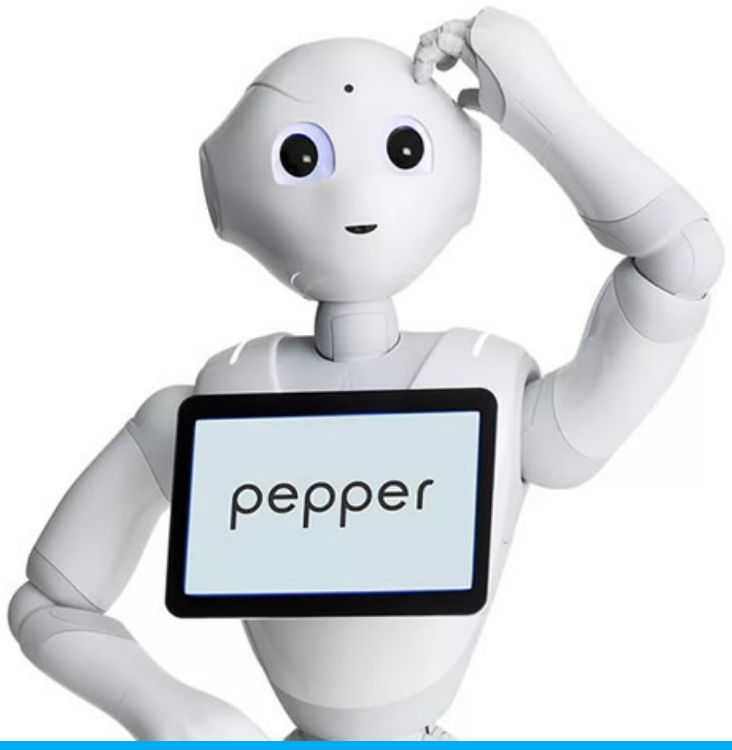
The effects of available complexity in verbal commands on robot imitation task performance and user satisfaction

J.M. Folmer



TU Delft

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by

J.M. Folmer

to obtain the degree of Master of Science
at the department of Mechanical Engineering
of the Delft University of Technology,
to be defended publicly on August 27, 2020 at 10:30 A.M.

Student number:	4117387
Master Track :	BioMechanical Design
Specialisation:	Biorobotics
Thesis committee:	Dr. ir. D.J. Broekens
	Prof. dr. ir. D.A. Abbink
	Prof. dr. M.A. Neerincx

TU Delft

IR

Nomenclature

Abbreviation	Description
ANOVA	ANalysis Of VAriance
API	Application Programming Interface
CNN	Convolutional Neural Network
DH-parameters	Denavit-Hartenberg parameters
GUI	Graphic User Interface
HRI	Human Robot Interaction
NLP	Natural Language Parser
RRT	Rapidly-exploring Random Tree
SD	Standard Deviation

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J.M. Folmer, *Cognitive Robotics, Delft University of Technology*, Delft, The Netherlands

***Abstract*—Programming robots with verbal commands is limited by the capabilities of the utilized natural language parser. A simple natural language parser which can understand only keywords and small phrases may be easy to use, but limited in what it can interpret and convey. Alternatively, a natural language parser which understands more complex commands can be used to convey more nuance, but can be more difficult to use and create. It is unclear when having complex verbal commands available is preferable to having only simple verbal commands available. Here we show that using natural language parsers which understand more complex commands are preferable when teaching a robot, both in terms of user preference and objective metrics such as completion time and accuracy, but only when the task is complex as well. During a preliminary wizard of oz experiment, we observed what types of phrases users use to correct the robot during a pose imitation learning task, in order to create multiple natural language parsers which allowed for different levels of complexity in given verbal feedback. In a follow up experiment, in which 24 users utilized these parsers in a similar task, the users reported finding the more complex ones to be more useful and satisfying to use. Additionally, the more complex parsers also led to a higher objective similarity between the pose that the user wanted to convey and the final attained pose by the robot. However, this last result was only found for poses which required a comparably high effort on part of the user.**

***Index Terms*—man-machine interaction, natural language parser, humanoid robot, pose imitation**

I. Introduction

In the recent past, the role of robotics in the workplace has increased tremendously. Whereas robotics used to be restricted to roles within industrial factories where interaction with the machines was limited, they are now rapidly being adopted into fields that require more direct engagement between user and robot. These fields include medical care [1], education [2], service industries [3] and rescue robotics [4]. Some experts even predict that by 2030, robots will make up about 25 per cent of the ”workforce” in the hospitality industry [5]. As the number of fields and tasks that incorporate robotics increases, so too does the number of people that have to work directly with them.

A known bottleneck in the widespread adoption of robotics by the general populace is the substantial technical skill needed to program behaviours, even if said behaviours are performed easily by humans, like simple movements and object recognition. Typically, such behaviours are programmed and controlled through a form of programming interface, which is time-consuming and requires dedicated robotics engineers [6]. Unfortunately, many real-life tasks involve goals that are complex, poorly defined or hard to specify when coded [7]. It is not feasible to have every new behaviour coded by a robotics engineer in the case of wide-spread adoption. In order for robotics to be adopted in unfamiliar fields, they must therefore be able to adapt to new situations and environments. Robots need to be able to learn new behaviours or use behaviours in novel ways.

A possible solution to this problem is to give the robot the ability to learn through imitation, which enables it to be taught by non-expert users [8].

A. Related work

Imitation learning, also known as apprenticeship learning and learning by demonstration, is a means of developing new skills from observing these skills performed by a teaching agent, which is either a person or another robot [9]. During a teaching phase, the teaching agent demonstrates an execution of a task. The learning robot observes how this is done and attempts to replicate the execution of the task, by learning a policy. The learner should then be able to execute the demonstrated task by itself, reproducing what it was taught during the learning phase. If the task varies to a degree from what has been shown, it should be able to find an approximate solution, based on the examples that were shown. The learner can do this by starting the search for a solution to the task at hand from an observed good solution, or conversely, by eliminating from the search space all observed bad solutions.

Examples of successful imitation learning in robotics include teaching an RC helicopter to fly based on expert demonstrations [10], teaching a robotic arm to predict desired behaviour in a teleoperation task [11] and teaching the locomotion of a quadruped robot [12].

Imitation learning is meant to be a natural way to transfer skill from a demonstrator to a robot such that explicit and tedious programming of a task by a human user can be minimized [13]. Previous research suggest that combining speech and gestures is a natural way for humans to communicate [14], because both are used in conjunction by humans when describing tasks, one providing meaning to the other [15]. Conveying information in this way is part of

the natural language domain.

A natural language is any language that has evolved in humans through use and repetition without conscious planning or premeditation [16]. This includes both verbal speech as well as gestures that indicate intent, such as holding your palm outward towards someone as an indication that that person should stop. Humans are very good at interpreting natural language cues, due to being exposed to it from birth. Even interactions that combine multiple forms of communication are very common, such as a dance instructor demonstrating a dance move and subsequently giving verbal corrections when the student attempts the movement themselves. In Scheutz et al. [17], it was proposed that for a Human-Robot Interaction (HRI) to feel natural, the robot in question must be able to interpret these natural language cues. An important challenge in this regard is the interpretation of verbal instructions of a human by a robot.

In order for a robot to learn how to interpret verbal commands, it must first be equipped with a verbal Natural Language Parser (NLP), which translates spoken sentences to instructions that it is able to execute. One of the major challenges to overcome in HRI with verbal communication is the problem of shared vocabulary [18]. Shared vocabulary is the language that both the user and robot must comprehend in order to communicate. In other words, the human must know what language the robot does or does not understand, and how the robot responds to this language.

A way to minimize this challenge is to restrict the commands that a user can give to a predefined list of keywords and short phrases. With such a system, users do not have to remember a large vocabulary of interactions. In certain HRI tasks, this may be sufficient and even preferable, such as with verbal interaction with smart homes [19], [20]. With respect to this task, it was found that users, when given the option to use commands of any length, tended to go for short commands based on keywords rather than long sentences. This also further minimized known NLP problems such as ambiguity in task explanation and difficulty with complete sentence detection. Related research in communication between humans and robots also found that humans were effectively commanding robots with the use of simple commands in more industrial environments [21], [22]. However, a drawback of these systems is that the complexity of behaviours that can be taught to a robot is directly limited by what preprogrammed behaviours are linked to the keywords and short phrases.

Other approaches to the shared vocabulary challenge have gone in the opposite direction, attempting to create NLPs that can understand both simple commands and full sentences, such as with robot navigation [23], the conveying of tasks to robots [24], GUI control [25] and helpdesk chatbots [26]. Whilst these approaches do provide a system which is better at interpreting unexpected commands, shared vocabulary still remains a problem. An inexperienced user will not know how the robot will react to instructions, or what instructions are even understood by the robot, perhaps even going so far as to not be able to utilize the full range of commands available. Such an advanced system also costs an increased amount of time and resources to fabricate, such that it becomes less feasible.

In Mavridis (2015) [27], a non-exhaustive list of desiderata are proposed for a conversational robot that can have fluid communication with humans. Many of these desiderata have proved too difficult to program for, such as situational language and learning to connect symbolic language with commands. Furthermore, any combination of setting and robot may have different requirements for an NLP, which may run into further techno-economic constraints as complexity increases.

Verbal NLPs in HRI tasks thus run into a trade-off. Creating a verbal NLP that can only understand basic commands is relatively cost efficient, due to its low complexity. However, these have the problem of being limited in what they can understand, which reduces their functionality. On the opposite side, creating a verbal NLP which can understand full, natural sentences is more difficult, but results in a more natural interaction. However, this creates higher expectations of the system as well, which may lead to a disappointing user interaction.

In order to better understand what level of verbal complexity is desired in HRI tasks, we must look at examples of how humans give instructions to robots if given the freedom to speak in any way they wish. For this, we can look at a dataset created by Scalise et al. [28]. Using amazon mechanical turk [29] as their environment, they presented test participants with a situation in which an image of a silhouetted robot or human was sitting in front of a pile of different colored blocks on top of a flat surface. The participant were then tasked with pointing out a specific colored block (indicated by a hovering red arrow) for the robot to pick up, by writing down a command as if they were giving verbal instructions. Using this method, 1582 natural language instructions were collected for 28 different situations in order to create a publicly available dataset. This dataset was further paired down by removing the invalid responses and taking a random subset of 1400 instructions, 50 for each situation. An evaluation of this dataset reveals that test subjects can use wildly differing commands when describing the same desired action.

II. Research questions

A. Objective and Contribution

As mentioned before, much research has been done in allowing robots to better perceive and parse natural language cues such as verbal commands, gestures and poses. This enables the creation of more complex NLPs and more natural language interactions. However, creating such NLPs runs into techno-economic constraints due to their complexity and the

time it takes to properly fit an NLP to a specific robot-task combination. Less research has been done on whether having complex verbal commands available in an HRI task is even preferred as opposed to having only basic verbal commands available and how this depends on the task.

The objective of our study is to find out what the effect of increased complexity of available verbal commands is on user satisfaction and task performance in a multi-modal pose imitation learning task performed on a humanoid robot.

Thus our research is split up into two distinct parts:

- The first part is a wizard of oz experiment in which we record the verbal interactions between user and robot during a simple pose imitation task. We do this in order to determine what constitutes a ”more” or ”less” complex command and what users choose to use when interacting with a real life robot. In Section III-A1, we discuss a categorization of different types of complexity that users used in an HRI study [28], so we can define what is a ”more” or ”less” complex command.

- The second experiment involved a similar pose imitation task, but utilizing 3 sets of NLPs which will be able to comprehend multiple levels of complexity, created based on the results of the first experiment. We use these in order to find out what the effects of the different levels of complexity in verbal commands are on task performance and user acceptance.

III. Experiment 1 : Wizard of Oz experiment

In order to determine what the effects, if any, of being able to give more complex verbal commands are on task performance and user satisfaction, we must determine what types of verbal commands people give when interacting with a physical, humanoid robot. In order to do this, we carried out an experiment in which we asked participants to perform a pose imitation task followed by the option to give corrective verbal commands. We recorded these verbal interactions, in order to determine what level of complexity to include in our NLPs during the rest of the study.

This chapter is organized as follows. First we will be discussing the methods and materials we required to perform the experiment. Second we will discuss our experiment setup and procedure. Finally we will discuss our results.

A. Method and materials experiment 1

In this section, we will first discuss our classification system of what constitutes added complexity in verbal commands. After this, we will discuss the materials we used during the first experiment, including the pieces of software that had to be created to make the experiment possible.

1) Taxonomy of commands in an HRI-task: As previously discussed in Section I-A, when we look at the commands that users gave during the experiment described in Scalise et al. [28], the specific word choice of the users could vary drastically when describing the same desired action. We have assessed the dataset that resulted from this experiment by deconstructing all of the given commands into sub parts which fall into overarching categories. We describe our categorization and give examples in the following list.

Noun and direction This was the simplest form of commands given, in which the participant indicated a specific limb and direction that limb should go towards. An example of this would be ”Move your hand forward”. All other categories described below were used to further clarify and specify a command.

Magnitude An indication of the desired size of a movement or distance that a designated object is. In the dataset, this was indicated by users using phrases such as ”very much” or ”a little”.

Body relative References to parts of the body and their relation to each other and to the environment. These can be phrases such as ”put your arms by your side” or ”the block closest to your left hand”.

History dependent These are the commands which have references in them to previously made instructions. They take the form of sequential commands, when a user subdivides a major task into several smaller tasks. Instead of saying ”Point your hand towards the left side of the table”, they would say say ”First stretch your arm, then rotate your elbow joint to the left and finally extend your hand”.

Comparisons To have the robot copy the posture of one limb to another or to copy a movement of the user, by using a comparison. They might say “Bend your left arm like your right arm” or ”I will guide your hand to the desired position”.

Common phrases in nomenclature These are the colloquialisms that humans use in every day conversation when describing movement or locations. Phrases whose intent is immediately obvious to other humans, but whose meaning can be ambivalent to a robot. Such phrases include “Cross your arms”, ”reach out with your hand” and “slouch over a little”.

References to the environment References to objects and spaces in the surroundings of the robot, such as “Point to that chair with your left arm” or ”The block near the edge of the table”.

In Table I, a few examples are given on how the instructions recorded in the dataset from Scalise et al. [28] were deconstructed to come to this subdivision of additional complexities in a HRI task. It should be noted that whilst the dataset does give a clear indication of how varied the instructions of users are in this particular HRI task, it is only about a single type of task, which was simulated in a GUI environment instead of in a real life scenario. There is no guarantee that humans would communicate in the same ways

when given a different HRI task with a physical robot.

2) Robot platform: The hardware platform that was used in our experiments is the humanoid robot Pepper [30]. Pepper is a commercial robot created by Softbank Robotics (formerly known as Aldebaran Robotics), available for public purchase. It was designed with an emphasis on interaction with humans as opposed to physical tasks. It has been employed as, e.g a receptionist [31] and a tour guide in the Smithsonian [32]. It has an anthropomorphic design, lacking only legs. The research will restrict itself to imitating the arms and both torso pitch and roll of the user. Because the Pepper has a broad base and only moves its upper body, stability will not be an issue or discussed in this research. The proportions of the limbs of the Pepper are similar to that of a human, but not an exact match. The Pepper will be able to imitate most simple poses, but due to restrictions in joint rotations, it will almost always be an approximation of the users pose. The Pepper robot was running NaoQi version 2.5.5.5.

3) Computer specifications: All computation and interpretation of sensor data from the robot is done on a separate laptop. This laptop has the following relevant specifications :

Product name HP ZBook 15 Mobile Workstation
Operating system Windows 10 home 64-bit
Processor Intel(R) Core(TM) i7-4700MQ CPU 2.40GHz
RAM 8.00 GB

B. Pose similarity

In this section we will describe how we determine objective pose similarity between the pose we wish to convey to the Pepper and the pose the Pepper attains after interacting with a user.

In order to find a measure which describes the similarity between the Pepper robot and the pose we have selected, we must first define what "similar pose" means in this context. During this study, the Pepper will attempt to imitate a pose using both of its arms and its torso. This means that its entire pose can be subdivided into 5 different limb-segments, namely the upper- and lower-arms on both sides and the torso. An individual limb-segment can be represented as a single straight line between two 3D points, the origin and the end-effector. For example, with a forearm, the origin would be at the elbow, and the end-effector would be at the hand.

When we wish to compare the orientation of a particular limb-segment between pose 1 and 2, the metric we use for similarity is calculated using the following formula :

$$sm_{limb} = 1 - \frac{mean(|\theta_{x1} - \theta_{x2}|, |\theta_{y1} - \theta_{y2}|, |\theta_{z1} - \theta_{z2}|)}{65}$$

where θ_x, θ_y, θ_z are the angles in degrees that their respective limbs make with the positive direction of the x-, y- and z-axis of the global axis system respectively. The value in the denominator normalizes the similarity metric between 0 and 1, where 1 represents an exact match between two limbs and 0 represents least similar. Some examples of the the similarity metric between two limbs with the same origin but different end-effector locations are shown in Figure 1.

Using this similarity metric between two limb segments, we can obtain a metric for similarity between two poses that we wish to compare, by comparing each of the five limb-segments that comprise a pose to their counterpart. This results in five limb segment similarity metrics, of which we calculate the mean to come to an overall metric for pose similarity. Because each individual similarity metric for the limbs is between 0 and 1 and we calculate the mean between them, the values for the pose similarity metric will also be between 0 and 1.

We will use this measure of similarity to evaluate how similar the pose we want the Pepper to have is as compared to the pose that the Pepper actually has. In order to do this, the joint locations of the pose we want to convey should be known to us. For this, we will be using information from the TotalCapture dataset [33].

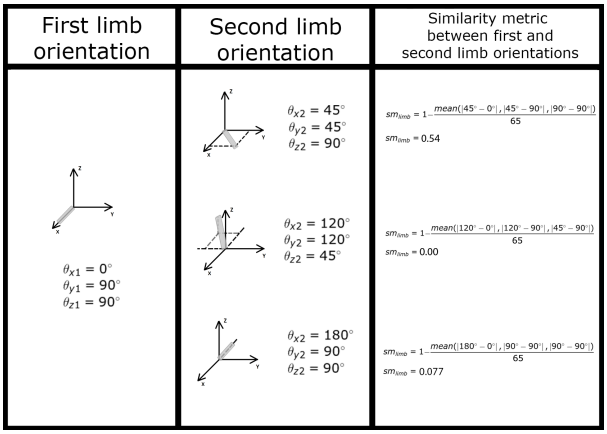

Fig. 1. Examples of how the similarity metric is calculated between two limb-segments with the same origin but different end-effector locations

C. 2D image to 3D pose estimation

The first part of this experiment is the Pepper robot imitating a pose that has been demonstrated by the user. The following section explains the steps taken to translate a single 2D RGB image that the Pepper obtains from its forehead camera to a series of joint rotations that best approximate the demonstrated pose on the Pepper.

1) 2D-skeleton extraction: The basis for pose estimation will be an image taken by the Pepper using its forehead camera. The 2D-skeleton is extracted from the image by detecting 18 points of interest, henceforth referred to as keypoints, which include the shoulders, elbows and wrists for both arms, hips, knees and ankles for both legs and several facial features such as the eyes. It does this by using a pretrained model taken

Instruction	Added complexities
Pick up the yellow block.	Simplest form of instruction, no additional complexities
Please pick up the green block that is positioned closest to you, slightly to your right.	- ”slightly” –>Magnitude - ”closest to you”, ”to your right” –>body relative
Find the two green blocks that are sitting together and touching each other. Pick up the one on the left.	- ”sitting together” –>nomenclature - multiple consecutive instructions –>History dependent
Grab the green block that is in the middle of the blocks and close to the bottom of the table	- ”middle of the blocks”, ”bottom of the table” –>references to environment
Come around to my side of the table, and pick up the blue block that is second closest to me	- ”second closest” –>magnitude and nomenclature - ”my side of the table”, ”closest to me” –>Comparison - ”side of the table” –>reference to environment

TABLE I
EXAMPLES OF DECONSTRUCTION OF INSTRUCTIONS FROM THE MECHANICAL TURK DATASET [28]

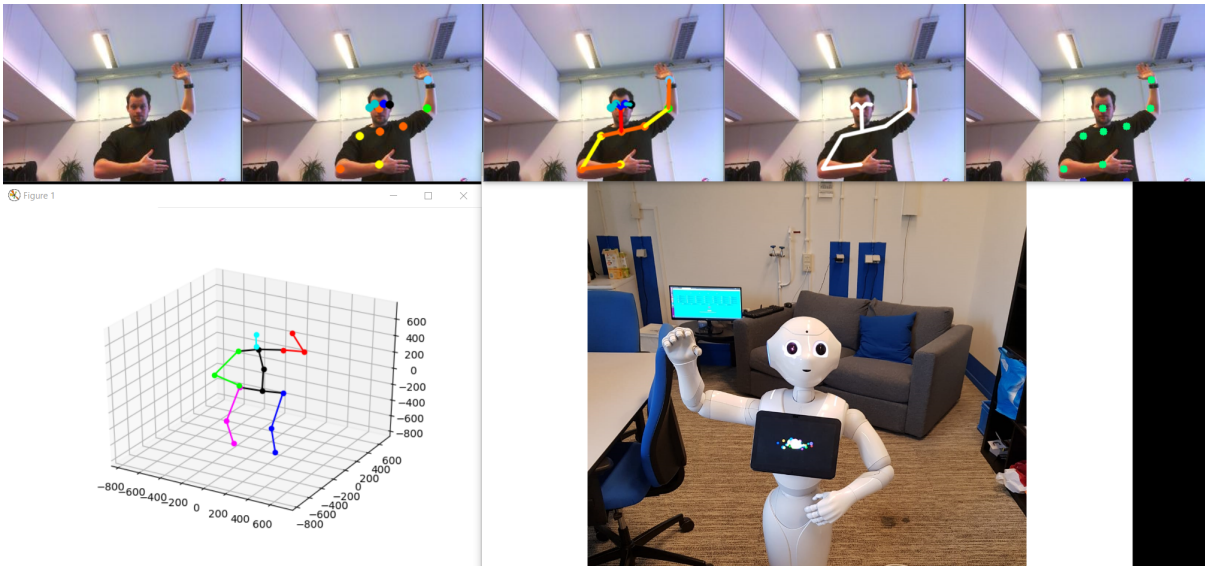

Fig. 2. From top left to bottom right : the initial image taken by the pepper, the detected keypoints, the creation of limbs from the keypoints, the filter to create one person, the return to keypoints and creation of missing keypoints, the estimated 3D skeleton data and the pose that the Pepper takes

from Cao et al. [34], which was trained on the COCO dataset [35].

The visible keypoints, i.e. those that aren't obscured or out of frame in the image, are connected together to form limb segments. For the purposes of 3D pose imitation during this experiment, we are only interested in the keypoints and limb segments related to the head, shoulders, elbows, wrists, and hips. These will be referred to as relevant keypoints and relevant limb segments.

2) 2D-skeleton to 3D-skeleton: For 3D-pose estimation, we use another pretrained model taken from Tome et al. [36], which accepts input in the format of a COCO pose model, which consists of the coordinates of 18 unique keypoints. This means we require a filter on the extracted relevant keypoints in order to be able to pass them on.

This filter consists of two parts. The first is clustering relevant keypoints and limb segments together based on proximity to each other, after which we select the largest cluster to proceed with, all others are discarded. We do this in order to filter out any false positives that have been detected and, in the case of multiple people being visible, select the one that is most prominent.

The second part is making a list of all missing relevant keypoints that we require to pass it on to the second model. The location of these non-visible keypoints is calculated in relation to the location of those that are visible.We are then able to pass this 2D-skeleton on to the pretrained model taken from Tome et al. [36], and receive as output a 3D-skeleton, which we can use to get an estimate of the joint angles for the Pepper.

3) Joint angles on the Pepper: The Pepper approximates the pose using 10 angles in its arms and torso. There are 4 joint rotations in each arm, the shoulderroll, shoulderpitch, elbowroll and elbowyaw. Additionally, there are two angles that can cause the torso to lean, the hiproll and the hippitch. Because these joint rotations of the Pepper are not the same as the joint rotations of a human, a mapping is needed between the estimated angles in the 3D-skeleton and the angles that get send to the Pepper in order to have it imitate the pose.

We achieve this by first using a grid search with a large step size to find a decent approximation of the pose

that the Pepper can achieve, followed by an implementation of an RRT-algorithm to further refine the pose until we find the best approximation. Combining the grid search and RRT algorithm produces fast results and avoids local minima when finding the optimal solution. A pseudo-code explanation of the process can be found in Algorithm 1.

In order to translate joint angles of the Pepper robot to xyz-coordinates of the relevant joints, we use the Denavit-Hartenberg convention [37], [38] (henceforth referred to as DH-parameters) with which we can describe the way the arms of the Pepper move. These DH-parameters can be found in table II.

	θ	d	a	α
1	-shoulderpitch	0	0	$\frac{\pi}{2}$
2	shoulderroll	0	upperarm length	$\frac{\pi}{2}$
3	$\frac{\pi}{2}$	0	0	$\frac{\pi}{2}$
4	elbowyaw - $\frac{\pi}{2}$	0	0	$\frac{\pi}{2}$
5	$\frac{\pi}{2}$	0	0	0
6	-elbowroll	0	0	lowerarm length

TABLE II
THE DH PARAMETERS OF THE PEPPER ROBOT ARMS

In Figure 2 you can see the entire process from initial image to the pose that the Pepper assumes. The quality of the assumed pose, which is the similarity between it and the desired pose, varies. This is partly to do with an embodiment problem, where the Pepper is physically unable to imitate the pose exactly due to joint limits, such as a user touching their shoulder with their wrist.

Additionally, because the estimation is based on a single 2D image, there are no depth markers. This manifests predominantly as miscalculations of the locations of keypoints along the median plane. For example, the Pepper can mistakenly believe that a person is leaning backwards or forwards, when they are in fact standing up straight.

Because of these factors, the assumed pose is very often an approximation and can be improved upon. During the experiment, the participants will be able to correct the pose via verbal commands, to make it more representative of the pose that they demonstrated.

D. Pose alteration GUI

In order to perform the first experiment, we developed a way to quickly alter the joint angles of the relevant limbs based on commands that the test participants gave. Figure 3 shows the GUI that was created for this purpose.

E. TotalCapture dataset

During the experiment, the participant is given several separate sets of 8 images, taken from the TotalCapture dataset

Data:
P1 = The xyz-coordinates of a pose
X = list of all available combinations of joint angles, with large step-size
Result: A list of joint angles that constitute the best approximation by the Pepper of P1

Translation of P1 into global axis Pepper;

```
/* Grid search                                  */
P2 = [] /* Best pose approximation              */
for angles ∈ X do
    P3 = angles_to_xyz(angles) ;
    sm1 = similarity_metric(P1,P2);
    sm2 = similarity_metric(P1,P3);
    if sm2 > sm3 then
        P2 = P3;
    end
end
/* RRT-search                                   */
k=0;
repeat
    P3 = P2 + random alteration;
    sm1 = similarity_metric(P1,P2);
    sm2 = similarity_metric(P1,P3);
    if sm2 > sm3 then
        P2 = P3;
    end
    k+=1
until abs(sm2-1)<0.1 or k>1000;
angles_list = xyz_to_angles(P2)
```

Algorithm 1: An algorithmic explanation to find the best approximation to a pose that a Pepper can attain

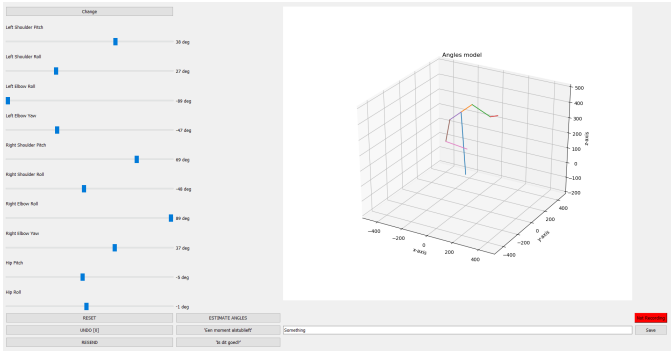

Fig. 3. The GUI environment used in the first experiment, which included sliders for each joint angle and the ability to have the Pepper say short phrases.

[33]. These 8 images are all taken of the same subject holding a particular pose, but from different angles, which allows the participant to properly observe the pose. It is this pose that they will then be asked to transfer upon the Pepper.

Not all poses that are possible for humans are attainable by the Pepper, so we first translated the kinematic data

from the TotalCapture dataset [33] to a pose which most closely resembles it and is achievable by the Pepper. To do this, we use the same process described in section III-C3. In Figure 4, you can see the pose that was found for the Pepper which has the highest pose similarity metric between it and the 3D-skeleton data from the TotalCapture dataset [33].

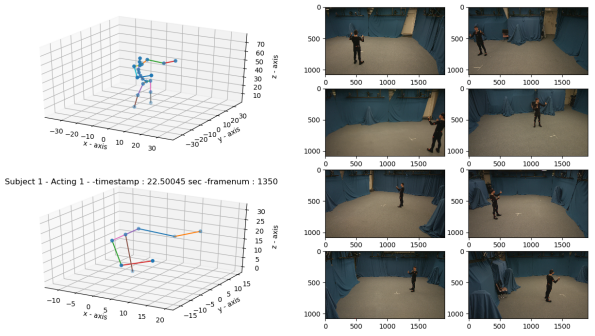

Fig. 4. Right side : 8 images taken from the video data from the TotalCapture dataset [33]. Upper left side : the 3D joint positions from the same timestamp as the 8 images. Lower left side : The 3D pose that the Pepper could have that has the highest possible pose similarity metric

The chosen poses from the TotalCapture dataset [33] are ones that the Pepper is physically able to imitate closely, so that it is possible for participants to successfully complete the task. This means the chosen poses have a value close to 1 when calculating the pose similarity metric, as described in Section III-B. In Figure 5 we show the scores that were found for the poses that we used. In Figure 6, the best approximations of the Pepper robot that correspond to these scores are shown. We classified the poses as low-, medium- and high difficulty, due to the respective effort of the participants that each pose imitation task took during the experiment.

F. Experiment setup

1) Participants: 16 participants (7 female and 9 male) with a mean age of 24.06 years (SD =2.51 years) participated in the study. Their reported familiarity with robotics had a mean value of 2.69 (SD = 1.49) of a possible value between 1 and 7 (1 = not at all familiar, 7 = very familiar with robotics). All participants were native dutch speakers. The participants were given the option to use either English or Dutch when conveying their commands, all of them chose to give commands in Dutch.

2) Experimental design: The experiment consists of a pose imitation task, performed 3 times by each participant. Each time, the participant will be asked to transfer a unique, predetermined pose taken from the TotalCapture dataset [33] upon the Pepper robot. These poses were described in section III-E. Which of the poses the participant has to convey is the only differentiating factor during the 3 separate times that the participant has to do the pose imitation task. The order in which the participants got these sets of images was the same for everyone.

The pose imitation task has 2 distinct phases, a visual imitation phase and a corrective verbal feedback phase. At the beginning of the pose imitation task, the participant is given one set of images that convey a pose that they must transfer unto the Pepper robot.

When the participant has had time to observe the pose depicted in the images and confirms they are ready, the first phase starts. The participant must stand in front of the Pepper and assume this pose, after which the Pepper takes an image of them and attempts to approximate the pose shown by the participant. The procedure for this is described in Section III-C. After the pepper is finished moving, the first phase is concluded.

During the second phase, the participant is instructed to give verbal commands to correct the pose of the robot to better approximate the pose depicted in the given set of images. After each command, the Pepper robot alters its pose in accordance to the command. The users were informed that the robot is equipped with an NLP, which it was using to interpret the commands. Unbeknownst to them, it was actually the researcher that inputs any changes to the pose of the robot using a GUI environment described in Section III-D. The participant will continue to give commands until the pose of the Pepper approximates the desired pose shown in the images as best as possible. This concludes the second phase and the pose imitation task as a whole.

The experimental procedure is given by the flowchart in Figure 7. Prior to the experiment, each of the participants was given an information sheet that described the experiment, a consent form to read and sign and a personal information sheet on which they recorded some demographic information such as age, gender and their overall familiarity with robotics. Prior and during the experiment, the participants had time to ask questions about any parts that were unclear. There was no time limit given for them to complete the experiment.

3) Measurements: For each of the participants, we made an audio recording of the verbal commands that they gave during each of the rounds. The recordings were later transcribed and put into a single dataset.

G. Results

From the participants we have collected 306 verbal commands. One of the participants misunderstood the objective and gave verbal commands in an aimless fashion. This person's commands were excluded from the dataset and analysis.

Of the remaining 256 spoken commands, 6 were discarded because they were either instructions for limbs that were outside of the scope of what the Pepper could imitate, i.e. references to head and finger positions or wordless phrases such as "hmmmm". It is worth noting that, despite being explicitly explained to the participants before the experiments started that the participant did not have to alter the orientation of the hands and head of the Pepper, some did attempt to do this. It is an indication that an effective natural language

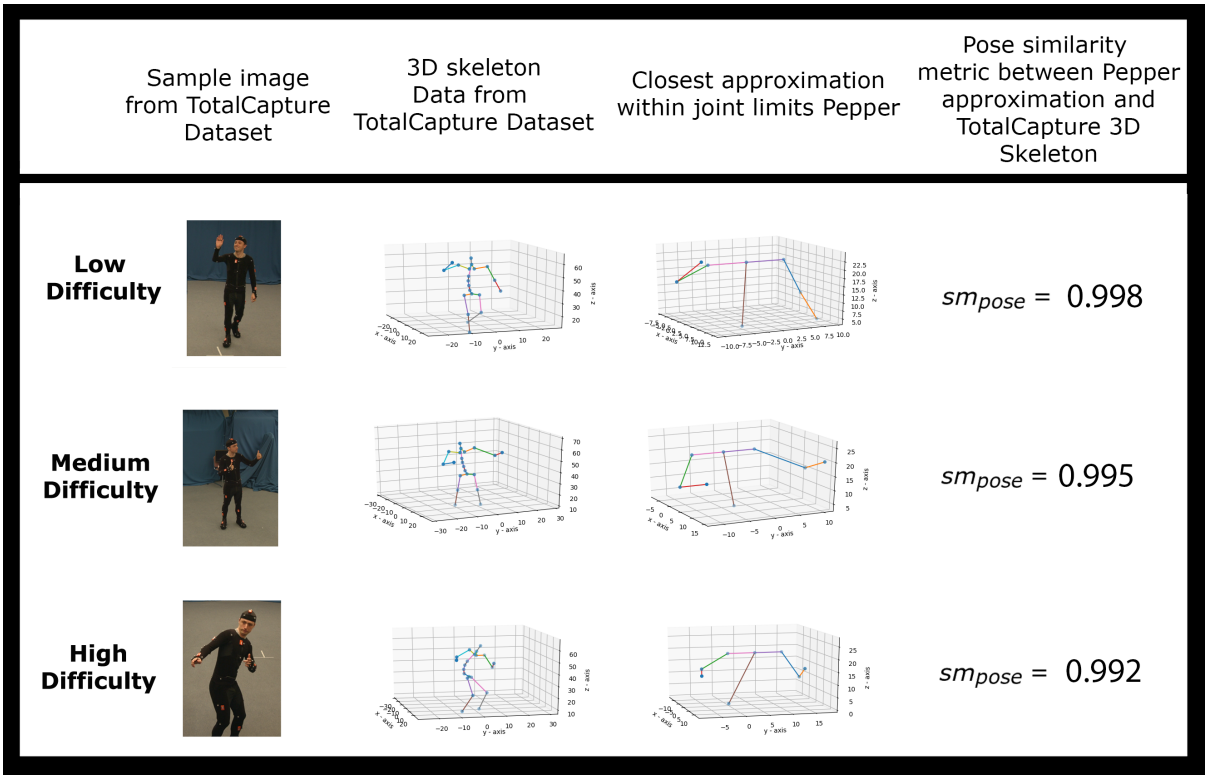

Fig. 5. From left to right : one of the 8 images taken from the videos at the same frame in the TotalCapture dataset, the 3D joint data from the TotalCapture dataset, the closest approximation that the pepper was able to find, and the similarity metric between the 3D joint data from the TotalCapture dataset and the closest approximation

parser should also be able to react to unsupported commands.

The 250 remaining commands were added to a dataset and deconstructed by the same method as described in Section III-A1.

Of the 250 commands, 45 of them consisted of only a reference to a limb and a direction. The remaining 205, consisted of at least 1 additional type of complexity in the command. Figure 8, shows the distribution of these additional types of complexities used in the verbal commands, spread out over the different pose imitation tasks, each of which had a different pose to transfer. We see that participants used references to 'Magnitude' most often, followed by references to 'History' as well as common phrases. Conversely, participants did not use the 'Comparison' and 'Environment' categories at all during the experiment, and 'Body relative' was used very little.

During the analysis of the commands given during the experiment, we noticed two forms of complexity given that we had not seen in the dataset from scalise et al. [28], namely reversals and rectifications.

Reversals mean that the user has uttered a command and after seeing its effect, decides that it is not what they wanted and thus seeks to return to the previous state. Some examples of these commands are "Go back" and "Undo".

Rectifications of previous commands are when the user has uttered an command that has produced an undesirable effect, such as when they specify the wrong limb or direction by accident. They might say something along the lines of "No, the other left arm" or "No, towards me". Alternatively, they may want to see an increased effect by saying something along the lines of "A bit more", if the previously given command has produced a movement which is too small.

The reason these did not occur in the dataset taken from Scalise et al. [28], is because in that experiment, the participants did not see the effects of their commands, as opposed to our experiment where each command had an immediate effect. Both reversals and rectifications are types of commands that reference previously made commands in some form, so both types have been categorized as references to 'History' in the analysis.

H. Discussion

In the previously discussed Scalise et al. [28], participants used (amongst other things) references to the environment, such as the table on which the colored blocks were placed. In the context of the first experiment, examples of commands that contain references to the environment are 'raise your left arm towards the ceiling' or 'bend towards the wall'. However, these weren't made by any of the participants during our experiment. Because the participants were explicitly told that there would be a visual imitation phase with a verbal corrections phase afterwards, it is possible that the users didn't think that using elements from the environment to clarify their commands was something the Pepper could

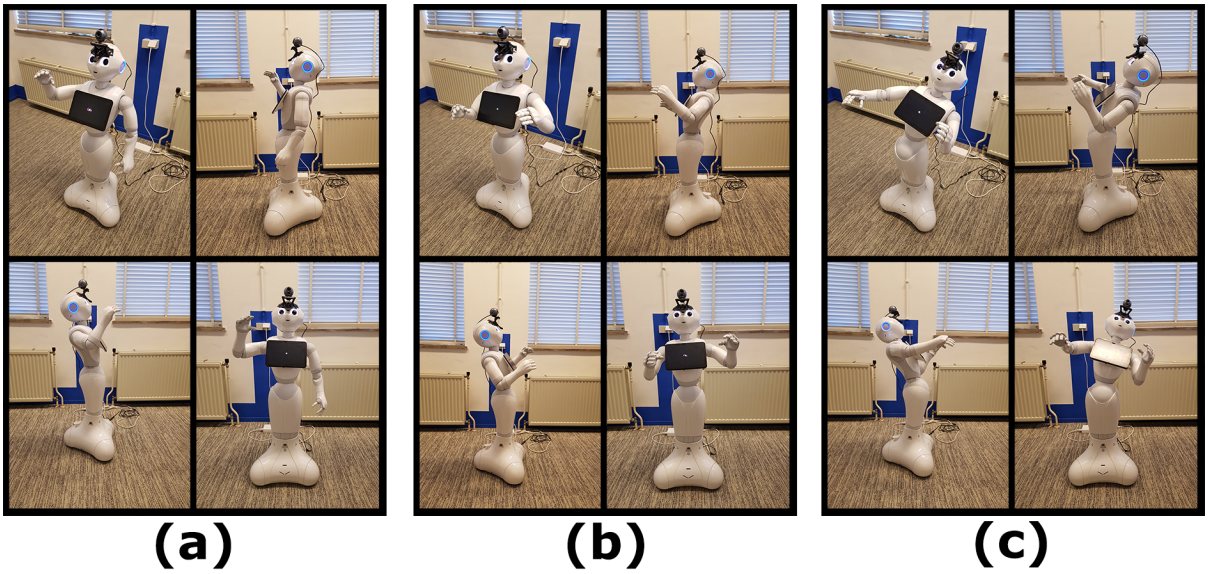

Fig. 6. (a) Easy difficulty, with a similarity score of 0.998 (b) Medium difficulty, with a similarity score of 0.995 (c) Hard difficulty, with a similarity score of 0.992

understand in that moment.

Commands that make comparisons are subdivided into internal comparisons referring to the pepper itself (i.e. 'bend your left arm like your right arm') and external comparisons referring to something outside the Pepper (i.e. 'bend your left arm like I'm bending my left arm). It is possible that participants did not use external comparisons for the same reason that they did not use references to the environment, i.e. the participant thinking that this was not possible. However, none attempted to use the internal comparisons either.

The goal of the first experiment was to ascertain what types of complexity are used in verbal commands during this human-robot interaction task, in order to use that knowledge to create different types of NLPs which can understand different levels of complexity. Based on the results of the first experiment, we have opted to create three NLPs, the first of which only understands 2 predefined words ("stop" and "no"), and the second and third of which understand phrases of different level of complexity.

The first of the NLPs that understand full phrases comprehends the most basic commands, which are references to limbs and directions. This NLP will be referred to as the Low Complexity NLP.

The second NLP that understands full phrases comprehends references to limbs and directions, as well as references to magnitude and history. This NLP will be referred to as the High Complexity NLP.

IV. Experiment 2 : effects of different levels of complexity on task performance and user acceptance

In the second experiment, we wish to determine what the effects are on task effectiveness and user acceptance, when using different levels of verbal complexity in commands. The following sections describe our setup for the experiment and discuss the results we found.

A. Hypothesis

It is hypothesized that : 1) the availability of complex verbal commands will lead to a significantly higher task performance than availability of lower complexity. 2) the availability of complex verbal commands will lead to a higher subjective user acceptance.

We believe these hypotheses to be true because being able to utilize more complexity in verbal commands will give the users more control over the task and how the robot operates, which should lead to better results if the users are able capitalize on it.

B. Method and materials experiment 2

Most of the materials used during the second experiment were carried over from the first experiment. In this sections we will discuss the changes to the robot platform and the created NLPs.

1) Robot platform: The robot platform and laptop used in the second experiment remain the same. However, due to a technical malfunction, we replaced the use of the forehead camera with a corded webcam with similar specifications, the logitech QuickCam Pro 5000 [39].

2) Natural Language Parser: During the second experiment, the participants will be able to correct the assumed pose of the Pepper by giving verbal commands. These verbal commands need to be translated to instructions that the Pepper can use, hence it needs to be processed by a Natural Language Parser (NLP). In this section we will be going over their technical implementation.

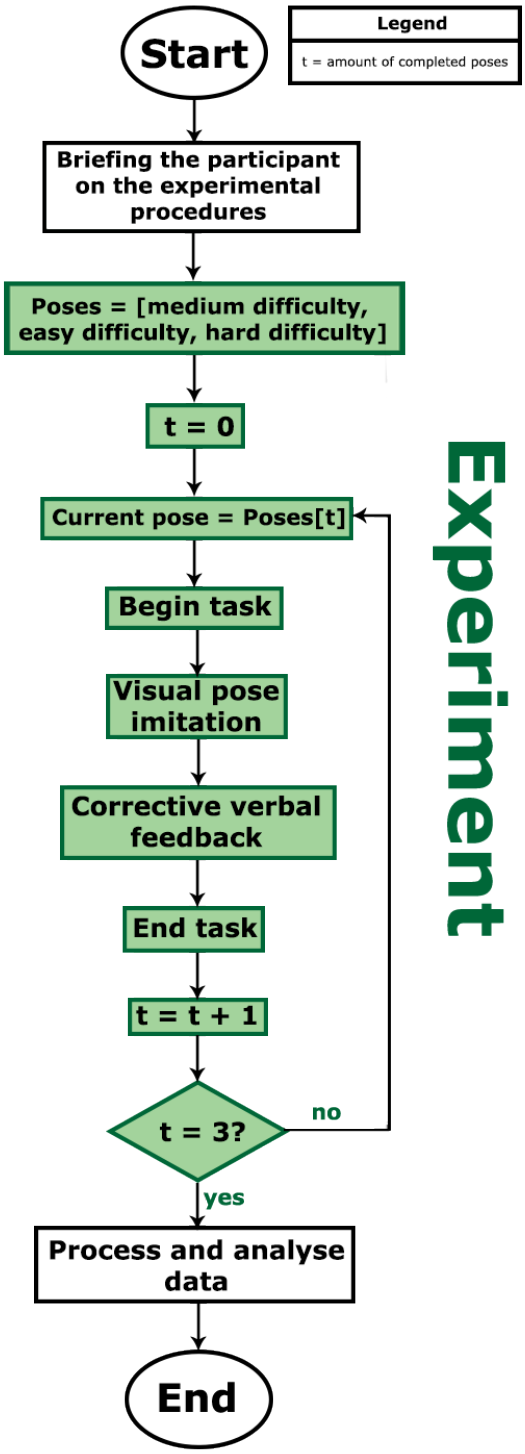

Fig. 7. Experimental design for the first experiment

The Pepper is equipped with a microphone that can stream audio. When a participant gives a command, the recorded audio is first checked for whether it contains speech. This is done using webrtcvad [40], which is a python module that allows for human speech detection in audio files. If speech has been detected, it gets send to the Google API [41], which returns a single string variable containing the transcribed command that the participant has given. This string is then parsed using an algorithm which we have developed that is partially based on the one proposed in Matuszek et al. [23].

We have created 3 different NLPs, the first of which is the Random condition, which only needs to understand the words ”No” and ”Stop”. If the user says ”No”, the Pepper will take a list of its current motor angles, and alter them slightly in a random direction, whilst staying within the limits for each motor. This will continue until the user says ”Stop”, at which point the round will end.

For the Low- and High complexity NLPs, we created several libraries of words that we match the individual words from a command to. These include libraries with words referring to specific limbs, to directions, to magnitude, and words referring to previously made commands. The words which were included in the libraries were taken from the dataset which was created from the wizard of oz experiment, in which participants gave verbal commands freely to the robot. In order to account for misunderstanding and unclear transcription by the google speech-to-text service [41], we included several words in the libraries which were commonly made mistakes during transcriptions, as well as a function that measures the Levenshtein distance [42] between transcribed words and the words in the libraries to determine whether they match.

The Low Complexity NLP understands references to limbs and directions, but nothing else. The transcribed command is split up into individual words, each of which gets checked against the different libraries. If a match is found within the Levenshtein distance [42], that word counts towards the action which is represented by that entry in that library. All words that do not match entries in any of the libraries are discarded.

For example, if the given command is ”Please put your left hand forward”, the first 3 words, ”Please”, ”put” and ”your” would not match any entries in the libraries and would be disregarded. Then the next two words, ”left hand” match an entry in the keypoint library which indicate that we are talking about the keypoint ”left wrist”. The last word, ”forward”, matches an entry in the direction library, which represents a movement in the positive x direction according to the global axis system. This command is thus interpreted as a command to move the left wrist in the positive x direction.

The High Complexity NLP understands verbal commands that make references to limbs and directions, as well as the additional categories of complexities ’magnitude’ and ’history’.

This NLP understands commands in a similar way as the Low Complexity NLP, where it matches separate words from the string which was returned by the Google text to speech

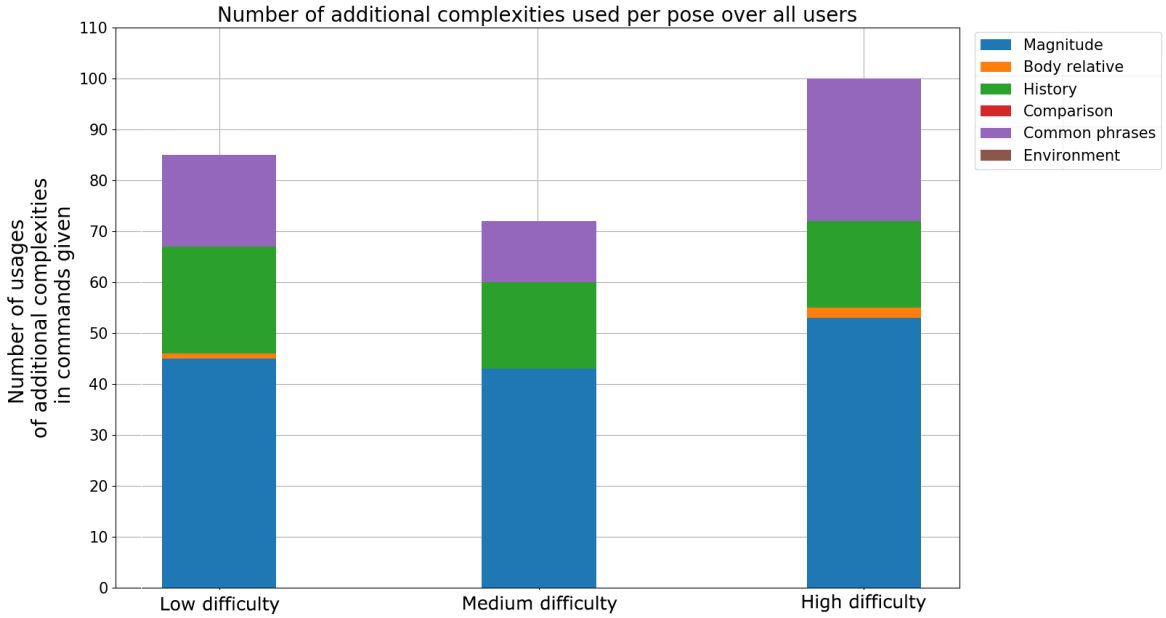

Fig. 8. Number of times a particular type of complexity was used for each of the different poses

API [41], but it additionally scans for words which match entries in the magnitude and the history libraries.

For example, if a command is transcribed as ”Move right elbow up a little”, then the words ”right elbow” and ”up” will match entries in the keypoint and direction libraries, same as with the Low Complexity NLP, and result in a movement of the right elbow in the positive z direction by a certain degree. However, the word ”little” will match an entry in the magnitude library which indicates a decrease in the size of the movement. Similarly, if a command is transcribed as ”back”, it will match an entry in the history-library, which will cause the robot to attempt to move its joints back to a previous orientation.

C. Experiment setup

1) Participants: 24 participants (9 female and 15 male) with a mean age of 26.0 years (SD = 6.65 years) participated in the study. Their reported familiarity with robotics had a mean value of 3.0 (SD = 1.72) of a possible value between 1 and 7 (1 = not at all familiar, 7 = very familiar with robotics). The participants had 2 different nationalities, 23 Dutch and 1 New Zealander. All of them were living in the Netherlands at time of the experiment. All reported to not have any form of colour-blindness and 1 reported to not be a native Dutch speaker.

2) Experimental design: During the second experiment, the participants were asked to perform a similar human-robot interaction task as in the first experiment. The difference is that the verbal commands that the users give will no longer be processed by the researcher through a GUI environment. There were 4 separate conditions to test our main hypothesis.

- Condition 1 = ”No NLP”, no corrective feedback after visual pose imitation.
- Condition 2 = ”Random”, participants performed the visual pose imitation task, and afterwards they were able to give verbal commands. If they give any command other than ”stop”, there are random alterations to the pose of the pepper. This continued until the participant gave the command ”stop”, after which the round ends. The participants were told that Robot alters its pose through an internal logic as opposed to purely random.
- Condition 3 = ”Low complexity NLP”, corrective feedback via verbal NLP that can parse references to limbs and direction, after visual pose imitation.
- Condition 4 = ”High complexity NLP”, corrective feedback via verbal NLP that can parse references to limbs and direction and 2 additional categories of complexities, namely references to magnitude and history, after visual pose imitation.

Condition 1 (”No NLP”) was added as a baseline, in order to compare it to other controllers which had a form of corrective control after visual pose imitation. Condition 2 (”Random”) was added to see if giving participants some sense of corrective control after visual pose imitation, as opposed to none in controller 1, would still lead to better user satisfaction and task performance. Condition 3 (”Low Complexity NLP”) and Condition 4 (”High Complexity NLP”) were previously discussed in Section III-H and were created to see what the effects are on task performance and user satisfaction of the availability of varying levels of complexity in the verbal commands they give.

Every participant repeated the experiment 4 times, once for each condition. The poses that were used during each pose imitation task were the same as in the first experiment, as

described in III-E, as well as an additional pose, which was any that the participant could think of that they wanted to transfer unto the robot.

The experimental procedure is given by the flowchart in Figure 9. The order in which the conditions were given to the participant were distributed so all 24 possible sequences were performed amongst the 24 test users. The order that the different poses were used was randomly selected at the beginning of each experiment.

Prior to the experiment, each of the participants was given an information sheet that described the experiment and a consent form to read and sign. The participants were not informed about the different conditions prior to the experiment in which they were utilized. At the beginning of each round, the participants were given information about the functionality of the robot as it applied to that condition and, in the case of condition 3 (”Low Complexity NLP”) and condition 4 (”High Complexity NLP”), were given a sheet of examples of verbal commands. Prior and during the experiment, the participants had time to ask questions about any parts that were unclear, and there was no time limit set on completing the experiment.

D. Outcome measures

1) Objective metrics: : In order to measure the extent to which the task was successfully completed, we used a metric for accuracy of the result and another metric for the effort it took the participant to achieve that result.

a) *Accuracy* : For each round that involved a pose taken from the TotalCapture dataset [33], we measured the accuracy using the similarity metric between the desired pose and the attained pose of the Pepper at the end of the round. This metric was explained in Section III-B.

b) *Effort* : For each round, we measure the effort it took the participant by recording the time between the visual pose imitation and the end of the round.

2) Subjective metrics: To analyze participant thoughts and opinions, the Van der Laan Questionnaire [43] is used. The Van der Laan questionnaire assesses the user acceptance of each of the 4 controllers that are presented in this study. The questionnaire consists of nine 5-point rating scales. These scales designate the usefulness and user satisfaction of the system. Usefulness reflects the practical aspects of the interactions in accomplishing the pose imitation task. Satisfaction indicates the fulfillment of one’s wishes, expectations, needs or the pleasure derived from this.

E. Results

1) Statistical analysis: All dependent measures have been analysed for the effects of command complexity task complexity using a (4x3) ANOVA.
Before performing statistical analyses, measures were checked for sphericity using Mauchly’s test. When the sphericity assumption was violated, Greenhouse-Geisser correction has been applied. Additionally, an exploratory correlation analysis

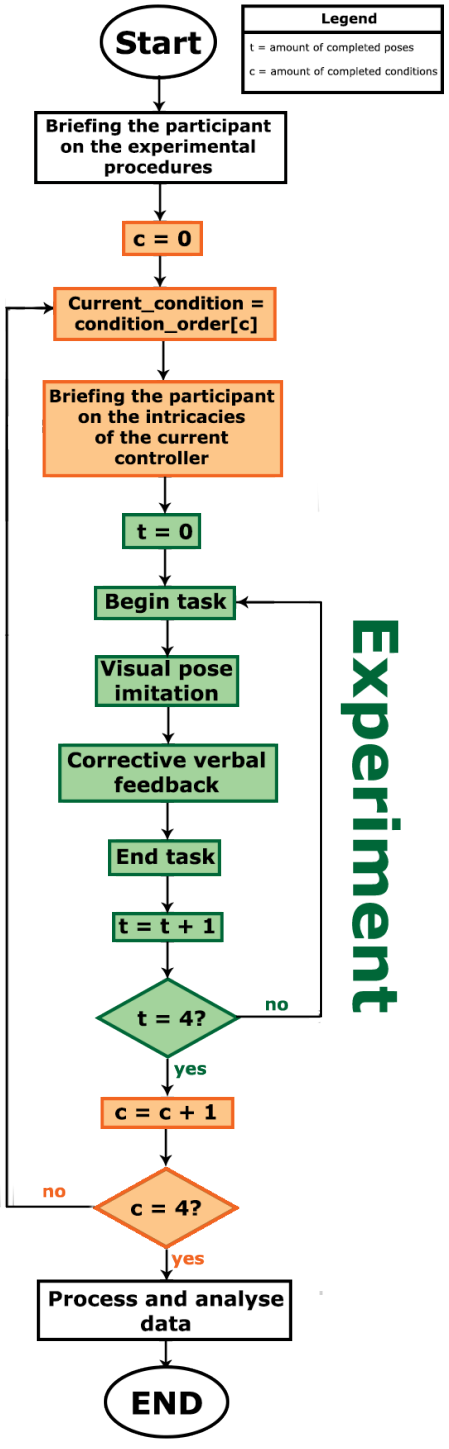

Fig. 9. Experimental design for the second experiment

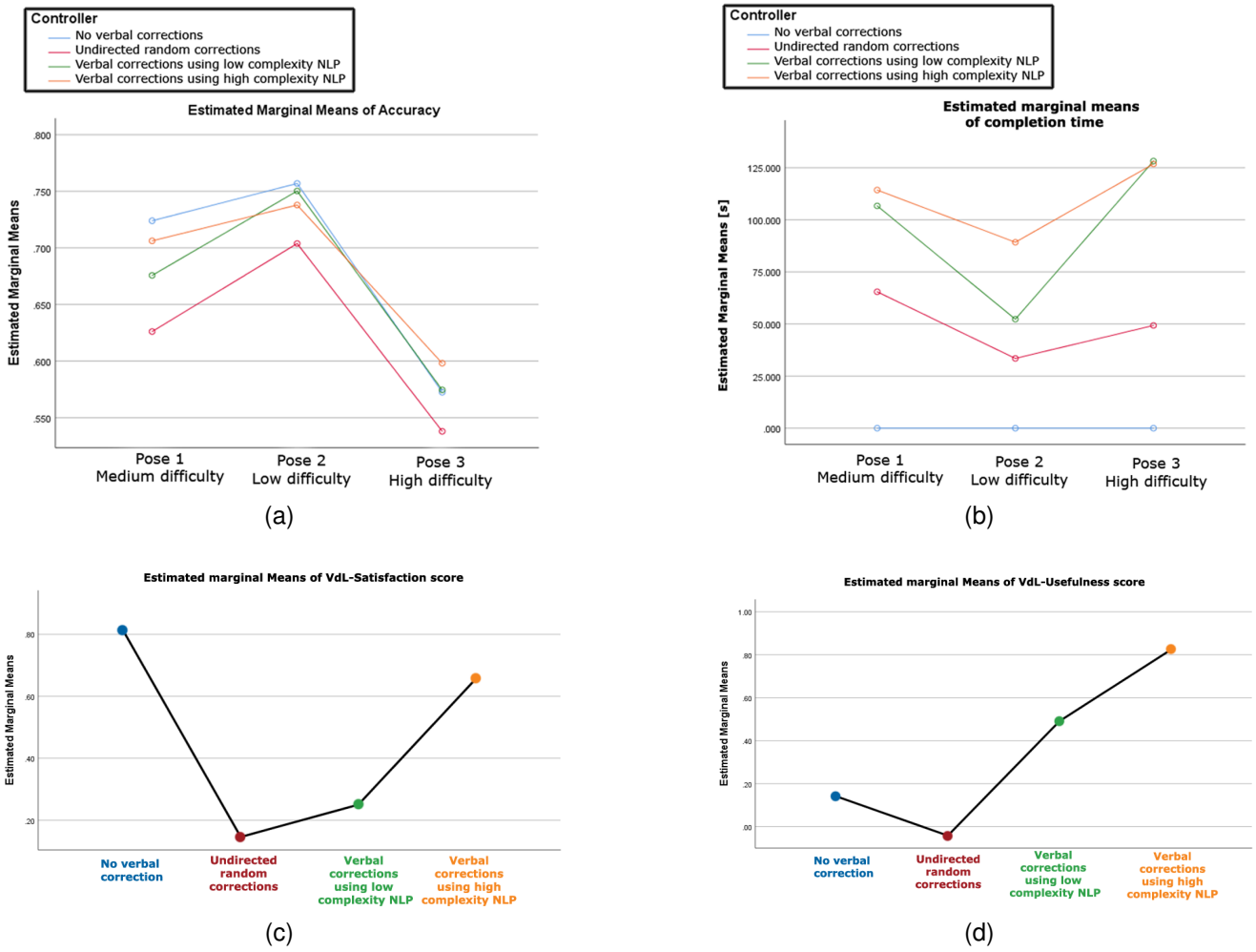

Fig. 10. The marginal means of the task completion metric data (a) accuracy (b) completion time and the marginal means of the subjective metrics (c) van der laan satisfaction score (d) Van der Laan usefulness score

was performed among individual participant characteristics, demographic factors and the dependent measures in order to find any unforeseen correlation.

2) Task performance metrics: When we looked at expended effort depending on controller, significant statistical difference was found between each of the different conditions, except between the ”Low complexity NLP” and the ”High Complexity NLP”, which showed no significant difference (p=1.000).

As can be seen in Figure 10b, the amount of effort each pose took, which we measure in terms of completion time of each round, we can see that 2 of the poses (medium difficulty and high difficulty) required more effort than the low difficulty and that the conditions which included some form of giving verbal commands required a higher effort than those that did not.

When further analyzed using pairwise comparisons, there was no significant difference for completion time between the ”Low Complexity NLP” and the ”High Complexity NLP” conditions for the medium and high difficulty poses (p=0.908).

If we look at the achieved accuracy for these two conditions and two poses in Figure 10a, pairwise comparisons show a statistically higher accuracy during the ”High Complexity NLP” conditions as opposed to the ”Low Complexity NLP” condition (p=0.015). This is in line with our hypothesis that having a higher verbal complexity available leads to a higher task performance, in the case of the tasks which require a greater degree of effort.

3) User acceptance: In Figure 10d, we can see that the conditions which had participants give verbal corrective commands (Low Complexity NLP and High Complexity NLP) were seen as more useful than the conditions which didn’t allow for this feedback (No NLP and Random). Pairwise comparisons also show a significant difference between the Low Complexity NLP and the High Complexity NLP (p=0.029), with participants finding the more complex NLP to be more useful.

In Figure 10c, we can see that the participants found the condition with no verbal corrections (”No NLP”)

and the condition with availability of high complexity in verbal commands (”High Complexity NLP”) to be the most satisfying to use. No statistical significant difference was found between these conditions (p=1.000). Pairwise comparisons also show a significant effect between the Low Complexity NLP and the High Complexity NLP (p=0.024), with participants finding the more complex NLP to be more satisfying to use.

4) Pearson's correlation matrix: An exploratory correlation analysis has been performed among the demographic factors and the dependent variables using spss [44]. We looked for strong, statistically significant correlations ($r \geq 0.60$, $p < 0.05$, N=24). Since (almost) all of the test users reported to be Dutch, native Dutch speakers, living in the Netherlands and to not have any form of colour-blindness, these demographic factors were left out of the correlation analysis.

There were strong correlations found for several combinations of completion time and other metrics, viewed in Table III. No obvious reason for these correlations was found.

For each of the different conditions, the usefulness and satisfying components of the Acceptance scale are strongly correlated with each other, but not with other variables. These can be found in Table IV.

No strong correlations were found between the final similarity scores achieved during any round using any controller and any other metric.

F. Discussion

Whilst our results support our hypothesis that having more complex verbal commands available leads to better task performance, we have found that this is only the case for the tasks that required a relatively high effort. For the task which required small effort, there was no significant difference found in achieved accuracy. This suggests that for simple tasks, simple commands suffice and there is no need to create systems which can understand a higher level of verbal complexity.

When looking at user acceptance, we found that there was a significant difference between how useful the participants viewed the ”High complexity NLP” as opposed to the ”No NLP” condition, where ”High complexity NLP” was seen to be much more useful. However, between these two conditions, there was no significant statistical difference in how satisfying they were to use. This suggests that having complex verbal commands available to the participant is preferable for user acceptance, because it gives them a sense of control without sacrificing ease of use.

1) Limitations of our research: a) *Homogeneous participant group*: Both experiments were performed with modest sample sizes, consisting largely of healthy adults in their 20's, most of whom where students or recently graduated from university or college, and all but one of whom were native Dutch speakers. Whilst their reported level of familiarity with robotics and gender were varied, it could be possible that other groups such as children or the elderly would act differently with the robot and would have different preferences.

b) *Limited speech-to-text functionality*: During the experiment itself, we have used the Dutch speech-to-text API of Google [41] in order to transcribe the spoken commands that users gave. We underestimated the varied ways in which the API would interpret the different test users, due to personal accents and cadence when speaking. Some commands were misinterpreted and had to be repeated louder and more clearly. This affects the conditions that involved speaking sentences (”Low Complexity NLP” and ”High Complexity NLP”) more, as opposed to the other two conditions (”No NLP” and ”Random”), which involved little to no speaking. It is possible this negatively influenced the satisfaction scores of the test users and would be more negated if we used the English version of the API, which some have suggested works better than the Dutch version. However, this was only hearsay and has not been tested during this study.

V. Conclusion and Recommendation

A. Conclusion

Programming robots with verbal commands is limited by the capabilities of natural language understanding. Our aim was to find out whether being able to give more complex verbal commands is preferable to only being able to give simple or no commands. After a preliminary wizard of oz experiment, in which 16 participants performed a multi-modal pose imitation task, we defined three levels of command complexity and created appropriate NLPs that understood these levels. We performed a follow up experiment, in which 24 participants performed a similar task and we measured task performance and subjective user acceptance. The users reported having more complex verbal commands available to be more useful and satisfying to use. Additionally, having more complex verbal commands available also led to a higher objective similarity between the pose that the user wanted to convey and the final attained pose by the robot. However, this last result was only found for poses which required a comparably high effort on part of the user.

This research illustrates that when in comes to tasks which require high effort on the part of the user, having a system with a higher natural language understanding that can comprehend more complex commands leads to a better result in terms of task effectiveness and user satisfaction. This suggests that it would be be better to utilize more complex natural language understanding for man-machine interaction if there is a chance for the task to involve more complicated actions.

B. Future work

During our experiments, we limited ourselves to having the participants perform a pose imitation and correction task. This study could be replicated with different tasks, such as

Metric 1	Metric 2	Pearson's r	significance
Age	Completion time during high difficulty pose with "Random" condition	r=0.641	p=0.001
Completion time during low difficulty pose with "Random" condition	Completion time during high difficulty pose with "Random" condition	r=0.643	p=0.001
Age	Completion time during medium difficulty pose with condition "High Complexity NLP"	r=0.643	p=0.001
Completion time during low difficulty pose with condition "High Complexity NLP"	Completion time during high difficulty pose with condition "High Complexity NLP"r	r=0.622	p=0.001

TABLE III
STRONG STATISTICAL CORRELATIONS BETWEEN COMPLETION TIMES OF ROUNDS AND OTHER METRICS

Metric 1	Metric 2	Pearson's r	significance
"No NLP" Van der Laan Usefulness score	"No NLP" Van der Laan Satisfaction score	r=0.658	p<0.001
"Random" Van der Laan Usefullness score	"Random" Van der Laan Satisfaction score	r=0.6	p=0.002
"Low Complexity NLP" Van der Laan Usefullness score	"Low Complexity NLP" Van der Laan Satisfaction score	r=0.68	p<0.001
"High Complexity NLP" Van der Laan Satisfaction score	"High Complexity NLP" Van der Laan Satisfaction score	r=0.82	p<0.001

TABLE IV
STRONG STATISTICAL CORRELATIONS BETWEEN THE USEFULNESS AND SATISFACTION SCORES FOR PARTICULAR CONTROLLERS

telling a robot where to go and see if the conclusions remain the same.

As mentioned in the Discussion, both experiments were performed with groups consisting largely of healthy adults in their 20's, most of whom were students. The results of this experiment may be very different for users of a different age group, such as children or the elderly, or participants within a certain profession that have different requirements of a robot.

Due to the way the Pepper robot is constructed, all movements with the arms and torso within the limitations of the motor result in a stable pose. So no questions about stability are taken into account in this research, which is a valid concern with other (humanoid) robots, such as the popular NAO [45]. It would be interesting to look into how a pose can be altered, finding a compromise between a robots stability and the pose or movement that the user wants to convey. This may also include poses which are physically impossible for the robot to attain due to the embodiment problem or transferring poses to non-humanoid robots, which we have not looked at.

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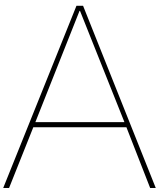
Appendices



Experiment 1 - Consent form

The following form was handed out to each of the 16 participants of the first experiment, to inform them of the information we would be recording and how we would handle this information during and after the study. All participant consented and successfully filled in this form prior to the experiment.

Consent Form for Experiment 1 in Imitation learning with Pepper

Please tick the appropriate boxes	Yes	No
Taking part in the study		
I have read and understood the study information dated 01-08-2019, or it has been read to me. I have been able to ask questions about the study and my questions have been answered to my satisfaction.	○	○
I consent voluntarily to be a participant in this study and understand that I can refuse to answer questions and I can withdraw from the study at any time, without having to give a reason.	○	○
I understand that taking part in the study involves recording my speech, which will be transcribed to text and the recording destroyed after completion of the research.	○	○
I understand that the anonymized transcribed text may be used as examples in the written thesis and may be deposited in full in the appendix of the written thesis.	○	○
I understand that taking part in the study involves recording video of me, which will be destroyed after completion of the experiment.	○	○
Use of the information in the study		
I understand that information I provide will be used for research purposes in a master thesis experiment at the Technical University of Delft.	○	○
I understand that personal information collected about me that can identify me, such as my name, age and gender, will not be shared beyond the study team.	○	○
Future use and reuse of the information by others		
I give permission for the anonymised transcripts that I provide to be archived in the education repository of the TU Delft so it can be used for future research and learning.	○	○

Signatures

_____	_____	_____
Name of participant	Signature	Date

I have accurately read out the information sheet to the potential participant and, to the best of my ability, ensured that the participant understands to what they are freely consenting.

Johannes M. Folmer	_____	_____
Researcher name [printed]	Signature	Date

Study contact details for further information: Johannes Folmer, martijn@folmermail.nl

B

Experiment 1 - Information sheet

The following form was send to each participant prior to their participation in the first experiment, to inform them of what was expected of them. There was time prior to the experiment to ask questions about any part which was unclear to them.

Experiment information form : Experiment 1 in imitation learning with Pepper

01-08-2019

Part 1: Terminology

Thank you for participating in this experiment. This section will introduce the robot and several terms used in the experiment

The pepper robot

The robot used in this experiment is the Pepper, which is a semi-humanoid robot manufactured by SoftBank Robotics. The Pepper has a humanoid torso and arms, but no legs. The arms each have 4 degrees of freedoms (DOFs), which roughly means that the arms have 4 joints it can adjust and rotate in order to assume a posture. The torso has 2 DOFs, being able to bend forward/backwards and sideways. See Figure 1 for a representation of the Pepper.

Workspace

The workspace of the Pepper is the nearby area surrounding the robot which it can reach by moving its arms and torso.

Joint Limits

The joints that the pepper has in the arms and torso have upper and lower limits beyond which they cannot bend. This is what limits the workspace.

Embodiment problem

The embodiment problem in a humanoid robot is caused when the robot has different types of joints, limbs and joint limits than a human. Thus it can not reach the same positions, poses and movements as a human, at least not in the same way. This means it has a different workspace than a human despite looking semi-human. It must work within its own limitations to approximate the desired movement/pose.

Natural language communication

Natural language is the speech, written words and signs that we as humans use to communicate with each other. Because we use it as our primary form of communication, it comes intuitively to us. Robots do not inherently understand natural language and must first be taught to parse it to understand commands.

Man-machine interaction

Man-machine interaction is a field of study that looks at how we communicate our desires and commands to robots and how the robots communicate information back at us. This is so we can better work together. This can, for example, be achieved through robots interpreting sensor data better, or by the use of controllers like joysticks or steering wheels that the robot is in partial control of.

Imitation learning

Imitation learning in robotics is the training of behaviours and movements by having the robot learn from demonstrations by an expert that is already proficient with the task. This expert is most commonly a human, but it could theoretically also be an animal or even another robot. Imitation learning allows people to teach a robot to do a task without the need to use computer code and to convey tasks that come naturally to us.

Figure 1 : the Pepper robot

Part 2 : The experiment

This part will introduce the experiment and everything you will be asked to do during it.

The goal of this research is to facilitate non-programmers to “program” certain behaviours into a robot, using nothing but visual and verbal commands. This would allow people who have no experience with computer coding to effectively use robots and teach them tasks, which will help in the adoption of robotics in everyday and professional life. Using natural language like full/partial sentences and hand signs for instructions comes very natural to humans, but is not something that a robot can just intuit. It must first be taught how to interpret natural language.

The experiment will consist of trying to get the Pepper robot to imitate a series of poses performed by a user. It will consist of 3 rounds, each consisting of 2 phases, a visual imitation phase and a

verbal command phase.

At the start of each of the rounds, you will be given a different set of 8 images. They are pictures of the same person, holding a certain pose, from 8 different angles. See figure 2 for an example of

these images. It will be this pose that you will try to convey to the robot during that specific round. At any point during the round, you may consult the images for reference.

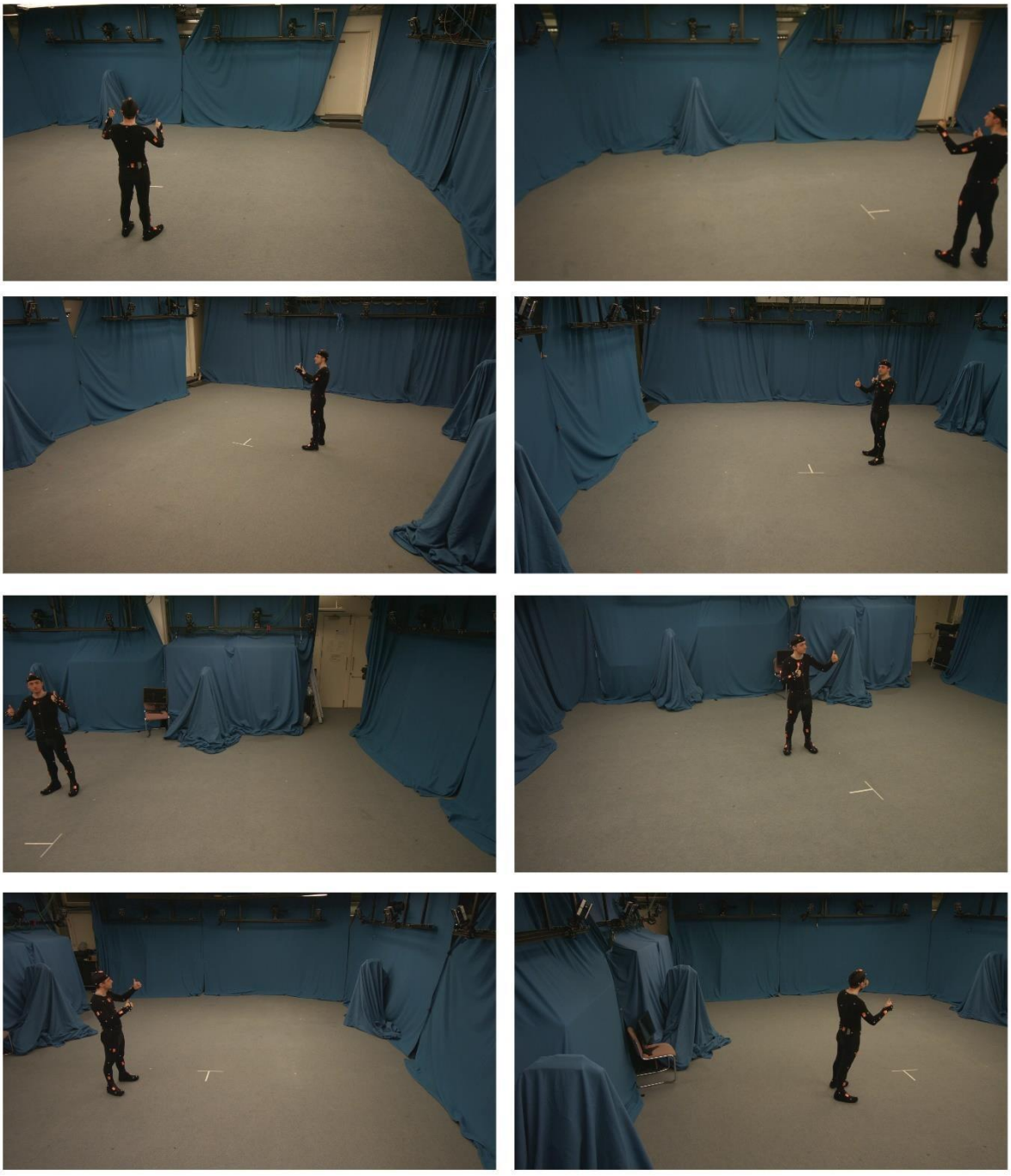


Figure 2 : an example of a set of images you will be shown

After you have consulted the image, you will be asked to stand in front of the Pepper robot, and we will start the visual imitation phase. You will show the Pepper the pose that you want it to imitate, by physically performing the pose that you saw on the images yourself. The Pepper robot will say that it will take a picture in 5 seconds. It will take the picture and proceed to try and mimic the pose

that you have shown it. This might take a couple of seconds. See figure 3 for an example of what it does with the image. This concludes the first phase of the round.

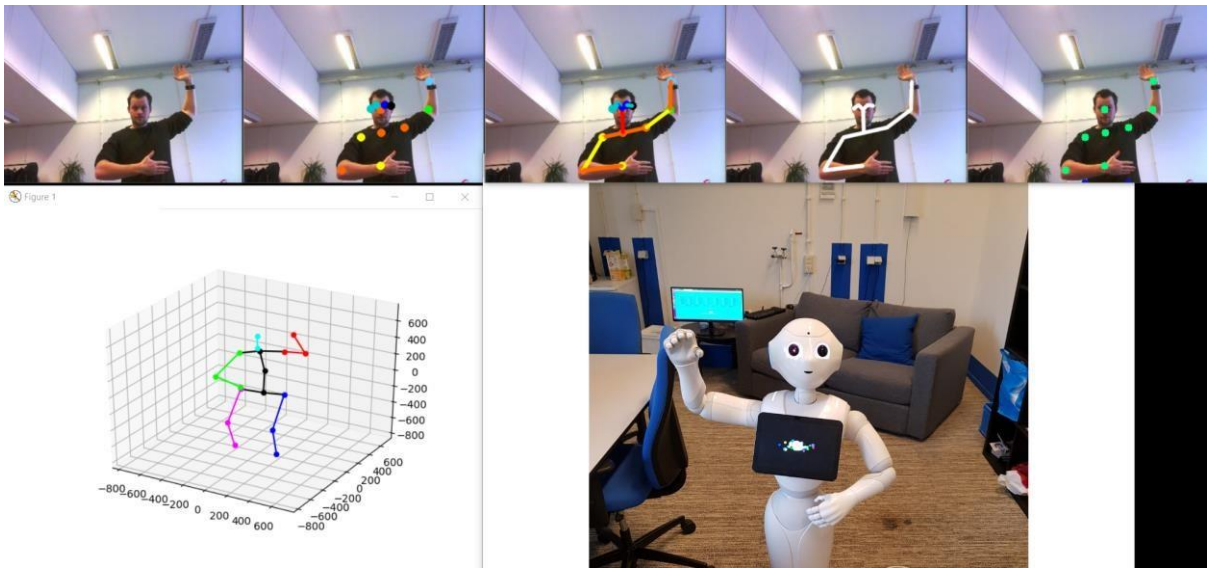


Figure 3: an example of how the image will be processed by the Pepper

During the second phase of the round, the verbal command phase, you will be able to alter the pose that the Pepper has taken using verbal commands. The Pepper will be equipped with a natural language parser, meaning that you can use phrases you would also use when talking to another person, and the Pepper will attempt to interpret commands from these phrases. A few examples of phrases you can use are "Pepper, put your hands up", "left arm down" or "Could you please bend backwards a bit". An audio recording will be made of you giving verbal commands to be used during the rest of the research. The commands you give can be either in English, or in Dutch, whichever language you are most comfortable with, as long as you don't mix the languages.

At any point during the second phase, you can stop giving commands and tell me that this is as close as you can get the Pepper to match the pose from the images given at the beginning of the round. That will mark the end of the round.

This process will be repeated 3 times with different images. Each round should only take a couple of minutes and the entire experiment should take somewhere between 20-30 minutes.

Part 3 : Further information

During the experiment, I will be observing and making sure that all the sensor data is received correctly, and that, when you give verbal commands, it sends relevant data to the robot and all recordings are stored in the correct place.

I will try to involve myself as little as possible during the round. In between the rounds I will give you the new set of images, and during the experiment you are free to ask questions at any time.

After the research is over, the audio recording will be destroyed and only an anonymized version of the transcription of your commands will be stored. If any part of the transcription reveals personal details about you (such as name, age, gender, etc.), that part will be censored.

You will be asked at the beginning of the experiment to sign a consent form, saying that you understand what is asked of you, what we will be recording and what we will do with the research data.

You will also be asked to fill out a small form asking for your name, age, gender and familiarity with robotics on a scale of 1-7 (1 being not at all familiar and 7 being very familiar). This information will be handled strictly confidentially by the research team and will be used to see if there are any unforeseen trends in the data. Any use of this information will be anonymized (names left out and all other information decoupled from each other) if used in the thesis report and all will be destroyed after the research has been concluded. If you are not comfortable with leaving your name, age or gender, you may also opt out of giving this information, as it is not strictly needed for the research.

The experiment is not very physically or mentally demanding, but if you feel uncomfortable at any point during the experiment for any reason, we can stop the experiment altogether.

If you have any further questions about the experiment, please feel free to contact me. And thank you again for participating in the experiment.

C

Experiment 1 - Participant information

The following form was given to each participant prior to the first experiment in order to record some demographic factors for later statistical analysis. All participants successfully and fully filled in the form.

Additional information form : experiment 1 Imitation learning with Pepper

Test user id :
Full name :
Age :
Gender: ○ Male ○ Female ○ Other

How familiar are you with robotics?

(1 = not at all familiar, 7 = Very familiar)

1 7

○ ○ ○ ○ ○ ○ ○

D

Experiment 1 - Dataset

Table D.1 contains all transcribed verbal commands given by the participants during the first experiment. The User ID indicates which of the participants spoke the command, the Round ID indicates which of the poses the command pertained to, with 1 being the medium difficulty pose, 2 being the low difficulty pose and 3 being the high difficulty pose.

Table D.1: Dataset resulting from experiment 1.

User ID	Round ID	Transcribed Verbal Command
1	1	Hey Pepper doe je linkerarm iets hoger
1	1	Je andere linkerarm
1	1	Doe je rechterarm iets hoger
1	1	Doe je arm een klein beetje lager
1	1	Doe je rechterarm nog iets lager
1	1	Doe nu je linkerarm een heel klein beetje lager
1	2	Steek je bovenlichaam iets verder naar voren
1	2	Steek je linkerarm iets omhoog
1	3	Pepper buig een heel klein beetje naar voren
1	3	Strek je rechterarm helemaal uit
1	3	Buig een heel klein beetje naar links
1	3	Buig een heel klein beetje naar rechts
1	3	Hou je linkerarm iets hoger
1	3	Buig een klein beetje naar rechts
2	1	Linkerhand een beetje omhoog
2	1	Iets minder omhoog, iets meer naar beneden
2	1	Rechterarm meer naar binnen
2	1	Rechterarm 5 centimeter omhoog
2	1	Rechterelleboog 10 centimeter naar voren
2	1	Rechterarm naar voren
2	1	Terug
2	1	Rechterarm iets naar boven
2	1	Linkerarm 10 centimeter naar voren
2	1	Linkerarm 10 centimeter naar boven
2	1	Linkerarm naar binnen
2	1	Linkerhand omhoog
2	2	Leun iets verder naar voren
2	2	Sta iets meer rechtop
2	2	Draai je linkerhand een kwarslag naar links
2	2	Linkerarm 10 centimeter omhoog

Continuation of Table D.1

User ID	Round ID	Transcribed Verbal Command
2	2	Linkerhand 5 centimeter naar beneden
2	2	Rechterarm 5 centimeter naar voren
2	2	Rechterarm gestrekt naar beneden
2	2	Hele rechterarm 5 centimeter naar voren
2	3	Linkerarm helemaal strekken opzij
2	3	Rechterarm een heel klein beetje omhoog
2	3	Rechterhand een beetje omhoog
3	1	Linkerarm omhoog
3	2	Rechterarm iets meer naar je zij
3	2	Linkerarm omhoog
3	2	Rechterarm omlaag
3	2	Rechterarm omhoog
3	2	Linkerarm langs je zij
3	3	Rechterarm iets omhoog
3	3	Linkerarm iets meer naar rechts
3	3	Linkerarm meer naar links
4	1	Rechterelleboog omlaag
4	1	Doe maar weer terug
4	1	Hand omhoog
4	1	Rechterelleboog een klein beetje naar voor
4	1	Ho stop
4	1	Linkerelleboog een beetje omhoog
4	1	Linkerhand een beetje naar links
4	1	Ho stop
4	1	Linkerhand een beetje omhoog
4	1	Rechterelleboog een klein beetje naar beneden
4	1	Rechterhand een beetje naar links
4	1	Linkerelleboog een heel klein beetje naar links
4	2	Beweeg je torso een heel klein beetje naar voren
4	2	Beweeg je rechterhand een heel klein beetje naar links
4	2	Beweeg je rechterhand een heel klein beetje naar voren
4	2	Beweeg je rechterelleboog een heel klein beetje naar links
4	2	Beweeg je torso een heel klein beetje naar voren
4	2	Ga rechtop staan
4	3	Pepper beweeg je torso een klein beetje naar links
4	3	Pepper beweeg je torso een klein beetje naar achteren
4	3	Beweeg je linker elleboog naar voren
4	3	Beweeg je linker elleboog een klein beetje naar onder
4	3	Beweeg je linker hand een klein beetje omhoog
4	3	Beweeg je rechter elleboog een klein beetje naar voren
4	3	Strek je arm
4	3	Beweeg je rechter hand een heel klein beetje omhoog
4	3	Draai je rechterhand een klein beetje linksom
4	3	Draai je rechterhand rechtom
4	3	Beweeg je rechterhand een heel klein beetje naar binnen toe
4	3	Beweeg je rechterhand een heel klein beetje naar links
5	1	Kun je je linkerarm hoger doen
5	1	Kun je je bovenarm omhoog doen
5	1	Je rechterarm naar beneden
5	1	Je linkeronderarm naar beneden
5	1	Je linkeronderarm een beetje omhoog
5	1	Je linkerarm klein beetje omhoog

Continuation of Table D.1		
User ID	**Round ID**	**Transcribed Verbal Command**
5	2	Doe je rechterhand omhoog
5	2	Doe je rechterhand een beetje omlaag
5	2	Linkerarm omlaag
5	2	Linkerelleboog omlaag
5	2	Linkerarm omlaag
5	2	Linkerarm een beetje naar voren
5	2	Linkerarm een beetje naar voren
5	3	Buig je borst meer naar links
5	3	Doe je rechterhand een beetje omlaag
5	3	Doe je linkerhand een beetje omhoog
5	3	Doe je linkerhand een klein beetje omlaag
6	1	Rechteronderarm omhoog
6	1	Linkeronderarm draaien tegen de klok in
6	1	Andere kant op
6	1	Linkeronderarm andere kant op draaien
6	1	Onderarm draaien
6	2	Voorover buigen met je torso
6	2	Rechterarm verder omhoog
6	2	Iets terug met je rechterarm omlaag
6	2	Torso een klein deel naar rechts draaien
6	2	Torso naar links draaien
6	2	Torso rechter
6	3	Rechterelleboog strekken
6	3	Rechterarm vooruit steken
6	3	Rechterarm laag vooruit steken
6	3	Torso naar achteren draaien
7	1	Pepper buig voorwaarts
7	1	Pepper til je rechterbovenarm op
7	1	Pepper til je linkerbovenarm op
7	1	Pepper doe je linkeronderarm iets lager
7	2	Pepper buig voorwaarts
7	2	Pepper sta rechtop
7	2	Pepper houd je linkerarm iets hoger
7	3	Pepper strek je linkerarm
7	3	Pepper doe je rechterarm iets naar voren
7	3	Pepper doe je linkerarm iets naar beneden
7	3	Pepper doe je linkeronderarm iets naar beneden
8	1	Rechterarm omhoog
8	1	Rechterarm iets omlaag
8	1	Torso iets naar voren
8	1	Linkerarm iets omhoog
8	2	Torso iets naar voren
8	2	Linkerarm omhoog
8	2	Rechterarm naar beneden
8	2	Rechterarm strekken
8	2	Rechterarm iets naar voren
8	2	Linkerarm iets naar voren
8	2	Linkerarm nog iets naar voren
8	2	Linkerarm hoger
8	2	Linkerarm naar voren
8	2	Linkerarm nog iets naar voren
8	2	Linkerarm iets terug

Continuation of Table D.1

User ID	Round ID	Transcribed Verbal Command
8	3	Rechterarm naar voren strekken
8	3	Linkerarm naar voren strekken
8	3	Linkerarm iets omlaag
8	3	Torso een klein stukje naar voren
8	3	Torso iets terug
8	3	Rechterarm iets terug
8	3	Torso nog iets naar achter
8	3	Linkerarm iets naar links
8	3	Linkerarm iets terug
9	1	Torso rechtop
9	1	Armen drie centimeter omhoog
9	1	Rechterarm 2 centimeter omhoog
9	1	Linkerarm 1 centimeter omhoog
9	2	Torso rechtop
9	2	Rechterarm 1 centimeter omhoog
9	2	Rechterhand naar voren
9	2	Rechterbovenarm 2 centimeter omhoog
9	2	Rechterhand 2 centimeter naar voren
9	2	Elleboog iets meer strekken
9	2	Rechterelleboog iets krommer
9	2	Linkerarm langs het lichaam
9	3	Torso meer naar links
9	3	Torso meer naar rechts
9	3	Torso nog een klein stukje naar rechts
9	3	Rechterarm schuin naar voren
9	3	Rechterarm meer naar voren
9	3	Rechterbovenarm naar voren
9	3	Rechterarm strekken
9	3	Linkerelleboog krommer
9	3	Linkerhand naar borst
9	3	Torso draaien rechtsom
9	3	Rechterarm meer naar voren
9	3	Rechterarm strekken
9	3	Torso stukje naar achter
10	1	Rechterarm iets meer naar je toe
10	1	Rechterarm meer omhoog
10	1	Rechterarm nog iets meer omhoog
10	2	Iets naar voren buigen
10	2	En nu je arm verder omhoog
10	2	Terug naar de vorige positie
10	2	Linkerarm iets verder omhoog
10	2	Linkerhand dichterbij je hoofd
10	3	Linkerhand verder van je af
11	1	Iets verder naar voren leunen
11	1	De rechterarm iets omhoog
11	1	Kan de rechterarm nog iets omhoog
11	1	De rechterarm iets omlaag
11	2	Iets verder naar voren leunen
11	2	Rechterarm omhoog
11	2	Rechterarm nog meer omhoog
11	2	Kan de rechterarm omhoog
11	2	Rechterarm iets naar voren doen

Continuation of Table D.1		
User ID	**Round ID**	**Transcribed Verbal Command**
11	2	Rechterarm omhoog
11	2	Rechterhand draaien
11	2	Rechterhand ietsje naar voren
11	2	Draai je elleboog van je rechterarm
11	2	Rechterarm omhoog
11	2	Rechterelleboog draaien
11	2	Stop
11	3	Iets naar voren alsjeblieft
11	3	Linkerarm iets naar je toe bewegen
11	3	Linkerarm iets meer naar je lichaam toe
11	3	Linkerarm iets meer naar buiten
11	3	Linkerelleboog iets naar onderen
11	3	Linkerelleboog iets meer gestrekt
11	3	Rechterarm iets omhoog
11	3	Je lichaam iets naar links kantelen
11	3	Lichaam iets naar rechts kantelen
13	1	Torso iets naar voren
13	1	Rechterarm een klein beetje omlaag
13	1	Rechterarm klein beetje omlaag
13	1	Rechterarm heel klein beetje omlaag
13	1	Ja stop
13	2	Arm naar voren draaien
13	2	Klein stukje terug
13	2	Stop
13	3	Rechterarm een klein beetje omhoog
13	3	Rechterarm iets meer strekken
13	3	Stop
13	3	Linkerarm ietsje omlaag
13	3	Stop
13	3	Rechterarm beetje omhoog
13	3	En stop
14	1	Linkerarm omhoog
14	1	Romp iets naar voor
14	1	Romp iets naar achteren
14	2	Torso iets naar voor
14	2	Rechterarm iets naar achter
14	2	Rechterelleboog iets naar voor
14	3	Rechterarm naar voor draaien
14	3	Linkerarm iets omhoog
14	3	Romp iets naar links draaien
15	1	Buig je bovenlichaam iets naar voren
15	1	Draai je bovenlichaam iets naar links
15	2	Buig je bovenlichaam iets naar voren
15	2	Doe je linkerarm omlaag
15	2	Doe je linkerarm omlaag
15	2	Doe je rechterarm omhoog
15	2	Buig je rechterarm 90 graden
15	2	Buig je rechterarm
15	2	Beweeg je hand een stukje naar boven, onderarm
15	3	Doe je linkerarm een stukje omhoog
16	1	Linkerarm meer omhoog
16	1	Torso naar voren

Continuation of Table D.1		
User ID	**Round ID**	**Transcribed Verbal Command**
16	1	Torso naar links draaien
16	1	Torso recht overeind
16	1	Linkerschouder kwart slag naar voren
16	1	Arm omlaag
16	1	Torso om de z-as draaien naar links
16	1	Torso recht overeind
16	2	Torso recht overeind
16	3	Rechterarm gestrekt naar buiten
16	3	Linkerarm kwartslag naar beneden
16	3	Linkerarm kwartslag naar voren
16	3	Linkerarm omlaag
16	3	Rechterarm schuin naar voren

E

Experiment 2 - Consent form

The following form was handed out to each of the 24 participants of the first experiment, to inform them of the information we would be recording and how we would handle this information during and after the study. All participant consented and successfully filled in this form prior to the experiment.

Consent Form for Experiment 2 in Imitation learning with Pepper

Please tick the appropriate boxes	Yes	No
Taking part in the study		
I have read and understood the study information dated 09-01-2020, or it has been read to me. I have been able to ask questions about the study and my questions have been answered to my satisfaction.	○	○
I consent voluntarily to be a participant in this study and understand that I can refuse to answer questions and I can withdraw from the study at any time, without having to give a reason.	○	○
I understand that taking part in the study involves recording my speech, which will be transcribed to text and the recording destroyed after completion of the research.	○	○
I understand that the anonymized transcribed text may be used as examples in the written thesis and may be deposited in full in the appendix of the written thesis.	○	○
I understand that taking part in the study involves recording video of me, which will be destroyed after completion of the experiment.	○	○
Use of the information in the study		
I understand that information I provide will be used for research purposes in a master thesis experiment at the Technical University of Delft.	○	○
I understand that personal information collected about me that can identify me, such as my name, age and gender, will not be shared beyond the study team.	○	○
Future use and reuse of the information by others		
I give permission for the anonymised transcripts that I provide to be archived in the education repository of the TU Delft so it can be used for future research and learning.	○	○

Signatures

_____	_____	_____
Name of participant	Signature	Date

I have accurately read out the information sheet to the potential participant and, to the best of my ability, ensured that the participant understands to what they are freely consenting.

Johannes M. Folmer	_____	_____
Researcher name [printed]	Signature	Date

Study contact details for further information: Johannes Folmer, martijn@folmermail.nl

F

Experiment 2 - Information sheet

The following form was send to each participant prior to their participation in the second experiment, to inform them of what was expected of them. There was time prior to the experiment to ask questions about any part which was unclear to them.

Experiment information form : Experiment 2 in imitation learning with Pepper

09-01-2020

Part 1: Terminology

Thank you for participating in this experiment. This section will introduce the robot and several terms used in the experiment

The pepper robot

The robot used in this experiment is the Pepper, which is a semi-humanoid robot manufactured by SoftBank Robotics. The Pepper has a humanoid torso and arms, but no legs. The arms each have 4 degrees of freedoms (DOFs), which roughly means that the arms have 4 joints it can adjust and rotate in order to assume a posture. The torso has 2 DOFs, being able to bend forward/backwards and sideways. See Figure 1 for a representation of the Pepper.

Imitation learning

Imitation learning in robotics is the training of behaviours and movements by having the robot learn from demonstrations by an expert that is already proficient with the task. This expert is most commonly a human, but it could theoretically also be an animal or even another robot. Imitation learning allows people to teach a robot to do a task without the need to use computer code and to convey tasks that come naturally to us.

Figure 1 : the Pepper robot

Part 2 : The experiment

This part will introduce the experiment and everything you will be asked to do during it.

The goal of this research is to facilitate non-programmers to “program” certain behaviours into a robot, using nothing but visual and verbal commands. This would allow people who have no experience with computer coding to effectively use robots and teach them tasks, which will help in the adoption of robotics in everyday and professional life.

The experiment will consists of a series of pose imitation tasks, in the pepper is trying to imitate a series of poses performed by the user. Each pose imitation task consists of 2 phases, a visual imitation phase and a verbal command phase.

At the start of each of the rounds, you will be given a different set of 8 images. They are pictures of the same person, holding a certain pose, from 8 different angles. See figure 2 for an example of these images. It will be this pose that you will try to convey to the robot during that specific round. At any point during the round, you may consult the images for reference.

Figure 2 : an example of a set of images you will be shown

After you have consulted the image, you will be asked to stand in front of the Pepper robot, and we will start the visual imitation phase. You will show the Pepper the pose that you want it to imitate, by physically performing the pose that you saw on the images yourself. The Pepper robot will say that it will take a picture in 5 seconds. It will take the picture and proceed to try and mimic the pose that you have shown it. This might take a couple of seconds. See figure 3 for an example of what it does with the image. This concludes the first phase of the round.

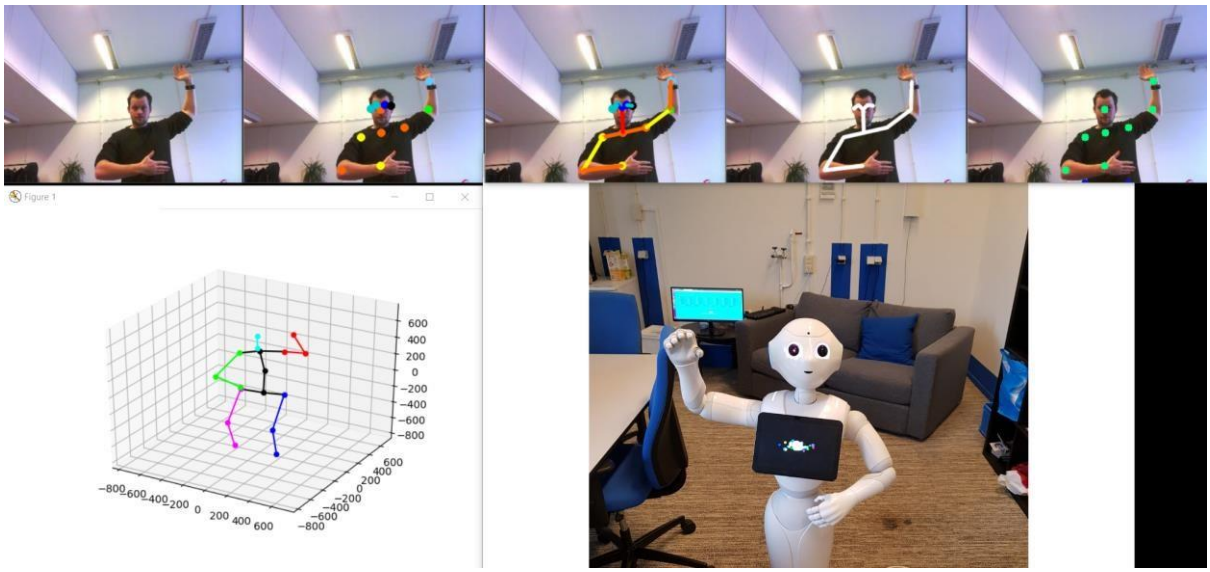


Figure 3: an example of how the image will be processed by the Pepper

After the pose imitation phase, you may be able to further alter the assumed pose. There are 4 different methods, all of which you will be asked to perform. What these methods entail and what you should do will be explained to during the experiment itself.

Part 3 : Further information

During the experiment, I will be monitoring the system. In between the rounds I will give you the new set of images and instructions, and during the experiment you are free to ask questions at any time.

After the research, the audio recording will be destroyed and only an anonymized version of the transcription of your commands will be stored. If any part of the transcription reveals personal details about you (such as name, age, gender, etc.), that part will be censored.

You will be asked at the beginning of the experiment to sign a consent form, saying that you understand what is asked of you, what we will be recording and what we will do with the research data.

When you have finished a round, you will be asked to fill in a questionnaire about your experience with the controller that you used during that particular round. This consists of several values that you can rate between 1 and 5, which will be used to evaluate your personal experience with that particular controller.

You will also be asked to fill out a small form asking for your name, age, gender and familiarity with robotics on a scale of 1-7 (1 being not at all familiar and 7 being very familiar). This information will be handled strictly confidentially by the research team and will be used to see if there are any unforeseen trends in the data. Any use of this information will be anonymized (names left out and all other information decoupled from each other) if used in the thesis report and all will be destroyed after the research has been concluded. If you are not comfortable with leaving your name, age or gender, you may also opt out of giving this information, as it is not strictly needed for the research.

Copies of all the forms that you will be asked to fill out (consent form, questionnaire, personal information form) will be sent to you before the start of the experiment. If there are any questions about them, please don't hesitate to ask.

The experiment is not very physically or mentally demanding, but if you feel uncomfortable at any point during the experiment for any reason, we can stop the experiment altogether.

If you have any further questions about the experiment, please feel free to contact me. And thank you again for participating in the experiment.

G

Experiment 2 - Participant information

The following form was given to each participant prior to the second experiment in order to record some demographic factors for later statistical analysis. All participants successfully and fully filled in the form.

Additional information form : experiment 2 Imitation learning with Pepper

Test user id :
Full name :
Age :
Gender: ○ Male ○ Female ○ Other

How familiar are you with robotics?

(1 = not at all familiar, 7 = Very familiar)

1 7

○ ○ ○ ○ ○ ○ ○

H

Experiment 2 - Van der Laan Acceptance form

A copy of the following questionnaire was given to each of the participants at the end of each round of the second experiment, to assess their subjective acceptance of the controller that they were using at the time. All 96 questionnaires (4 per participant) were filled in successfully.

Van der Laan Questionnaire

This questionnaire assesses the acceptance of the system that you have used during the experiment.

Participant nr:	Date:	Controller:

I find controlling the Pepper robot using the controller (please tick a box on every line)

1.	Usefull						Useless
2.	Pleasant						Unpleasant
3.	Bad						Good
4.	Nice						Annoying
5.	Effective						Superfluous
6.	Irritating						Likeable
7.	Assisting						Worthless
8.	Undesirable						Desirable
9.	Raising alertness						Sleep-inducing

Please enter further comments on the controller below:

Experiment 2 - Dataset

This appendix includes all of the transcribed commands that the participants gave during the second experiment and the effect it had on the robot. The User ID is number between 1 and 24 and denotes the participant that was giving the commands.

The Controller ID is a number between 1 and 3, which refers to our different conditions. Controller 1 is the random controller where the users could give verbal feedback through saying ”Nee” and ”Stop”. Controller 2 is the controller with the low complexity NLP, where users could reference a limb and a direction. Controller 3 is the controller with the high complexity NLP, where users could also use the additional categories of complexity ”magnitude” and ”history”.

The round ID is a number between 0 and 3, and denotes which of the sets of images we were using, and thus which pose we wished to transfer upon the robot. During round 0, we used the Medium Difficulty pose (two thumbs up), during round 1 we used the Low Difficulty pose (only right arm raised), during round 2 we used the High difficulty pose (slightly bend backwards and arms lifted slightly in mock fear). Round 3 was the round in which the test users were allowed to come up with their own pose to transfer upon the Pepper.

The transcribed command is the string that the google API send back after we send the recorded sound file to it. Only commands that returned a string were recorded, so this list excludes all external sounds which couldn’t be transcribed for whatever reason, such as the user having spoken too softly for the robot to hear, or an errant car horn from outside the test location.

The effect column consists of the effect that the transcribed command had on the Pepper robot and the experiment as a whole. It denotes the action that the Pepper has taken during the experiment.

Table I.1: Dataset resulting from experiment 2.

User ID	Controller ID	Round ID	Transcribed Command	Effect
1	1	0	nee	Alter pose randomly
1	1	0	stop	End of round
1	2	0	lichaam naar voren	Keypoints : neck Direction : to the front
1	2	0	restaurant omhoog	Keypoints : right hand Direction : up

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
1	2	0	stop	End of round
1	3	0	lichaam iets naar Hoorn	Keypoints : neck Direction : to the front Magnitude : –
1	3	0	stop	End of round
1	1	1	stop	End of round
1	2	1	lichaam naar Hoorn	Keypoints : neck Direction : to the front
1	2	1	rechterarm hoog	Keypoints : right elbow + right hand Direction : to the front + up
1	2	1	stop	End of round
1	3	1	rechterbovenarm naar boven	Keypoints : right elbow Direction : up
1	3	1	lichaam Hoorn	Keypoints : neck Direction : to the front
1	3	1	iets terug	History : A little less
1	3	1	lichaam iets naar achteren	Keypoints : neck Direction : to the back Magnitude : –
1	3	1	stop	End of round
1	1	2	nee	Alter pose randomly
1	1	2	stop	End of round
1	2	2	lichaam naar rechts	Keypoints : neck Direction : to the right

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
1	2	2	lichaam	Keypoints : neck ERROR : don't understand
1	2	2	lichaam naar links	Keypoints : neck Direction : to the left
1	2	2	trechtervorm arm naar beneden	Keypoints : right hand Direction : down
1	2	2	linkervooraan omhoog	Keypoints : left elbow Direction : up
1	2	2	rechtervoorarm naar beneden	Keypoints : right hand Direction : down
1	2	2	stop	End of round
1	3	2	rechterhand iets naar voren	Keypoints : right hand Direction : to the front Magnitude : –
1	3	2	stop	End of round
1	1	3	nee	Alter pose randomly
1	1	3	nee	Alter pose randomly
1	1	3	stop	End of round
1	2	3	linkerarm naar voren	Keypoints : left elbow + left hand Direction : to the front
1	2	3	lichaam naar voren	Keypoints : neck Direction : to the front
1	2	3	rechterhand omhoog	Keypoints : right hand Direction : up
1	2	3	restaurant naar links	Keypoints : right hand Direction : to the left
1	2	3	linkerhand naar voren	Keypoints : left hand Direction : to the front

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
1	2	3	lekker voor aanmaken	Keypoints : None, no effect Direction : to the front ERROR : don't understand
1	2	3	stop	End of round
1	3	3	lichaam naar voren	Keypoints : neck Direction : to the front
1	3	3	verder naar voren	Keypoints : None, no effect Direction : to the front
1	3	3	lichaam verder naar voor	Keypoints : neck Direction : to the front
1	3	3	rechterhand omhoog	Keypoints : right hand Direction : up
1	3	3	linkerhand naar voren	Keypoints : left hand Direction : to the front
1	3	3	lekker vooral naar voren	Keypoints : left hand + right hand Direction : to the front
1	3	3	naar voren	Keypoints : None, no effect Direction : to the front
1	3	3	stop	End of round
2	1	0	nee	Alter pose randomly
2	1	0	nee	Alter pose randomly
2	1	0	nee	Alter pose randomly
2	1	0	nee	Alter pose randomly
2	1	0	nee	Alter pose randomly
2	1	0	stop	End of round

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
2	2	0	stop	End of round
2	3	0	linkerarm naar voren	Keypoints : left elbow + left hand Direction : to the front
2	3	0	link	Keypoints : None, no effect Direction : to the left
2	3	0	terug	History : Back to previous pose
2	3	0	stop	End of round
2	1	1	stop	End of round
2	2	1	rechterarm omhoog	Keypoints : right elbow + right hand Direction : up
2	2	1	stop	End of round
2	3	1	rechterarm omhoog	Keypoints : right elbow + right hand Direction : up
2	3	1	rechterarm naar voren	Keypoints : right elbow + right hand Direction : to the front
2	3	1	stop	End of round
2	1	2	stop	End of round
2	2	2	rechterarm naar voor	Keypoints : right elbow + right hand Direction : to the front
2	2	2	rechterarm omlaag	Keypoints : right elbow + right hand Direction : down
2	2	2	rechterarm	Keypoints : right elbow + right hand ERROR : don’t understand

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
2	2	2	rechterarm naar voren	Keypoints : right elbow + right hand Direction : to the front
2	2	2	rechterarm omlaag	Keypoints : right elbow + right hand Direction : down
2	2	2	rechterarm naar voren	Keypoints : right elbow + right hand Direction : to the front
2	2	2	stop	End of round
2	3	2	rechterarm naar Born	Keypoints : right elbow + right hand Direction : to the front
2	3	2	linkerarm omhoog	Keypoints : left elbow + left hand Direction : up
2	3	2	terug	History : Back to previous pose
2	3	2	linkerarm naar voren	Keypoints : left elbow + left hand Direction : to the front
2	3	2	linkerarm naar voren	Keypoints : left elbow + left hand Direction : to the front
2	3	2	linkerelleboog naar beneden	Keypoints : left elbow Direction : down
2	3	2	linkerelleboog naar beneden	Keypoints : left elbow Direction : down
2	3	2	linkervoorarm naar voren	Keypoints : left hand Direction : to the front
2	3	2	stop	End of round
2	1	3	stop	End of round
2	2	3	stop	End of round

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
2	3	3	rechterbovenarm omhoog	Keypoints : right elbow Direction : up
2	3	3	linkerVormhaven omhoog	Keypoints : None, no effect Direction : up
2	3	3	linkervoor arm omhoog	Keypoints : left elbow + left hand + right elbow + right hand Direction : up
2	3	3	rechte vooraf omhoog	Keypoints : left hand + right hand Direction : to the right + up
2	3	3	terug	History : Back to previous pose
2	3	3	lekker voor on hold	Keypoints : None, no effect Direction : to the front
2	3	3	ietsjes meer	History : A little more
2	3	3	stop	End of round
3	1	0	stop	End of round
3	2	0	lichaam naar voren	Keypoints : neck Direction : to the front
3	2	0	rechteronderarm naar boven	Keypoints : right hand Direction : up
3	2	0	linkerarm naar boven	Keypoints : left elbow + left hand Direction : up
3	2	0	linkeronderarm naar achter	Keypoints : left hand Direction : to the back
3	2	0	linkeronderarm naar voor	Keypoints : left hand Direction : to the front
3	2	0	rechterarm omhoog	Keypoints : right elbow + right hand Direction : up

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
3	2	0	rechterarm naar	Keypoints : right elbow + right hand ERROR : don't understand
3	2	0	rechterelleboog	Keypoints : right elbow ERROR : don't understand
3	2	0	rechterelleboog naar rechts	Keypoints : right elbow Direction : to the right
3	2	0	rechterelleboog naar links	Keypoints : right elbow Direction : to the left
3	2	0	rechteronderarm naar achter	Keypoints : right hand Direction : to the back
3	2	0	rechterelleboog naar rechts	Keypoints : right elbow Direction : to the right
3	2	0	wekker onderarm omlaag	Keypoints : None, no effect Direction : down ERROR : don't understand
3	2	0	rechteronderarm omlaag	Keypoints : right hand Direction : down
3	2	0	stop	End of round
3	3	0	linkerarm iets omhoog	Keypoints : left elbow + left hand Direction : up Magnitude : –
3	3	0	rechterelleboog	Keypoints : right elbow
3	3	0	linkerelleboog	Keypoints : left elbow
3	3	0	rechterelleboog naar links	Keypoints : right elbow Direction : to the left
3	3	0	terug	History : Back to previous pose
3	3	0	rechterelleboog	Keypoints : right elbow

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
3	3	0	rechterelleboog naar links	Keypoints : right elbow Direction : to the left
3	3	0	rechterelleboog naar rechts	Keypoints : right elbow Direction : to the right
3	3	0	rechterelleboog meer naar rechts	Keypoints : right elbow Direction : to the right Magnitude : +
3	3	0	rechteronderarm naar voren	Keypoints : right hand Direction : to the front
3	3	0	rechteronderarm meer naar voren	Keypoints : right hand Direction : to the front Magnitude : +
3	3	0	rechterelleboog omlaag	Keypoints : right elbow Direction : down
3	3	0	stop	End of round
3	1	1	nee	Alter pose randomly
3	1	1	nee	Alter pose randomly
3	1	1	stop	End of round
3	2	1	rechteronderarm naar achter	Keypoints : right hand Direction : to the back
3	2	1	lichaam naar voor	Keypoints : neck Direction : to the front
3	2	1	stop	End of round
3	3	1	lichaam	Keypoints : neck
3	3	1	lichaam iets naar voren	Keypoints : neck Direction : to the front Magnitude : –
3	3	1	rechteronderarm iets naar achter	Keypoints : right hand Direction : to the back Magnitude : –

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
3	3	1	iets terug	History : A little less
3	3	1	nog iets terug	ERROR : Don't understand
3	3	1	rechteronderarm iets naar voren	Keypoints : right hand Direction : to the front Magnitude : –
3	3	1	stop	End of round
3	1	2	nee	Alter pose randomly
3	1	2	nee	Alter pose randomly
3	1	2	nee	Alter pose randomly
3	1	2	stop	End of round
3	2	2	linkeronderarm omhoog	Keypoints : left hand Direction : up
3	2	2	stop	End of round
3	3	2	rechterarm iets omhoog	Keypoints : right elbow + right hand Direction : up Magnitude : –
3	3	2	terug	History : Back to previous pose
3	3	2	linkeronderarm iets omhoog	Keypoints : left hand Direction : up Magnitude : –
3	3	2	stop	End of round
3	1	3	nee	Alter pose randomly

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
3	1	3	nee	Alter pose randomly
3	1	3	nee	Alter pose randomly
3	1	3	nee	Alter pose randomly
3	1	3	nee	Alter pose randomly
3	1	3	stop	End of round
3	2	3	lichaam naar voren	Keypoints : neck Direction : to the front
3	2	3	rechteronderarm	Keypoints : right hand ERROR : don’t understand
3	2	3	rechteronderarm omhoog	Keypoints : right hand Direction : up
3	2	3	linkeronderarm omhoog	Keypoints : left hand Direction : up
3	2	3	rechterarm	Keypoints : right elbow + right hand ERROR : don’t understand
3	2	3	stop	End of round
3	3	3	lichaam iets naar voor	Keypoints : neck Direction : to the front Magnitude : –
3	3	3	rechterhand	Keypoints : right hand Direction : to the right
3	3	3	terug	History : Back to previous pose
3	3	3	rechterhand iets naar links	Keypoints : right hand Direction : to the left Magnitude : –
3	3	3	linkerhand iets naar achter	Keypoints : left hand Direction : to the back Magnitude : –

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
3	3	3	stop	End of round
4	1	0	nee	Alter pose randomly
4	1	0	nee	Alter pose randomly
4	1	0	nee	Alter pose randomly
4	1	0	nee	Alter pose randomly
4	1	0	nee	Alter pose randomly
4	1	0	nee	Alter pose randomly
4	1	0	nee	Alter pose randomly
4	1	0	nee	Alter pose randomly
4	1	0	nee	Alter pose randomly
4	1	0	nee	Alter pose randomly
4	1	0	nee	Alter pose randomly
4	1	0	nee	Alter pose randomly
4	1	0	nee	Alter pose randomly
4	1	0	nee	Alter pose randomly
4	1	0	nee	Alter pose randomly
4	1	0	nee	Alter pose randomly
4	1	0	nee	Alter pose randomly

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
4	1	0	nee	Alter pose randomly
4	1	0	stop	End of round
4	2	0	forum	Keypoints : None, no effect ERROR : don't understand
4	2	0	naar voren	Keypoints : None, no effect Direction : to the front ERROR : don't understand
4	2	0	lichaam naar voren	Keypoints : neck Direction : to the front
4	2	0	stop	End of round
4	3	0	rechterklein beetje omhoog	Keypoints : None, no effect Direction : up Magnitude : -
4	3	0	iets meer	History : A little more
4	3	0	klein beetje omhoog	Keypoints : None, no effect Direction : up Magnitude : -
4	3	0	rechterarm klein beetje omhoog	Keypoints : right elbow + right hand Direction : up Magnitude : -
4	3	0	stop	End of round
4	1	1	nee	Alter pose randomly
4	1	1	nee	Alter pose randomly
4	1	1	stop	End of round
4	2	1	lichaam naar voren	Keypoints : neck Direction : to the front

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
4	2	1	rechterarm omhoog	Keypoints : right elbow + right hand Direction : up
4	2	1	stop	End of round
4	3	1	Peugeot klein beetje naar voren	Keypoints : None, no effect Direction : to the front Magnitude : -
4	3	1	torso klein beetje naar voren	Keypoints : neck Direction : to the front Magnitude : -
4	3	1	hezemeer	Keypoints : None, no effect
4	3	1	torso naar voren	Keypoints : neck Direction : to the front
4	3	1	klein beetje terug	History : Back to previous pose
4	3	1	stop	End of round
4	1	2	nee	Alter pose randomly
4	1	2	nee	Alter pose randomly
4	1	2	nee	Alter pose randomly
4	1	2	nee	Alter pose randomly
4	1	2	nee	Alter pose randomly
4	1	2	nee	Alter pose randomly
4	1	2	nee	Alter pose randomly
4	1	2	nee	Alter pose randomly

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
4	1	2	nee	Alter pose randomly
4	1	2	nee	Alter pose randomly
4	1	2	stop	End of round
4	2	2	rechterarm naar voren	Keypoints : right elbow + right hand Direction : to the front
4	2	2	rechterarm naar voren	Keypoints : right elbow + right hand Direction : to the front
4	2	2	linkerarm vandaag	Keypoints : left elbow + left hand ERROR : don’t understand
4	2	2	linkerarm omlaag	Keypoints : left elbow + left hand Direction : down
4	2	2	stop	End of round
4	3	2	rechterarm omhoog	Keypoints : right elbow + right hand Direction : up
4	3	2	linkerarm	Keypoints : left elbow + left hand
4	3	2	wekker gesprekken	Keypoints : None, no effect
4	3	2	rechterarm klein beetje omlaag	Keypoints : right elbow + right hand Direction : down Magnitude : -
4	3	2	stop	End of round
4	1	3	nee	Alter pose randomly
4	1	3	nee	Alter pose randomly

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
4	1	3	nee	Alter pose randomly
4	1	3	nee	Alter pose randomly
4	1	3	stop	End of round
4	2	3	rechterarm naar voren	Keypoints : right elbow + right hand Direction : to the front
4	2	3	rechterarm naar voren	Keypoints : right elbow + right hand Direction : to the front
4	2	3	stop	End of round
4	3	3	rechterarm naar achteren	Keypoints : right elbow + right hand Direction : to the back
4	3	3	torso naar voren	Keypoints : neck Direction : to the front
4	3	3	beetje meer	History : A little more
4	3	3	beetje meer	History : A little more
4	3	3	stop	End of round
5	1	0	nee	Alter pose randomly
5	1	0	nee	Alter pose randomly
5	1	0	nee	Alter pose randomly
5	1	0	nee	Alter pose randomly
5	1	0	nee	Alter pose randomly

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
5	1	0	nee	Alter pose randomly
5	1	0	stop	End of round
5	2	0	lichaam naar folder	Keypoints : neck Direction : down
5	2	0	lichaam naar voren	Keypoints : neck Direction : to the front
5	2	0	stop	End of round
5	3	0	lichaam naar Polen	Keypoints : neck Direction : to the front
5	3	0	stop	End of round
5	1	1	nee	Alter pose randomly
5	1	1	nee	Alter pose randomly
5	1	1	stop	End of round
5	2	1	lichaam naar voren	Keypoints : neck Direction : to the front
5	2	1	stop	End of round
5	3	1	naar boven	Keypoints : None, no effect Direction : up
5	3	1	lichaam naar voren	Keypoints : neck Direction : to the front
5	3	1	iets meer	History : A little more
5	3	1	rechterarm	Keypoints : right elbow + right hand

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
5	3	1	rechts voor arm naar achter	Keypoints : left elbow + left hand + right elbow + right hand Direction : to the back
5	3	1	rechtervoorarm omhoog	Keypoints : right hand Direction : up
5	3	1	stop	End of round
5	1	2	stop	End of round
5	2	2	rechtervooraf naar achter	Keypoints : None, no effect Direction : to the back ERROR : don't understand
5	2	2	rechtervoorarm naar achter	Keypoints : right hand Direction : to the back
5	2	2	rechtervoorarm naar Polder	Keypoints : right hand Direction : down
5	2	2	rechtervoorarm naar links	Keypoints : right hand Direction : to the left
5	2	2	rechtervoorarm naar boven	Keypoints : right hand Direction : up
5	2	2	rechtervoorarm naar rechts	Keypoints : right hand Direction : to the right
5	2	2	rechtervoorarm naar links	Keypoints : right hand Direction : to the left
5	2	2	rechtervoorarm naar onder	Keypoints : right hand Direction : down
5	2	2	rechterarm naar rechts	Keypoints : right elbow + right hand Direction : to the right
5	2	2	wekker voor 8	Keypoints : None, no effect Direction : to the front + to the back ERROR : don't understand
5	2	2	voorarm naar boven	Keypoints : left hand + right hand Direction : up

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
5	2	2	rechtervoorarm	Keypoints : right hand ERROR : don't understand
5	2	2	rechts vooraan naar rechts	Keypoints : None, no effect Direction : to the right ERROR : don't understand
5	2	2	rechtervoorarm	Keypoints : right hand ERROR : don't understand
5	2	2	vooral naar beneden	Keypoints : left hand + right hand Direction : down
5	2	2	rechtervoorarm daarachter	Keypoints : right hand ERROR : don't understand
5	2	2	linkervoor arm omhoog	Keypoints : left elbow + left hand + right elbow + right hand Direction : up
5	2	2	rechtervoorarm	Keypoints : right hand ERROR : don't understand
5	2	2	naar links	Keypoints : None, no effect Direction : to the left ERROR : don't understand
5	2	2	stop	End of round
5	3	2	voorarm omhoog	Keypoints : left hand + right hand Direction : up
5	3	2	rechtervoorarm omlaag	Keypoints : right hand Direction : down
5	3	2	rechtervoorarm omhoog	Keypoints : right hand Direction : up
5	3	2	stop	End of round
5	1	3	stop	End of round
5	2	3	licht aan	Keypoints : neck ERROR : don't understand

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
5	2	3	lichaam naar voren	Keypoints : neck Direction : to the front
5	2	3	linkerarm omhoog	Keypoints : left elbow + left hand Direction : up
5	2	3	rechterarm omhoog	Keypoints : right elbow + right hand Direction : up
5	2	3	stop	End of round
5	3	3	zo	Keypoints : None, no effect Direction : to the back
5	3	3	lichaam naar folder	Keypoints : neck Direction : down
5	3	3	lichaam naar Polen	Keypoints : neck Direction : to the front
5	3	3	iets meer	History : A little more
5	3	3	ietsje meer	History : A little more
5	3	3	lichaam naar voren	Keypoints : neck Direction : to the front
5	3	3	rechterarm omlaag	Keypoints : right elbow + right hand Direction : down
5	3	3	rechterarm	Keypoints : right elbow + right hand
5	3	3	rechterarm naar Polen	Keypoints : right elbow + right hand Direction : to the front
5	3	3	restaurant omlaag	Keypoints : right hand Direction : down
5	3	3	rechtervoorarm omhoog	Keypoints : right hand Direction : up
5	3	3	volume omlaag	Keypoints : None, no effect Direction : down

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
5	3	3	rechterarm omlaag	Keypoints : right elbow + right hand Direction : down
5	3	3	rechtervoorarm	Keypoints : right hand
5	3	3	Vomar folder	Keypoints : None, no effect Direction : down
5	3	3	werd de voorrang naar Polder	Keypoints : None, no effect Direction : to the back + down
5	3	3	stop	End of round
6	1	0	stop	End of round
6	2	0	rechterarm omhoog	Keypoints : right elbow + right hand Direction : up
6	2	0	rechterarm naar rechts	Keypoints : right elbow + right hand Direction : to the right
6	2	0	restaurant naar beneden	Keypoints : right hand Direction : down
6	2	0	rechteronderarm omhoog	Keypoints : right hand Direction : up
6	2	0	rechteronderarm	Keypoints : right hand ERROR : don’t understand
6	2	0	rechteronderarm omhoog	Keypoints : right hand Direction : up
6	2	0	rechterbeneden arm naar beneden	Keypoints : left elbow + left hand + right elbow + right hand Direction : down
6	2	0	linkerbovenarm	Keypoints : left elbow ERROR : don’t understand
6	2	0	linkerbovenarm omhoog	Keypoints : left elbow Direction : up

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
6	2	0	linkeronderarm omhoog	Keypoints : left hand Direction : up
6	2	0	linkeronderarm omhoog	Keypoints : left hand Direction : up
6	2	0	stop	End of round
6	3	0	linkerbovenarm fietsen omhoog	Keypoints : left elbow Direction : up
6	3	0	terug	History : Back to previous pose
6	3	0	linkeronderarm iets omhoog	Keypoints : left hand Direction : up Magnitude : –
6	3	0	stop	End of round
6	1	1	stop	End of round
6	2	1	rechterarm ervoor	Keypoints : right elbow + right hand Direction : to the front
6	2	1	linkerarm waarvoor	Keypoints : left elbow + left hand ERROR : don’t understand
6	2	1	linkerarm daarvoor	Keypoints : left elbow + left hand ERROR : don’t understand
6	2	1	linkerarm naar Vorden	Keypoints : left elbow + left hand Direction : to the front
6	2	1	stop	End of round
6	3	1	lichaam naar voren	Keypoints : neck Direction : to the front
6	3	1	rechteronderarm omhoog	Keypoints : right hand Direction : up

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
6	3	1	linkerarm naar Vorden	Keypoints : left elbow + left hand Direction : to the front
6	3	1	stop	End of round
6	1	2	nee	Alter pose randomly
6	1	2	nee	Alter pose randomly
6	1	2	stop	End of round
6	2	2	linkerbovenarm naar Vorden	Keypoints : left elbow Direction : to the front
6	2	2	linkeronderarm omhoog	Keypoints : left hand Direction : up
6	2	2	rechterbovenarm naar Vorden	Keypoints : right elbow Direction : to the front
6	2	2	rechteronderarm naar voren	Keypoints : right hand Direction : to the front
6	2	2	rechteronderarm	Keypoints : right hand ERROR : don’t understand
6	2	2	rechteronderarm naar beneden	Keypoints : right hand Direction : down
6	2	2	rechterbovenarm naar beneden	Keypoints : right elbow Direction : down
6	2	2	rechteronderarm naar beneden	Keypoints : right hand Direction : down
6	2	2	rechteronderarm omhoog	Keypoints : right hand Direction : up
6	2	2	rechteronderarm omhoog	Keypoints : right hand Direction : up
6	2	2	restaurant naar beneden	Keypoints : right hand Direction : down

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
6	2	2	rechterbovenarm naar beneden	Keypoints : right elbow Direction : down
6	2	2	rechterbovenarm naar beneden	Keypoints : right elbow Direction : down
6	2	2	rechteronderarm naar beneden	Keypoints : right hand Direction : down
6	2	2	rechterbovenarm naar beneden	Keypoints : right elbow Direction : down
6	2	2	rechterbovenarm naar beneden	Keypoints : right elbow Direction : down
6	2	2	rechterbovenarm naar beneden	Keypoints : right elbow Direction : down
6	2	2	rechterbovenarm naar beneden	Keypoints : right elbow Direction : down
6	2	2	rechteronderarm naar beneden	Keypoints : right hand Direction : down
6	2	2	rechteronderarm naar beneden	Keypoints : right hand Direction : down
6	2	2	rechteronderarm naar beneden	Keypoints : right hand Direction : down
6	2	2	rechterbovenarm omhoog	Keypoints : right elbow Direction : up
6	2	2	rechteronderarm daarvoor de	Keypoints : right hand Direction : to the back
6	2	2	rechteronderarm naar achter	Keypoints : right hand Direction : to the back
6	2	2	rechteronderarm rechts	Keypoints : right hand Direction : to the right
6	2	2	rechteronderarm omhoog	Keypoints : right hand Direction : up
6	2	2	rechteronderarm omhoog	Keypoints : right hand Direction : up

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
6	2	2	rechteronderarm omhoog	Keypoints : right hand Direction : up
6	2	2	rechterbovenarm naar beneden	Keypoints : right elbow Direction : down
6	2	2	rechterbovenarm naar beneden	Keypoints : right elbow Direction : down
6	2	2	rechterbovenarm naar beneden	Keypoints : right elbow Direction : down
6	2	2	rechteronderarm maar weg	Keypoints : right hand ERROR : don’t understand
6	2	2	rechteronderrug rechts	Keypoints : None, no effect Direction : to the right ERROR : don’t understand
6	2	2	rechteronderarm aardig	Keypoints : right hand ERROR : don’t understand
6	2	2	rechterbovenarm naar beneden	Keypoints : right elbow Direction : down
6	2	2	rechterbovenarm naar beneden	Keypoints : right elbow Direction : down
6	2	2	rechteronderarm naar	Keypoints : right hand ERROR : don’t understand
6	2	2	rechteronderarm rechts	Keypoints : right hand Direction : to the right
6	2	2	rechteronderarm naar beneden	Keypoints : right hand Direction : down
6	2	2	naar rechts	Keypoints : None, no effect Direction : to the right ERROR : don’t understand
6	2	2	rechterbovenarm naar beneden	Keypoints : right elbow Direction : down
6	2	2	naar beneden	Keypoints : None, no effect Direction : down ERROR : don’t understand
6	2	2	rechteronderarm naar beneden	Keypoints : right hand Direction : down

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
6	2	2	bovenarm naar beneden	Keypoints : left elbow + right elbow Direction : down
6	2	2	rechteronderarm naar rechts	Keypoints : right hand Direction : to the right
6	2	2	linkerbovenarm	Keypoints : left elbow ERROR : don't understand
6	2	2	linkerbovenarm omhoog	Keypoints : left elbow Direction : up
6	2	2	linkeronderarm omhoog	Keypoints : left hand Direction : up
6	2	2	rechteronderarm naar beneden	Keypoints : right hand Direction : down
6	2	2	letter bovenarm naar beneden	Keypoints : left elbow + right elbow Direction : down
6	2	2	rechteronderarm maar weg	Keypoints : right hand ERROR : don't understand
6	2	2	rechteronderarm naar rechts	Keypoints : right hand Direction : to the right
6	2	2	lekker onderweg naar Utrecht	Keypoints : None, no effect Direction : down ERROR : don't understand
6	2	2	rechterbovenarm naar beneden	Keypoints : right elbow Direction : down
6	2	2	Never onderarm naar beneden	Keypoints : None, no effect Direction : down ERROR : don't understand
6	2	2	rechteronderarm naar beneden	Keypoints : right hand Direction : down
6	2	2	rechteronderarm aardig	Keypoints : right hand ERROR : don't understand
6	2	2	letter onderarm naar rechts	Keypoints : None, no effect Direction : to the right ERROR : don't understand

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
6	2	2	rechteronderarm naar rechts	Keypoints : right hand Direction : to the right
6	2	2	rechterbovenarm naar beneden	Keypoints : right elbow Direction : down
6	2	2	rechteronderarm naar beneden	Keypoints : right hand Direction : down
6	2	2	rechteronderarm naar rechts	Keypoints : right hand Direction : to the right
6	2	2	even bovenarm naar beneden	Keypoints : left elbow + right elbow Direction : down
6	2	2	rechteronderarm naar rechts	Keypoints : right hand Direction : to the right
6	2	2	rechteronderarm naar rechts	Keypoints : right hand Direction : to the right
6	2	2	stop	End of round
6	3	2	linkeronderarm iets omhoog	Keypoints : left hand Direction : up Magnitude : –
6	3	2	rechterbovenarm iets naar beneden	Keypoints : right elbow Direction : down Magnitude : –
6	3	2	rechteronderarm iets naar beneden	Keypoints : right hand Direction : down Magnitude : –
6	3	2	terug	History : Back to previous pose
6	3	2	wekker onderarm iets naar voren	Keypoints : None, no effect Direction : to the front Magnitude : –
6	3	2	rechteronderarm iets naar voren	Keypoints : right hand Direction : to the front Magnitude : –
6	3	2	rechteronderarm fiets naar rechts	Keypoints : right hand Direction : to the right Magnitude : –

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
6	3	2	rechteronderarm iets naar rechts	Keypoints : right hand Direction : to the right Magnitude : –
6	3	2	rechterbovenarm naar beneden	Keypoints : right elbow Direction : down
6	3	2	rechteronderarm naar beneden	Keypoints : right hand Direction : down
6	3	2	stop	End of round
6	1	3	stop	End of round
6	2	3	lichaam naar Goirle	Keypoints : neck ERROR : don't understand
6	2	3	lichaam naar voren	Keypoints : neck Direction : to the front
6	2	3	rechteronderarm omhoog	Keypoints : right hand Direction : up
6	2	3	linkeronderarm omhoog	Keypoints : left hand Direction : up
6	2	3	rechterbovenarm naar rechts	Keypoints : right elbow Direction : to the right
6	2	3	rechteronderarm omhoog	Keypoints : right hand Direction : up
6	2	3	linkerbovenarm	Keypoints : left elbow ERROR : don't understand
6	2	3	linkeronderarm naar links	Keypoints : left hand Direction : to the left
6	2	3	stop	End of round
6	3	3	lichaam naar voren	Keypoints : neck Direction : to the front
6	3	3	linkeronderarm iets omhoog	Keypoints : left hand Direction : up Magnitude : –

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
6	3	3	rechterbovenarm iets naar beneden	Keypoints : right elbow Direction : down Magnitude : –
6	3	3	rechteronderarm iets omhoog	Keypoints : right hand Direction : up Magnitude : –
6	3	3	rechteronderarm iets omhoog	Keypoints : right hand Direction : up Magnitude : –
6	3	3	rechteronderarm iets omhoog	Keypoints : right hand Direction : up Magnitude : –
6	3	3	terug	History : Back to previous pose
6	3	3	rechteronderarm naar voren	Keypoints : right hand Direction : to the front
6	3	3	onderarm naar rechts	Keypoints : None, no effect Direction : to the right
6	3	3	rechteronderarm naar rechts	Keypoints : right hand Direction : to the right
6	3	3	rechteronderarm naar beneden	Keypoints : right hand Direction : down
6	3	3	rechteronderarm naar beneden	Keypoints : right hand Direction : down
6	3	3	rechteronderarm naar beneden	Keypoints : right hand Direction : down
6	3	3	rechterbovenarm naar beneden	Keypoints : right elbow Direction : down
6	3	3	laptop maar naar beneden	Keypoints : None, no effect Direction : down
6	3	3	rechterarm naar beneden	Keypoints : right elbow + right hand Direction : down
6	3	3	stop	End of round

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
7	1	0	nee	Alter pose randomly
7	1	0	nee	Alter pose randomly
7	1	0	nee	Alter pose randomly
7	1	0	stop	End of round
7	2	0	linkerarm	Keypoints : left elbow + left hand ERROR : don't understand
7	2	0	linkerarm naar voren	Keypoints : left elbow + left hand Direction : to the front
7	2	0	linkerarm omlaag	Keypoints : left elbow + left hand Direction : down
7	2	0	linkerarm omhoog	Keypoints : left elbow + left hand Direction : up
7	2	0	linkerarm naar voren	Keypoints : left elbow + left hand Direction : to the front
7	2	0	omhoog	Keypoints : None, no effect Direction : up ERROR : don't understand
7	2	0	linkerhand omhoog	Keypoints : left hand Direction : up
7	2	0	linkerarm omlaag	Keypoints : left elbow + left hand Direction : down
7	2	0	stop	End of round
7	3	0	lichaam naar voren	Keypoints : neck Direction : to the front
7	3	0	een beetje minder naar voren	History : A little less

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
7	3	0	linkerarm naar voren	Keypoints : left elbow + left hand Direction : to the front
7	3	0	rechterarm een beetje naar voren	Keypoints : right elbow + right hand Direction : to the front Magnitude : -
7	3	0	rechterhand een beetje omhoog	Keypoints : right hand Direction : up Magnitude : -
7	3	0	stop	End of round
7	1	1	stop	End of round
7	2	1	stop	End of round
7	3	1	lichaam een beetje naar voren	Keypoints : neck Direction : to the front Magnitude : -
7	3	1	stop	End of round
7	1	2	stop	End of round
7	2	2	linkerarm	Keypoints : left elbow + left hand ERROR : don’t understand
7	2	2	linkerarm naar voren	Keypoints : left elbow + left hand Direction : to the front
7	2	2	stop	End of round
7	3	2	rechterarm naar voren	Keypoints : right elbow + right hand Direction : to the front
7	3	2	rechterarm een beetje naar beneden	Keypoints : right elbow + right hand Direction : down Magnitude : -
7	3	2	stop	End of round

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
7	1	3	nee	Alter pose randomly
7	1	3	nee	Alter pose randomly
7	1	3	nee	Alter pose randomly
7	1	3	stop	End of round
7	2	3	lichaam naar voren	Keypoints : neck Direction : to the front
7	2	3	linkerhand omhoog	Keypoints : left hand Direction : up
7	2	3	linkerelleboog omhoog	Keypoints : left elbow Direction : up
7	2	3	linkerhand omhoog	Keypoints : left hand Direction : up
7	2	3	stop	End of round
7	3	3	lichaam een beetje naar voren	Keypoints : neck Direction : to the front Magnitude : -
7	3	3	iets meer naar voren	History : A little more
7	3	3	iets meer naar voren	History : A little more
7	3	3	linkerhand omhoog	Keypoints : left hand Direction : up
7	3	3	linkerarm omhoog	Keypoints : left elbow + left hand Direction : up
7	3	3	stop	End of round
8	1	0	nee	Alter pose randomly

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
8	1	0	stop	End of round
8	2	0	linkervoorarm naar rechts	Keypoints : left hand Direction : to the right
8	2	0	linkervoor rechts	Keypoints : None, no effect Direction : to the right ERROR : don't understand
8	2	0	linkerarm rechts	Keypoints : left elbow + left hand Direction : to the right
8	2	0	stop	End of round
8	3	0	lichaam naar voren	Keypoints : neck Direction : to the front
8	3	0	stop	End of round
8	1	1	stop	End of round
8	2	1	rechterarm omhoog	Keypoints : right elbow + right hand Direction : up
8	2	1	omlaag	Keypoints : None, no effect Direction : down ERROR : don't understand
8	2	1	rechterbovenarm en omlaag	Keypoints : right elbow Direction : down
8	2	1	rechterarm naar voren	Keypoints : right elbow + right hand Direction : to the front
8	2	1	stop	End of round
8	3	1	rechterarm omhoog	Keypoints : right elbow + right hand Direction : up
8	3	1	lichaam naar voren	Keypoints : neck Direction : to the front

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
8	3	1	terug	History : Back to previous pose
8	3	1	stop	End of round
8	1	2	nee	Alter pose randomly
8	1	2	nee	Alter pose randomly
8	1	2	nee	Alter pose randomly
8	1	2	nee	Alter pose randomly
8	1	2	nee	Alter pose randomly
8	1	2	nee	Alter pose randomly
8	1	2	nee	Alter pose randomly
8	1	2	nee	Alter pose randomly
8	1	2	nee	Alter pose randomly
8	1	2	nee	Alter pose randomly
8	1	2	nee	Alter pose randomly
8	1	2	stop	End of round
8	2	2	wekker arm omhoog	Keypoints : left elbow + left hand + right elbow + right hand Direction : up
8	2	2	linkerarm omlaag	Keypoints : left elbow + left hand Direction : down

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
8	2	2	rechterarm naar voren	Keypoints : right elbow + right hand Direction : to the front
8	2	2	lichaam naar links	Keypoints : neck Direction : to the left
8	2	2	stop	End of round
8	3	2	rechterhand naar rechts	Keypoints : right hand Direction : to the right
8	3	2	terug	History : Back to previous pose
8	3	2	rechterbovenarm naar rechts	Keypoints : right elbow Direction : to the right
8	3	2	terug	History : Back to previous pose
8	3	2	rechtervoorarm naar rechts	Keypoints : right hand Direction : to the right
8	3	2	terug	History : Back to previous pose
8	3	2	rechterhand naar Born	Keypoints : right hand Direction : to the front
8	3	2	linkerarm naar beneden	Keypoints : left elbow + left hand Direction : down
8	3	2	stop	End of round
8	1	3	nee	Alter pose randomly
8	1	3	stop	End of round
8	2	3	linkerarm naar voren	Keypoints : left elbow + left hand Direction : to the front
8	2	3	linkerarm omlaag	Keypoints : left elbow + left hand Direction : down

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
8	2	3	linkerarm naar voeren	Keypoints : left elbow + left hand Direction : to the front
8	2	3	rechtervoorarm naar links	Keypoints : right hand Direction : to the left
8	2	3	linkervoorarm naar rechts	Keypoints : left hand Direction : to the right
8	2	3	stop	End of round
8	3	3	lichaam naar voren	Keypoints : neck Direction : to the front
8	3	3	armen omhoog	Keypoints : left elbow + left hand + right elbow + right hand Direction : up
8	3	3	armen omhoog	Keypoints : left elbow + left hand + right elbow + right hand Direction : up
8	3	3	Handen Omhoog	Keypoints : left hand + right hand Direction : up
8	3	3	handen verder omhoog	Keypoints : left hand + right hand Direction : up
8	3	3	linkerarm omhoog	Keypoints : left elbow + left hand Direction : up
8	3	3	linkerhand omhoog	Keypoints : left hand Direction : up
8	3	3	linkerhand verder omhoog	Keypoints : left hand Direction : up
8	3	3	rechterhand verder omhoog	Keypoints : right hand Direction : up
8	3	3	rechterarm omhoog	Keypoints : right elbow + right hand Direction : up

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
8	3	3	linkerarm verder omhoog	Keypoints : left elbow + left hand Direction : up
8	3	3	lichaam ver naar voren	Keypoints : neck Direction : to the front
8	3	3	lichaam naar voren	Keypoints : neck Direction : to the front
8	3	3	verder	Keypoints : None, no effect
8	3	3	lichaam naar voren	Keypoints : neck Direction : to the front
8	3	3	verder	Keypoints : None, no effect
8	3	3	lichaam ver naar voren	Keypoints : neck Direction : to the front
8	3	3	lichaam ver naar voren	Keypoints : neck Direction : to the front
8	3	3	lichaam verder naar voren	Keypoints : neck Direction : to the front
8	3	3	stop	End of round
9	1	0	nee	Alter pose randomly
9	1	0	nee	Alter pose randomly
9	1	0	nee	Alter pose randomly
9	1	0	nee	Alter pose randomly
9	1	0	nee	Alter pose randomly
9	1	0	nee	Alter pose randomly

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
9	1	0	nee	Alter pose randomly
9	1	0	nee	Alter pose randomly
9	1	0	nee	Alter pose randomly
9	1	0	nee	Alter pose randomly
9	1	0	nee	Alter pose randomly
9	1	0	nee	Alter pose randomly
9	1	0	nee	Alter pose randomly
9	1	0	stop	End of round
9	2	0	Denk aan morgen	Keypoints : None, no effect Direction : to the front ERROR : don't understand
9	2	0	linkerhand naar boven	Keypoints : left hand Direction : up
9	2	0	profarm	Keypoints : None, no effect ERROR : don't understand
9	2	0	rechterbovenarm links	Keypoints : right elbow Direction : to the left
9	2	0	rechterbovenarm rechts	Keypoints : right elbow Direction : to the right
9	2	0	stop	End of round
9	3	0	lichaam naar voren	Keypoints : neck Direction : to the front
9	3	0	Ik ga een beetje naar achteren	Keypoints : None, no effect Direction : to the back Magnitude : -

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
9	3	0	lichaam beetje naar achteren	Keypoints : neck Direction : to the back Magnitude : -
9	3	0	linkerarm omhoog	Keypoints : left elbow + left hand Direction : up
9	3	0	linkereen beetje naar beneden	Keypoints : None, no effect Direction : down Magnitude : -
9	3	0	linkerarm weet je naar beneden	Keypoints : left elbow + left hand Direction : down
9	3	0	linkerarm naar voren	Keypoints : left elbow + left hand Direction : to the front
9	3	0	linkeronderarm naar achteren	Keypoints : left hand Direction : to the back
9	3	0	lekker voor aan de boven	Keypoints : None, no effect Direction : to the front
9	3	0	wekker voor anderhalve	Keypoints : None, no effect Direction : to the front
9	3	0	linkeronderarm naar boven	Keypoints : left hand Direction : up
9	3	0	linkerhand naar boven	Keypoints : left hand Direction : up
9	3	0	beetje naar beneden	Keypoints : None, no effect Direction : down Magnitude : -
9	3	0	linkerbovenarm	Keypoints : left elbow
9	3	0	linkerbovenarm links	Keypoints : left elbow Direction : to the left
9	3	0	linkerbovenarm links	Keypoints : left elbow Direction : to the left
9	3	0	linkerarm naar links	Keypoints : left elbow + left hand Direction : to the left

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
9	3	0	Lik aan links	Keypoints : None, no effect Direction : to the left
9	3	0	linkerelleboog naar links	Keypoints : left elbow Direction : to the left
9	3	0	linkerelleboog naar links	Keypoints : left elbow Direction : to the left
9	3	0	terug	History : Back to previous pose
9	3	0	terug	History : Back to previous pose
9	3	0	linkerarm omhoog	Keypoints : left elbow + left hand Direction : up
9	3	0	linkerelleboog fiets naar links	Keypoints : left elbow Direction : to the left Magnitude : –
9	3	0	linkerelleboog ik beetje links	Keypoints : left elbow Direction : to the left Magnitude : -
9	3	0	linkerarm beetje links	Keypoints : left elbow + left hand Direction : to the left Magnitude : -
9	3	0	linkerarm naar links	Keypoints : left elbow + left hand Direction : to the left
9	3	0	linkerarm links	Keypoints : left elbow + left hand Direction : to the left
9	3	0	linkerarm naar links	Keypoints : left elbow + left hand Direction : to the left
9	3	0	denk aan terug	History : Back to previous pose
9	3	0	linkerarm terug	History : Back to previous pose
9	3	0	linkerbovenarm naar boven	Keypoints : left elbow Direction : up

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
9	3	0	linkeronderarm naar boven	Keypoints : left hand Direction : up
9	3	0	linkerelleboog naar	Keypoints : left elbow
9	3	0	linkerelleboog naar links	Keypoints : left elbow Direction : to the left
9	3	0	linkerelleboog naar links	Keypoints : left elbow Direction : to the left
9	3	0	linkerarm naar links	Keypoints : left elbow + left hand Direction : to the left
9	3	0	stop	End of round
9	1	1	nee	Alter pose randomly
9	1	1	nee	Alter pose randomly
9	1	1	nee	Alter pose randomly
9	1	1	nee	Alter pose randomly
9	1	1	nee	Alter pose randomly
9	1	1	nee	Alter pose randomly
9	1	1	nee	Alter pose randomly
9	1	1	nee	Alter pose randomly
9	1	1	nee	Alter pose randomly
9	1	1	nee	Alter pose randomly
9	1	1	nee	Alter pose randomly

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
9	1	1	nee	Alter pose randomly
9	1	1	nee	Alter pose randomly
9	1	1	nee	Alter pose randomly
9	1	1	nee	Alter pose randomly
9	1	1	stop	End of round
9	2	1	lichaam naar voren	Keypoints : neck Direction : to the front
9	2	1	onderarmen achter	Keypoints : None, no effect Direction : to the back ERROR : don't understand
9	2	1	westerwoldelaan Drachten	Keypoints : None, no effect Direction : to the back ERROR : don't understand
9	2	1	rechterhand naar achteren	Keypoints : right hand Direction : to the back
9	2	1	stop	End of round
9	3	1	rechterlaan naar voren	Keypoints : None, no effect Direction : to the front
9	3	1	rechterbovenarm naar voren	Keypoints : right elbow Direction : to the front
9	3	1	rechteronderarm naar voren	Keypoints : right hand Direction : to the front
9	3	1	rechterbovenarm naar voren	Keypoints : right elbow Direction : to the front
9	3	1	rechteronderarm naar voren	Keypoints : right hand Direction : to the front
9	3	1	stop	End of round

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
9	1	2	nee	Alter pose randomly
9	1	2	nee	Alter pose randomly
9	1	2	nee	Alter pose randomly
9	1	2	nee	Alter pose randomly
9	1	2	nee	Alter pose randomly
9	1	2	nee	Alter pose randomly
9	1	2	nee	Alter pose randomly
9	1	2	nee	Alter pose randomly
9	1	2	nee	Alter pose randomly
9	1	2	nee	Alter pose randomly
9	1	2	nee	Alter pose randomly
9	1	2	nee	Alter pose randomly
9	1	2	nee	Alter pose randomly
9	1	2	nee	Alter pose randomly
9	1	2	nee	Alter pose randomly
9	1	2	nee	Alter pose randomly
9	1	2	nee	Alter pose randomly

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
9	1	2	nee	Alter pose randomly
9	1	2	nee	Alter pose randomly
9	1	2	nee	Alter pose randomly
9	1	2	nee	Alter pose randomly
9	1	2	nee	Alter pose randomly
9	1	2	nee	Alter pose randomly
9	1	2	stop	End of round
9	2	2	bovenlichaam naar voren	Keypoints : neck Direction : to the front
9	2	2	Flickr	Keypoints : None, no effect ERROR : don't understand
9	2	2	linkeronderarm naar voren	Keypoints : left hand Direction : to the front
9	2	2	dikke bovenarmen voor	Keypoints : None, no effect Direction : to the front ERROR : don't understand
9	2	2	bovenarm	Keypoints : left elbow + right elbow ERROR : don't understand
9	2	2	linkerbovenarm naar voren	Keypoints : left elbow Direction : to the front
9	2	2	linkeronderarm naar boven	Keypoints : left hand Direction : up
9	2	2	linkerbovenarm naar voren	Keypoints : left elbow Direction : to the front
9	2	2	naar boven	Keypoints : None, no effect Direction : up ERROR : don't understand

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
9	2	2	boven	Keypoints : None, no effect Direction : up ERROR : don't understand
9	2	2	linkerhand naar boven	Keypoints : left hand Direction : up
9	2	2	linkerhand achteren	Keypoints : left hand Direction : to the back
9	2	2	rechteronderarm naar voren	Keypoints : right hand Direction : to the front
9	2	2	beste bovenarm naar voren	Keypoints : left elbow + right elbow Direction : to the front
9	2	2	lekker	Keypoints : None, no effect ERROR : don't understand
9	2	2	rechterhand naar voren	Keypoints : right hand Direction : to the front
9	2	2	rechterhand	Keypoints : right hand Direction : to the right
9	2	2	rechterbovenarm naar boven	Keypoints : right elbow Direction : up
9	2	2	rechterbovenarm	Keypoints : right elbow ERROR : don't understand
9	2	2	rechterbovenarm naar beneden	Keypoints : right elbow Direction : down
9	2	2	verander horen	Keypoints : None, no effect Direction : to the front ERROR : don't understand
9	2	2	onderaan de boven	Keypoints : None, no effect Direction : up ERROR : don't understand
9	2	2	rechterbovenarm naar binnen	Keypoints : right elbow ERROR : don't understand
9	2	2	rechterbovenarm naar binnen	Keypoints : right elbow ERROR : don't understand

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
9	2	2	beste bovenarm naar links	Keypoints : left elbow + right elbow Direction : to the left
9	2	2	stop	End of round
9	3	2	Tot zo naar voren	Keypoints : None, no effect Direction : to the front
9	3	2	lichaam	Keypoints : neck
9	3	2	lichaam horen	Keypoints : neck Direction : to the front
9	3	2	rechterarm naar voren	Keypoints : right elbow + right hand Direction : to the front
9	3	2	weggaan	Keypoints : None, no effect
9	3	2	rechterarm iets omhoog	Keypoints : right elbow + right hand Direction : up Magnitude : –
9	3	2	Kieskeurig	Keypoints : None, no effect
9	3	2	beetje terug	History : Back to previous pose
9	3	2	rechterarm beetje terug	History : Back to previous pose
9	3	2	rechterarm beetje naar beneden	Keypoints : right elbow + right hand Direction : down Magnitude : -
9	3	2	beste onderarm tevoren	Keypoints : None, no effect Direction : to the front
9	3	2	met de voornaam	Keypoints : None, no effect Direction : to the back
9	3	2	verder vooraan naar voren	Keypoints : None, no effect Direction : to the front

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
9	3	2	wekker voor aan de rechts	Keypoints : None, no effect Direction : to the front + to the right
9	3	2	rechts onderaan rechts	Keypoints : None, no effect Direction : to the right
9	3	2	rechteronderarm werken	Keypoints : right hand
9	3	2	rechteronderarm naar rechts	Keypoints : right hand Direction : to the right
9	3	2	terug	History : Back to previous pose
9	3	2	rechterarm naar voren	Keypoints : right elbow + right hand Direction : to the front
9	3	2	rechteronderarm naar voren	Keypoints : right hand Direction : to the front
9	3	2	rechteronderarm naar voren	Keypoints : right hand Direction : to the front
9	3	2	weg	Keypoints : None, no effect
9	3	2	lichaam naar achteren	Keypoints : neck Direction : to the back
9	3	2	weg vragen naar beneden	Keypoints : None, no effect Direction : down
9	3	2	rechterarm beneden	Keypoints : right elbow + right hand Direction : down
9	3	2	terug	History : Back to previous pose
9	3	2	rechterarm omlaag	Keypoints : right elbow + right hand Direction : down
9	3	2	weg iets omhoog	Keypoints : None, no effect Direction : up Magnitude : –

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
9	3	2	best raar iets omhoog	Keypoints : None, no effect Direction : up Magnitude : –
9	3	2	rechterarm omhoog	Keypoints : right elbow + right hand Direction : up
9	3	2	Westerlaan iets naar beneden	Keypoints : None, no effect Direction : down Magnitude : –
9	3	2	linkerarm naar voren	Keypoints : left elbow + left hand Direction : to the front
9	3	2	linkeronderarm naar	Keypoints : left hand
9	3	2	linkeronderarm links	Keypoints : left hand Direction : to the left
9	3	2	linkerbovenarm naar binnen	Keypoints : left elbow
9	3	2	linkerbovenarm naar voren	Keypoints : left elbow Direction : to the front
9	3	2	linkeronderarm naar boven	Keypoints : left hand Direction : up
9	3	2	linkerbovenarm naar voren	Keypoints : left elbow Direction : to the front
9	3	2	linkeronderarm naar boven	Keypoints : left hand Direction : up
9	3	2	linkeronderarm naar achteren	Keypoints : left hand Direction : to the back
9	3	2	stop	End of round
9	1	3	nee	Alter pose randomly
9	1	3	nee	Alter pose randomly
9	1	3	nee	Alter pose randomly

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
9	1	3	nee	Alter pose randomly
9	1	3	nee	Alter pose randomly
9	1	3	nee	Alter pose randomly
9	1	3	stop	End of round
9	2	3	ok□	Keypoints : None, no effect ERROR : don't understand
9	2	3	lichaam	Keypoints : neck ERROR : don't understand
9	2	3	lichaam naar voren	Keypoints : neck Direction : to the front
9	2	3	rechterbovenarm naar achter	Keypoints : right elbow Direction : to the back
9	2	3	rechterbovenarm naar beneden	Keypoints : right elbow Direction : down
9	2	3	rechterbovenarm elleboog	Keypoints : right elbow ERROR : don't understand
9	2	3	rechteronderarm naar boven	Keypoints : right hand Direction : up
9	2	3	krijg je onderaan de 8	Keypoints : None, no effect Direction : to the back ERROR : don't understand
9	2	3	rechts onderaan naar achteren	Keypoints : None, no effect Direction : to the back ERROR : don't understand
9	2	3	linkerbovenarm naar voren	Keypoints : left elbow Direction : to the front
9	2	3	linkeronderarm naar boven	Keypoints : left hand Direction : up
9	2	3	rechterhand van achteren	Keypoints : right hand Direction : to the back

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
9	2	3	stop	End of round
9	3	3	armen naar achteren	Keypoints : left elbow + left hand + right elbow + right hand Direction : to the back
9	3	3	armen naar achteren	Keypoints : left elbow + left hand + right elbow + right hand Direction : to the back
9	3	3	gaan we naar achteren	Keypoints : None, no effect Direction : to the back
9	3	3	achteren	Keypoints : None, no effect Direction : to the back
9	3	3	armen naar achteren	Keypoints : left elbow + left hand + right elbow + right hand Direction : to the back
9	3	3	waar	Keypoints : None, no effect
9	3	3	stop	End of round
10	1	0	nee	Alter pose randomly
10	1	0	nee	Alter pose randomly
10	1	0	nee	Alter pose randomly
10	1	0	nee	Alter pose randomly
10	1	0	nee	Alter pose randomly
10	1	0	nee	Alter pose randomly

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
10	1	0	nee	Alter pose randomly
10	1	0	stop	End of round
10	2	0	rechterhand omhoog	Keypoints : right hand Direction : up
10	2	0	linkerelleboog naar voren	Keypoints : left elbow Direction : to the front
10	2	0	rechterelleboog omhoog	Keypoints : right elbow Direction : up
10	2	0	rechterhand omhoog	Keypoints : right hand Direction : up
10	2	0	rechtervoorarm omhoog	Keypoints : right hand Direction : up
10	2	0	linkervoor arm omhoog	Keypoints : left elbow + left hand + right elbow + right hand Direction : up
10	2	0	bovenarmen omlaag	Keypoints : None, no effect Direction : down ERROR : don’t understand
10	2	0	bovenarmen omlaag	Keypoints : None, no effect Direction : down ERROR : don’t understand
10	2	0	rechterbovenarm omlaag	Keypoints : right elbow Direction : down
10	2	0	linkerbovenarm omlaag	Keypoints : left elbow Direction : down
10	2	0	linkerhand naar rechts	Keypoints : left hand Direction : to the right
10	2	0	stop	End of round
10	3	0	rechteronderarm naar boven	Keypoints : right hand Direction : up

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
10	3	0	iets meer	History : A little more
10	3	0	nog iets meer	History : A little more
10	3	0	linkeronderarm naar boven	Keypoints : left hand Direction : up
10	3	0	linkerelleboog omhoog	Keypoints : left elbow Direction : up
10	3	0	terug	History : Back to previous pose
10	3	0	linkerelleboog een beetje naar voren	Keypoints : left elbow Direction : to the front Magnitude : -
10	3	0	linkerhand omhoog	Keypoints : left hand Direction : up
10	3	0	rechterelleboog een beetje naar voren	Keypoints : right elbow Direction : to the front Magnitude : -
10	3	0	rechterhand omhoog	Keypoints : right hand Direction : up
10	3	0	linkerelleboog een beetje naar links	Keypoints : left elbow Direction : to the left Magnitude : -
10	3	0	linkerhand een beetje omhoog	Keypoints : left hand Direction : up Magnitude : -
10	3	0	terug	History : Back to previous pose
10	3	0	stop	End of round
10	1	1	nee	Alter pose randomly
10	1	1	nee	Alter pose randomly
10	1	1	nee	Alter pose randomly

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
10	1	1	nee	Alter pose randomly
10	1	1	nee	Alter pose randomly
10	1	1	nee	Alter pose randomly
10	1	1	nee	Alter pose randomly
10	1	1	nee	Alter pose randomly
10	1	1	nee	Alter pose randomly
10	1	1	stop	End of round
10	2	1	rechterhand omhoog	Keypoints : right hand Direction : up
10	2	1	stop	End of round
10	3	1	rechterhand veel omhoog	Keypoints : right hand Direction : up Magnitude : ++
10	3	1	rechterelleboog omhoog	Keypoints : right elbow Direction : up
10	3	1	rechterhand omhoog	Keypoints : right hand Direction : up
10	3	1	rechterelleboog omlaag	Keypoints : right elbow Direction : down
10	3	1	lichaam een beetje naar voren	Keypoints : neck Direction : to the front Magnitude : -
10	3	1	rechterelleboog een beetje omhoog	Keypoints : right elbow Direction : up Magnitude : -
10	3	1	rechterhand een beetje omhoog	Keypoints : right hand Direction : up Magnitude : -

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
10	3	1	iets meer	History : A little more
10	3	1	stop	End of round
10	1	2	nee	Alter pose randomly
10	1	2	nee	Alter pose randomly
10	1	2	nee	Alter pose randomly
10	1	2	nee	Alter pose randomly
10	1	2	nee	Alter pose randomly
10	1	2	nee	Alter pose randomly
10	1	2	nee	Alter pose randomly
10	1	2	nee	Alter pose randomly
10	1	2	nee	Alter pose randomly
10	1	2	stop	End of round
10	2	2	lichaam naar folder	Keypoints : neck Direction : down
10	2	2	die gaan we daarvoor	Keypoints : None, no effect Direction : to the back + to the left ERROR : don't understand
10	2	2	lichaam naar voren	Keypoints : neck Direction : to the front
10	2	2	rechterhand naar voren	Keypoints : right hand Direction : to the front
10	2	2	rechterelleboog omlaag	Keypoints : right elbow Direction : down

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
10	2	2	rechterhand omlaag	Keypoints : right hand Direction : down
10	2	2	linkerhand omhoog	Keypoints : left hand Direction : up
10	2	2	linkerhand omhoog	Keypoints : left hand Direction : up
10	2	2	linkerelleboog naar links	Keypoints : left elbow Direction : to the left
10	2	2	stop	End of round
10	3	2	rechterhand veel naar voren	Keypoints : right hand Direction : to the front Magnitude : ++
10	3	2	linkerhand omhoog	Keypoints : left hand Direction : up
10	3	2	lichaam een beetje naar voren	Keypoints : neck Direction : to the front Magnitude : -
10	3	2	rechterelleboog een beetje naar beneden	Keypoints : right elbow Direction : down Magnitude : -
10	3	2	iets minder	History : A little less
10	3	2	rechteronderarm een beetje naar beneden	Keypoints : right hand Direction : down Magnitude : -
10	3	2	linkerhand een beetje omhoog	Keypoints : left hand Direction : up Magnitude : -
10	3	2	stop	End of round
10	1	3	stop	End of round
10	2	3	rechterhand naar links	Keypoints : right hand Direction : to the left

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
10	2	3	stop	End of round
10	3	3	rechterhand naar links	Keypoints : right hand Direction : to the left
10	3	3	rechterhand een beetje omhoog	Keypoints : right hand Direction : up Magnitude : -
10	3	3	terug	History : Back to previous pose
10	3	3	rechterhand een beetje naar links	Keypoints : right hand Direction : to the left Magnitude : -
10	3	3	stop	End of round
11	1	0	nee	Alter pose randomly
11	1	0	nee	Alter pose randomly
11	1	0	nee	Alter pose randomly
11	1	0	nee	Alter pose randomly
11	1	0	nee	Alter pose randomly
11	1	0	nee	Alter pose randomly
11	1	0	nee	Alter pose randomly
11	1	0	nee	Alter pose randomly
11	1	0	nee	Alter pose randomly
11	1	0	nee	Alter pose randomly
11	1	0	nee	Alter pose randomly

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
11	1	0	nee	Alter pose randomly
11	1	0	nee	Alter pose randomly
11	1	0	stop	End of round
11	2	0	lichaam naar voren	Keypoints : neck Direction : to the front
11	2	0	stop	End of round
11	3	0	linkerarm iets omhoog	Keypoints : left elbow + left hand Direction : up Magnitude : –
11	3	0	terug	History : Back to previous pose
11	3	0	iets naar 8	Keypoints : None, no effect Direction : to the back Magnitude : –
11	3	0	lichaam	Keypoints : neck
11	3	0	lichaam fiets naar	Keypoints : neck Magnitude : –
11	3	0	lichaam iets naar achter	Keypoints : neck Direction : to the back Magnitude : –
11	3	0	linkerarm	Keypoints : left elbow + left hand
11	3	0	linkerarm naar rechts	Keypoints : left elbow + left hand Direction : to the right
11	3	0	stop	End of round
11	1	1	nee	Alter pose randomly

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
11	1	1	nee	Alter pose randomly
11	1	1	nee	Alter pose randomly
11	1	1	nee	Alter pose randomly
11	1	1	nee	Alter pose randomly
11	1	1	nee	Alter pose randomly
11	1	1	stop	End of round
11	2	1	lichaam naar voren	Keypoints : neck Direction : to the front
11	2	1	lichaam	Keypoints : neck ERROR : don't understand
11	2	1	elleboog	Keypoints : left elbow + right elbow ERROR : don't understand
11	2	1	elleboog	Keypoints : left elbow + right elbow ERROR : don't understand
11	2	1	rechterelleboog naar boven	Keypoints : right elbow Direction : up
11	2	1	rechtervoorarm naar rechts	Keypoints : right hand Direction : to the right
11	2	1	rechtse voorarm naar voren	Keypoints : left hand + right hand Direction : to the front
11	2	1	rechterelleboog naar links	Keypoints : right elbow Direction : to the left
11	2	1	rechtervoorarm naar links	Keypoints : right hand Direction : to the left
11	2	1	rechtervoorarm naar voren	Keypoints : right hand Direction : to the front

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
11	2	1	stop	End of round
11	3	1	lichaam naar voren	Keypoints : neck Direction : to the front
11	3	1	bovenarm of naar	Keypoints : left elbow + right elbow Direction : to the back
11	3	1	terug	History : Back to previous pose
11	3	1	rechterbovenarm naar voren	Keypoints : right elbow Direction : to the front
11	3	1	rechtervoorarm naar voren	Keypoints : right hand Direction : to the front
11	3	1	stop	End of round
11	1	2	nee	Alter pose randomly
11	1	2	nee	Alter pose randomly
11	1	2	nee	Alter pose randomly
11	1	2	nee	Alter pose randomly
11	1	2	nee	Alter pose randomly
11	1	2	stop	End of round
11	2	2	rechten voor naar boven	Keypoints : None, no effect Direction : to the front ERROR : don’t understand
11	2	2	rechterarm naar	Keypoints : right elbow + right hand ERROR : don’t understand
11	2	2	linkerarm naar voren	Keypoints : left elbow + left hand Direction : to the front

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
11	2	2	lichaam naar achter	Keypoints : neck Direction : to the back
11	2	2	stop	End of round
11	3	2	rechterbovenarm naar beneden	Keypoints : right elbow Direction : down
11	3	2	terug	History : Back to previous pose
11	3	2	bovenarm naar beneden	Keypoints : left elbow + right elbow Direction : down
11	3	2	linkerbovenarm naar voren	Keypoints : left elbow Direction : to the front
11	3	2	naar voren	Keypoints : None, no effect Direction : to the front
11	3	2	linkervoorarm naar voren	Keypoints : left hand Direction : to the front
11	3	2	linkerarm naar beneden	Keypoints : left elbow + left hand Direction : down
11	3	2	linkerbovenarm naar beneden	Keypoints : left elbow Direction : down
11	3	2	armen omlaag	Keypoints : left elbow + left hand + right elbow + right hand Direction : down
11	3	2	armen omlaag	Keypoints : left elbow + left hand + right elbow + right hand Direction : down
11	3	2	armen naar beneden	Keypoints : left elbow + left hand + right elbow + right hand Direction : down
11	3	2	linkerarm naar beneden	Keypoints : left elbow + left hand Direction : down

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
11	3	2	Richter	Keypoints : None, no effect Direction : to the back
11	3	2	rechtervoorarm naar voren	Keypoints : right hand Direction : to the front
11	3	2	stop	End of round
11	1	3	nee	Alter pose randomly
11	1	3	nee	Alter pose randomly
11	1	3	nee	Alter pose randomly
11	1	3	nee	Alter pose randomly
11	1	3	nee	Alter pose randomly
11	1	3	nee	Alter pose randomly
11	1	3	nee	Alter pose randomly
11	1	3	nee	Alter pose randomly
11	1	3	nee	Alter pose randomly
11	1	3	nee	Alter pose randomly
11	1	3	nee	Alter pose randomly
11	1	3	nee	Alter pose randomly
11	1	3	nee	Alter pose randomly
11	1	3	nee	Alter pose randomly

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
11	1	3	nee	Alter pose randomly
11	1	3	stop	End of round
11	2	3	rechtervoorarm naar achteren	Keypoints : right hand Direction : to the back
11	2	3	linkervoorarm naar achteren	Keypoints : left hand Direction : to the back
11	2	3	linkervoorarm naar achteren	Keypoints : left hand Direction : to the back
11	2	3	linkerarm naar achteren	Keypoints : left elbow + left hand Direction : to the back
11	2	3	lichaam naar voren	Keypoints : neck Direction : to the front
11	2	3	linkervoor arm naar achteren	Keypoints : left elbow + left hand + right elbow + right hand Direction : to the back
11	2	3	rechtervoorarm naar voren	Keypoints : right hand Direction : to the front
11	2	3	rechterelleboog naar beneden	Keypoints : right elbow Direction : down
11	2	3	rechtervoorarm naar achteren	Keypoints : right hand Direction : to the back
11	2	3	stop	End of round
11	3	3	lichaam iets	Keypoints : neck Magnitude : –
11	3	3	lichaam iets naar voren	Keypoints : neck Direction : to the front Magnitude : –
11	3	3	terug	History : Back to previous pose

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
11	3	3	linkerom voorarm naar boven	Keypoints : left hand + right hand Direction : up
11	3	3	rechterarm naar rechts	Keypoints : right elbow + right hand Direction : to the right
11	3	3	terug	History : Back to previous pose
11	3	3	linkerarm naar rechts	Keypoints : left elbow + left hand Direction : to the right
11	3	3	stop	End of round
12	1	0	stop	End of round
12	2	0	Ik ga naar Hoorn	Keypoints : None, no effect Direction : to the back ERROR : don’t understand
12	2	0	lichaam naar voren	Keypoints : neck Direction : to the front
12	2	0	linkeronderarm omlaag	Keypoints : left hand Direction : down
12	2	0	linker	Keypoints : None, no effect Direction : to the left ERROR : don’t understand
12	2	0	linkeronderarm omlaag	Keypoints : left hand Direction : down
12	2	0	stop	End of round
12	3	0	lichaam iets naar voren	Keypoints : neck Direction : to the front Magnitude : –
12	3	0	stop	End of round
12	1	1	nee	Alter pose randomly

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
12	1	1	nee	Alter pose randomly
12	1	1	stop	End of round
12	2	1	lichaam naar Hoorn	Keypoints : neck Direction : to the front
12	2	1	stop	End of round
12	3	1	lichaam fiets naar Hoorn	Keypoints : neck Direction : to the front Magnitude : –
12	3	1	rechtervoorarm omhoog	Keypoints : right hand Direction : up
12	3	1	stop	End of round
12	1	2	nee	Alter pose randomly
12	1	2	stop	End of round
12	2	2	rechteronderarm	Keypoints : right hand ERROR : don’t understand
12	2	2	linkeronderarm omhoog	Keypoints : left hand Direction : up
12	2	2	stop	End of round
12	3	2	linkeronderarm iets omhoog	Keypoints : left hand Direction : up Magnitude : –
12	3	2	stop	End of round
12	1	3	nee	Alter pose randomly
12	1	3	nee	Alter pose randomly

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
12	1	3	stop	End of round
12	2	3	lichaam naar Hoorn	Keypoints : neck Direction : to the front
12	2	3	rechtervoorarm omhoog	Keypoints : right hand Direction : up
12	2	3	omhoog	Keypoints : None, no effect Direction : up ERROR : don't understand
12	2	3	stop	End of round
12	3	3	rechterbovenarm iets omhoog	Keypoints : right elbow Direction : up Magnitude : –
12	3	3	rechterbovenarm iets omhoog	Keypoints : right elbow Direction : up Magnitude : –
12	3	3	stop	End of round
13	1	0	nee	Alter pose randomly
13	1	0	nee	Alter pose randomly
13	1	0	nee	Alter pose randomly
13	1	0	nee	Alter pose randomly
13	1	0	nee	Alter pose randomly
13	1	0	nee	Alter pose randomly
13	1	0	nee	Alter pose randomly
13	1	0	nee	Alter pose randomly
13	1	0	nee	Alter pose randomly

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
13	1	0	nee	Alter pose randomly
13	1	0	nee	Alter pose randomly
13	1	0	nee	Alter pose randomly
13	1	0	nee	Alter pose randomly
13	1	0	nee	Alter pose randomly
13	1	0	nee	Alter pose randomly
13	1	0	nee	Alter pose randomly
13	1	0	nee	Alter pose randomly
13	1	0	stop	End of round
13	2	0	lichaam naar voren	Keypoints : neck Direction : to the front
13	2	0	linkerarm omhoog	Keypoints : left elbow + left hand Direction : up
13	2	0	linkerelleboog vandaag	Keypoints : left elbow ERROR : don't understand
13	2	0	linkerelleboog omlaag	Keypoints : left elbow Direction : down
13	2	0	linkerelleboog omlaag	Keypoints : left elbow Direction : down
13	2	0	linkerbovenarm naar voren	Keypoints : left elbow Direction : to the front
13	2	0	rechteronderarm naar voren	Keypoints : right hand Direction : to the front

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
13	2	0	rechterelleboog naar voren	Keypoints : right elbow Direction : to the front
13	2	0	gister elleboog naar achteren	Keypoints : left elbow + right elbow Direction : to the back
13	2	0	rechterelleboog naar achteren	Keypoints : right elbow Direction : to the back
13	2	0	linkerelleboog naar voren	Keypoints : left elbow Direction : to the front
13	2	0	linkerbovenarm naar voren	Keypoints : left elbow Direction : to the front
13	2	0	linkerhand naar voren	Keypoints : left hand Direction : to the front
13	2	0	linkerarm naar voren	Keypoints : left elbow + left hand Direction : to the front
13	2	0	ligging elleboog naar voren	Keypoints : left elbow + right elbow Direction : to the front
13	2	0	linkerelleboog naar onderen	Keypoints : left elbow Direction : down
13	2	0	rechteronderarm omhoog	Keypoints : right hand Direction : up
13	2	0	rechterelleboog naar links	Keypoints : right elbow Direction : to the left
13	2	0	rechterelleboog naar rechts	Keypoints : right elbow Direction : to the right
13	2	0	rechterbovenarm omlaag	Keypoints : right elbow Direction : down
13	2	0	stop	End of round
13	3	0	linkerarm is naar voren	Keypoints : left elbow + left hand Direction : to the front
13	3	0	rechterarm draaien	Keypoints : right elbow + right hand

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
13	3	0	rechterbovenarm omhoog	Keypoints : right elbow Direction : up
13	3	0	8:30	Keypoints : None, no effect
13	3	0	rechterarm vooruit	Keypoints : right elbow + right hand Direction : to the front
13	3	0	restaurant Stavoren	Keypoints : right hand Direction : to the front
13	3	0	rechterelleboog gemaakt	Keypoints : right elbow
13	3	0	Geef mij elleboog omlaag	Keypoints : left elbow + right elbow Direction : down
13	3	0	linkerarm naar voren	Keypoints : left elbow + left hand Direction : to the front
13	3	0	stop	End of round
13	1	1	stop	End of round
13	2	1	lichaam naar voren	Keypoints : neck Direction : to the front
13	2	1	rechterelleboog naar voren	Keypoints : right elbow Direction : to the front
13	2	1	rechterhand naar voren	Keypoints : right hand Direction : to the front
13	2	1	linkerhand omlaag	Keypoints : left hand Direction : down
13	2	1	stop	End of round
13	3	1	lichaam in Stavoren	Keypoints : neck Direction : to the front
13	3	1	iets meer	History : A little more

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
13	3	1	veel meer	History : A little more
13	3	1	lichaam naar voren	Keypoints : neck Direction : to the front
13	3	1	linkerelleboog naar voren	Keypoints : left elbow Direction : to the front
13	3	1	terug	History : Back to previous pose
13	3	1	restaurant omhoog	Keypoints : right hand Direction : up
13	3	1	rechterarm omhoog	Keypoints : right elbow + right hand Direction : up
13	3	1	stop	End of round
13	1	2	stop	End of round
13	2	2	rechterhand naar rechts	Keypoints : right hand Direction : to the right
13	2	2	stop	End of round
13	3	2	lichaam naar voren	Keypoints : neck Direction : to the front
13	3	2	linkerarm naar voren	Keypoints : left elbow + left hand Direction : to the front
13	3	2	stop	End of round
13	1	3	nee	Alter pose randomly
13	1	3	nee	Alter pose randomly
13	1	3	stop	End of round

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
13	2	3	lichaam naar voren	Keypoints : neck Direction : to the front
13	2	3	lichaam naar voren	Keypoints : neck Direction : to the front
13	2	3	armen omhoog	Keypoints : left elbow + left hand + right elbow + right hand Direction : up
13	2	3	onderarmen naar achteren	Keypoints : None, no effect Direction : to the back ERROR : don't understand
13	2	3	ellebogen achteren	Keypoints : left elbow + right elbow Direction : to the back
13	2	3	Handen Omhoog	Keypoints : left hand + right hand Direction : up
13	2	3	armen omhoog	Keypoints : left elbow + left hand + right elbow + right hand Direction : up
13	2	3	ellebogen naar onderen	Keypoints : left elbow + right elbow Direction : down
13	2	3	armen omhoog	Keypoints : left elbow + left hand + right elbow + right hand Direction : up
13	2	3	restaurant naar links	Keypoints : right hand Direction : to the left
13	2	3	linkerhand naar rechts	Keypoints : left hand Direction : to the right
13	2	3	linkerhand naar rechts	Keypoints : left hand Direction : to the right
13	2	3	armen omhoog	Keypoints : left elbow + left hand + right elbow + right hand Direction : up

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
13	2	3	stop	End of round
13	3	3	Nederlandse achter	Keypoints : None, no effect Direction : to the back
13	3	3	legerland naar achteren	Keypoints : None, no effect Direction : to the back
13	3	3	linkerhand naar achteren	Keypoints : left hand Direction : to the back
13	3	3	rechterhand omhoog	Keypoints : right hand Direction : up
13	3	3	rechterelleboog omhoog	Keypoints : right elbow Direction : up
13	3	3	Ik heb de elleboog omlaag	Keypoints : left elbow + right elbow Direction : down
13	3	3	terug	History : Back to previous pose
13	3	3	rechterhand omhoog	Keypoints : right hand Direction : up
13	3	3	stop	End of round
14	1	0	nee	Alter pose randomly
14	1	0	nee	Alter pose randomly
14	1	0	nee	Alter pose randomly
14	1	0	nee	Alter pose randomly
14	1	0	nee	Alter pose randomly
14	1	0	nee	Alter pose randomly

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
14	1	0	nee	Alter pose randomly
14	1	0	stop	End of round
14	2	0	lichaam naar voren	Keypoints : neck Direction : to the front
14	2	0	rechterhand naar boven	Keypoints : right hand Direction : up
14	2	0	linkerhand naar boven	Keypoints : left hand Direction : up
14	2	0	rechterbovenarm naar boven	Keypoints : right elbow Direction : up
14	2	0	echte voorarm naar boven	Keypoints : left hand + right hand Direction : up
14	2	0	rechtervoorarm naar links	Keypoints : right hand Direction : to the left
14	2	0	beide bovenarmen naar boven	Keypoints : None, no effect Direction : up ERROR : don’t understand
14	2	0	beide bovenarmen naar boven	Keypoints : None, no effect Direction : up ERROR : don’t understand
14	2	0	allebei de bovenarmen naar boven	Keypoints : None, no effect Direction : up ERROR : don’t understand
14	2	0	linkerbovenarm naar boven	Keypoints : left elbow Direction : up
14	2	0	linkervooraan naar boven	Keypoints : left elbow Direction : up
14	2	0	linkerhand naar boven	Keypoints : left hand Direction : up
14	2	0	stop	End of round

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
14	3	0	Tot zo een beetje naar voren	Keypoints : None, no effect Direction : to the front Magnitude : -
14	3	0	lichaam een beetje naar voren	Keypoints : neck Direction : to the front Magnitude : -
14	3	0	trechtervorm een beetje naar boven	Keypoints : right hand Direction : up Magnitude : -
14	3	0	linkerhand beetje naar links	Keypoints : left hand Direction : to the left Magnitude : -
14	3	0	rechtervoorarm een beetje naar boven	Keypoints : right hand Direction : up Magnitude : -
14	3	0	rechterhand een beetje naar rechts	Keypoints : right hand Direction : to the right Magnitude : -
14	3	0	restaurant een beetje naar links	Keypoints : right hand Direction : to the left Magnitude : -
14	3	0	stop	End of round
14	1	1	stop	End of round
14	2	1	lichaam naar voren	Keypoints : neck Direction : to the front
14	2	1	rechterhand naar boven	Keypoints : right hand Direction : up
14	2	1	restaurant naar boven	Keypoints : right hand Direction : up
14	2	1	rechterhand naar achteren	Keypoints : right hand Direction : to the back
14	2	1	stop	End of round
14	3	1	restaurant omhoog	Keypoints : right hand Direction : up

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
14	3	1	beste arm Filmhallen	Keypoints : left elbow + left hand + right elbow + right hand
14	3	1	rechterbovenarm	Keypoints : right elbow
14	3	1	rechterbovenarm omhoog	Keypoints : right elbow Direction : up
14	3	1	rechterbovenarm naar rechts	Keypoints : right elbow Direction : to the right
14	3	1	voorarm omhoog	Keypoints : left hand + right hand Direction : up
14	3	1	rechtervoorarm omhoog	Keypoints : right hand Direction : up
14	3	1	forearm een beetje omhoog	Keypoints : None, no effect Direction : up Magnitude : -
14	3	1	rechtervoorarm beetje hoog	Keypoints : right hand Direction : to the front + up Magnitude : -
14	3	1	rechtervoorarm een beetje omhoog	Keypoints : right hand Direction : up Magnitude : -
14	3	1	rechtsvorm een beetje omhoog	Keypoints : None, no effect Direction : up Magnitude : -
14	3	1	linkervoorarm omlaag	Keypoints : left hand Direction : down
14	3	1	linkervoorarm een beetje omlaag	Keypoints : left hand Direction : down Magnitude : -
14	3	1	stop	End of round
14	1	2	nee	Alter pose randomly
14	1	2	nee	Alter pose randomly

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
14	1	2	nee	Alter pose randomly
14	1	2	nee	Alter pose randomly
14	1	2	stop	End of round
14	2	2	stop	End of round
14	3	2	linkerhand een beetje naar voren	Keypoints : left hand Direction : to the front Magnitude : -
14	3	2	restaurant een beetje nacht	Keypoints : right hand Direction : to the back Magnitude : -
14	3	2	rechterhand een beetje naar voren	Keypoints : right hand Direction : to the front Magnitude : -
14	3	2	rechterbovenarm een beetje naar achter	Keypoints : right elbow Direction : to the back Magnitude : -
14	3	2	rechtervoorarm een beetje naar achter	Keypoints : right hand Direction : to the back Magnitude : -
14	3	2	rechterhand een beetje naar voren	Keypoints : right hand Direction : to the front Magnitude : -
14	3	2	rechterhand een beetje naar beneden	Keypoints : right hand Direction : down Magnitude : -
14	3	2	stop	End of round
14	1	3	nee	Alter pose randomly
14	1	3	nee	Alter pose randomly
14	1	3	stop	End of round

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
14	2	3	lichaam Apeldoorn	Keypoints : neck ERROR : don't understand
14	2	3	lichaam naar boven	Keypoints : neck Direction : up
14	2	3	lichaam naar Hoorn	Keypoints : neck Direction : to the front
14	2	3	beide armen naar boven	Keypoints : left elbow + left hand + right elbow + right hand Direction : up
14	2	3	beide voorarmen naar voor	Keypoints : None, no effect Direction : to the front ERROR : don't understand
14	2	3	allebei de Vormen naar voor	Keypoints : None, no effect Direction : to the front ERROR : don't understand
14	2	3	allebei de voor armen naar voren	Keypoints : left elbow + left hand + right elbow + right hand Direction : to the front
14	2	3	linkervoorarm naar voren	Keypoints : left hand Direction : to the front
14	2	3	stop	End of round
14	3	3	dat kan ik niet	Keypoints : None, no effect Direction : to the back + to the left
14	3	3	dat kan ik wel	Keypoints : None, no effect Direction : to the back
14	3	3	ben echter vooral naar boven	Keypoints : left hand + right hand Direction : up
14	3	3	beste vooral naar boven	Keypoints : left hand + right hand Direction : to the front + up
14	3	3	rechtervoorarm film naar boven	Keypoints : right hand Direction : up

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
14	3	3	rechtervoorarm naar boven	Keypoints : right hand Direction : up
14	3	3	linkervoorarm naar beneden	Keypoints : left hand Direction : down
14	3	3	linkervoorarm naar links	Keypoints : left hand Direction : to the left
14	3	3	linkerhand naar boven	Keypoints : left hand Direction : up
14	3	3	beide handen naar boven	Keypoints : left hand + right hand Direction : up
14	3	3	beide handen naar beneden	Keypoints : left hand + right hand Direction : down
14	3	3	restaurant een beetje naar boven	Keypoints : right hand Direction : up Magnitude : -
14	3	3	rechterhand een beetje naar voren	Keypoints : right hand Direction : to the front Magnitude : -
14	3	3	rechterhand naar achteren	Keypoints : right hand Direction : to the back
14	3	3	rechtdoor nog een beetje naar voor	History : A little more
14	3	3	rechtervoorarm naar voren	Keypoints : right hand Direction : to the front
14	3	3	rechterhand naar achteren	Keypoints : right hand Direction : to the back
14	3	3	linkerhand naar boven	Keypoints : left hand Direction : up
14	3	3	linkerhand veel naar boven	Keypoints : left hand Direction : up Magnitude : ++
14	3	3	linkerhand veel naar achter	Keypoints : left hand Direction : to the back Magnitude : ++

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
14	3	3	linkerhand naar boven	Keypoints : left hand Direction : up
14	3	3	linkerhand naar achter	Keypoints : left hand Direction : to the back
14	3	3	stop	End of round
15	1	0	stop	End of round
15	2	0	rechterarm naar achter	Keypoints : right elbow + right hand Direction : to the back
15	2	0	rechterarm	Keypoints : right elbow + right hand ERROR : don't understand
15	2	0	rechterhand naar links	Keypoints : right hand Direction : to the left
15	2	0	rechterarm naar voren	Keypoints : right elbow + right hand Direction : to the front
15	2	0	rechterarm naar boven	Keypoints : right elbow + right hand Direction : up
15	2	0	rechterhand omhoog	Keypoints : right hand Direction : up
15	2	0	stop	End of round
15	3	0	30 forearm omhoog	Keypoints : None, no effect Direction : up
15	3	0	hertenfarm omhoog	Keypoints : None, no effect Direction : up
15	3	0	rechtervoorarm omhoog	Keypoints : right hand Direction : up
15	3	0	linkervoor arm omhoog	Keypoints : left elbow + left hand + right elbow + right hand Direction : up

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
15	3	0	linkerbovenarm naar voren	Keypoints : left elbow Direction : to the front
15	3	0	rechterbovenarm naar achter	Keypoints : right elbow Direction : to the back
15	3	0	linkerbovenarm	Keypoints : left elbow
15	3	0	winkel voor armen omhoog	Keypoints : left elbow + left hand + right elbow + right hand Direction : to the front + up
15	3	0	stop	End of round
15	1	1	nee	Alter pose randomly
15	1	1	nee	Alter pose randomly
15	1	1	nee	Alter pose randomly
15	1	1	stop	End of round
15	2	1	rechterarm naar boven	Keypoints : right elbow + right hand Direction : up
15	2	1	stop	End of round
15	3	1	Predator	Keypoints : None, no effect
15	3	1	hertenfarm omhoog	Keypoints : None, no effect Direction : up
15	3	1	rechtervoorarm omhoog	Keypoints : right hand Direction : up
15	3	1	rechterbovenarm nog	Keypoints : right elbow

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
15	3	1	rechterbovenarm	Keypoints : right elbow
15	3	1	rechterbovenarm	Keypoints : right elbow
15	3	1	rechterbovenarm omhoog	Keypoints : right elbow Direction : up
15	3	1	rechterfor forearm omhoog	Keypoints : None, no effect Direction : up
15	3	1	30 forearm omhoog	Keypoints : None, no effect Direction : up
15	3	1	rechtervoorarm onder	Keypoints : right hand Direction : down
15	3	1	rechtervoorarm omhoog	Keypoints : right hand Direction : up
15	3	1	iets meer	History : A little more
15	3	1	iets	Keypoints : None, no effect Magnitude : –
15	3	1	iets meer omhoog	History : A little more
15	3	1	iets meer omhoog	History : A little more
15	3	1	linkervoorarm omlaag	Keypoints : left hand Direction : down
15	3	1	stop	End of round
15	1	2	nee	Alter pose randomly
15	1	2	nee	Alter pose randomly
15	1	2	stop	End of round

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
15	2	2	rechterhand omlaag	Keypoints : right hand Direction : down
15	2	2	rechterarm omlaag	Keypoints : right elbow + right hand Direction : down
15	2	2	linkerarm naar voren	Keypoints : left elbow + left hand Direction : to the front
15	2	2	linkerarm omhoog	Keypoints : left elbow + left hand Direction : up
15	2	2	lichaam naar voren	Keypoints : neck Direction : to the front
15	2	2	lichaam naar achter	Keypoints : neck Direction : to the back
15	2	2	stop	End of round
15	3	2	rechtervoorarm naar voren	Keypoints : right hand Direction : to the front
15	3	2	iets meer	History : A little more
15	3	2	rechterbovenarm naar beneden	Keypoints : right elbow Direction : down
15	3	2	hertenfarm naar achter	Keypoints : None, no effect Direction : to the back
15	3	2	rechtervoorarm naar beneden	Keypoints : right hand Direction : down
15	3	2	rechterbovenarm naar boven	Keypoints : right elbow Direction : up
15	3	2	Reddit forum naar achter	Keypoints : None, no effect Direction : to the back
15	3	2	hertenfarm naar voren	Keypoints : None, no effect Direction : to the front
15	3	2	hertenfarm naar voren	Keypoints : None, no effect Direction : to the front

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
15	3	2	Ready For NATO	Keypoints : None, no effect Direction : to the front
15	3	2	linkerbovenarm naar voren	Keypoints : left elbow Direction : to the front
15	3	2	linkervoorarm naar achter	Keypoints : left hand Direction : to the back
15	3	2	iets meer	History : A little more
15	3	2	linkerhand omhoog	Keypoints : left hand Direction : up
15	3	2	lichaam naar voren	Keypoints : neck Direction : to the front
15	3	2	linkervoorarm naar voren	Keypoints : left hand Direction : to the front
15	3	2	kaartje voor naar achter	Keypoints : None, no effect Direction : to the back
15	3	2	rechtervoorarm naar achter	Keypoints : right hand Direction : to the back
15	3	2	rechterbovenarm naar achter	Keypoints : right elbow Direction : to the back
15	3	2	stop	End of round
15	1	3	nee	Alter pose randomly
15	1	3	nee	Alter pose randomly
15	1	3	nee	Alter pose randomly
15	1	3	nee	Alter pose randomly
15	1	3	nee	Alter pose randomly

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
15	1	3	stop	End of round
15	2	3	rechterbovenarm naar voren	Keypoints : right elbow Direction : to the front
15	2	3	krijg de bovenarm naar achter	Keypoints : left elbow + right elbow Direction : to the back
15	2	3	rechterbovenarm naar achter	Keypoints : right elbow Direction : to the back
15	2	3	rechterhand naar voren	Keypoints : right hand Direction : to the front
15	2	3	rechtervoorarm naar voren	Keypoints : right hand Direction : to the front
15	2	3	stop	End of round
15	3	3	bovenarm naar boven	Keypoints : left elbow + right elbow Direction : up
15	3	3	forearm naar voren	Keypoints : None, no effect Direction : to the front
15	3	3	voorarm naar voren	Keypoints : left hand + right hand Direction : to the front
15	3	3	lichaam naar voren	Keypoints : neck Direction : to the front
15	3	3	iets meer	History : A little more
15	3	3	veel meer	History : A little more
15	3	3	voorraam naar voren	Keypoints : None, no effect Direction : to the front
15	3	3	forearm naar boven	Keypoints : None, no effect Direction : up
15	3	3	stop	End of round

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
16	1	0	nee	Alter pose randomly
16	1	0	stop	End of round
16	2	0	lichaam naar voren	Keypoints : neck Direction : to the front
16	2	0	We gaan naar achteren	Keypoints : None, no effect Direction : to the back ERROR : don't understand
16	2	0	lichaam naar achteren	Keypoints : neck Direction : to the back
16	2	0	stop	End of round
16	3	0	linkerhand een beetje omhoog	Keypoints : left hand Direction : up Magnitude : -
16	3	0	rechterhand een beetje omhoog	Keypoints : right hand Direction : up Magnitude : -
16	3	0	linkerarm een beetje omhoog	Keypoints : left elbow + left hand Direction : up Magnitude : -
16	3	0	een beetje omhoog	Keypoints : None, no effect Direction : up Magnitude : -
16	3	0	rechterarm is omhoog	Keypoints : right elbow + right hand Direction : up
16	3	0	terug	History : Back to previous pose
16	3	0	rechterarm een beetje omhoog	Keypoints : right elbow + right hand Direction : up Magnitude : -
16	3	0	rechterhand een beetje omhoog	Keypoints : right hand Direction : up Magnitude : -
16	3	0	stop	End of round

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
16	1	1	stop	End of round
16	2	1	rechterarm naar voren	Keypoints : right elbow + right hand Direction : to the front
16	2	1	stop	End of round
16	3	1	lichaam ietsje naar voren	Keypoints : neck Direction : to the front
16	3	1	rechterarm naar voren	Keypoints : right elbow + right hand Direction : to the front
16	3	1	bovenarm	Keypoints : left elbow + right elbow
16	3	1	linkerbovenarm ietsje naar voren	Keypoints : left elbow Direction : to the front
16	3	1	ietsje Mer	Keypoints : None, no effect
16	3	1	linkeronderarm ietsje naar voren	Keypoints : left hand Direction : to the front
16	3	1	linkerbovenarm iets naar voren	Keypoints : left elbow Direction : to the front Magnitude : –
16	3	1	linkerbovenarm ietsje naar achteren	Keypoints : left elbow Direction : to the back
16	3	1	terug	History : Back to previous pose
16	3	1	linkeronderarm fietsen naar Vorden	Keypoints : left hand Direction : to the front
16	3	1	linkerbovenarm omhoog	Keypoints : left elbow Direction : up
16	3	1	terug	History : Back to previous pose
16	3	1	stop	End of round

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
16	1	2	nee	Alter pose randomly
16	1	2	nee	Alter pose randomly
16	1	2	nee	Alter pose randomly
16	1	2	nee	Alter pose randomly
16	1	2	nee	Alter pose randomly
16	1	2	stop	End of round
16	2	2	linkeronderarm naar boven	Keypoints : left hand Direction : up
16	2	2	onderarm naar links	Keypoints : None, no effect Direction : to the left ERROR : don't understand
16	2	2	Utrecht	Keypoints : None, no effect ERROR : don't understand
16	2	2	linkeronderarm naar rechts	Keypoints : left hand Direction : to the right
16	2	2	rechterbovenarm	Keypoints : right elbow ERROR : don't understand
16	2	2	rechteronderarm naar voren	Keypoints : right hand Direction : to the front
16	2	2	rechterbovenarm naar voren	Keypoints : right elbow Direction : to the front
16	2	2	rechterbovenarm omhoog	Keypoints : right elbow Direction : up
16	2	2	onderarm naar voren	Keypoints : None, no effect Direction : to the front ERROR : don't understand

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
16	2	2	Hector boven onderarm naar voren ligt er onder andere woorden	Keypoints : None, no effect Direction : to the front + down ERROR : don't understand
16	2	2	rechteronderarm naar voren	Keypoints : right hand Direction : to the front
16	2	2	rechterarm omhoog	Keypoints : right elbow + right hand Direction : up
16	2	2	rechteronderarm naar voren	Keypoints : right hand Direction : to the front
16	2	2	rechtsonder omhoog	Keypoints : None, no effect Direction : up ERROR : don't understand
16	2	2	onderarm	Keypoints : None, no effect ERROR : don't understand
16	2	2	rechterarm omlaag	Keypoints : right elbow + right hand Direction : down
16	2	2	onderarm omhoog	Keypoints : None, no effect Direction : up ERROR : don't understand
16	2	2	rechteronderarm omhoog	Keypoints : right hand Direction : up
16	2	2	rechteronderarm omhoog	Keypoints : right hand Direction : up
16	2	2	rechteronderarm naar rechts	Keypoints : right hand Direction : to the right
16	2	2	onderarm	Keypoints : None, no effect ERROR : don't understand
16	2	2	rechtsonder	Keypoints : None, no effect ERROR : don't understand
16	2	2	stop	End of round
16	3	2	linkerelleboog naar links	Keypoints : left elbow Direction : to the left

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
16	3	2	linkervoor arm omhoog	Keypoints : left elbow + left hand + right elbow + right hand Direction : up
16	3	2	linkerhand omhoog	Keypoints : left hand Direction : up
16	3	2	linkerarm omlaag	Keypoints : left elbow + left hand Direction : down
16	3	2	linkerarm omlaag	Keypoints : left elbow + left hand Direction : down
16	3	2	bovenaan rechts	Keypoints : None, no effect Direction : to the right
16	3	2	rechterelleboog naar rechts	Keypoints : right elbow Direction : to the right
16	3	2	rechterhand naar voren	Keypoints : right hand Direction : to the front
16	3	2	nog ietsje	Keypoints : None, no effect
16	3	2	restaurants naar voren	Keypoints : right hand Direction : to the front
16	3	2	rechterhand naar rechts	Keypoints : right hand Direction : to the right
16	3	2	restaurants naar voren	Keypoints : right hand Direction : to the front
16	3	2	nog ietsje	Keypoints : None, no effect
16	3	2	restaurant Stavoren	Keypoints : right hand Direction : to the front
16	3	2	rechterhand naar rechts	Keypoints : right hand Direction : to the right
16	3	2	rechterbovenarm naar omlaag	Keypoints : right elbow Direction : down

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
16	3	2	rechterhand naar rechts	Keypoints : right hand Direction : to the right
16	3	2	vandaag	Keypoints : None, no effect
16	3	2	rechterhand vandaag	Keypoints : right hand Direction : to the right
16	3	2	proctor	Keypoints : None, no effect
16	3	2	restaurant Vandaag	Keypoints : right hand
16	3	2	restaurant Vandaag	Keypoints : right hand
16	3	2	rechterhand omlaag	Keypoints : right hand Direction : down
16	3	2	terug	History : Back to previous pose
16	3	2	rechterbovenarm naar voren	Keypoints : right elbow Direction : to the front
16	3	2	terug	History : Back to previous pose
16	3	2	linkerhand naar links	Keypoints : left hand Direction : to the left
16	3	2	linkerhand naar rechts	Keypoints : left hand Direction : to the right
16	3	2	linkerhand naar rechts	Keypoints : left hand Direction : to the right
16	3	2	linkerhand naar rechts	Keypoints : left hand Direction : to the right
16	3	2	linkerhand omhoog	Keypoints : left hand Direction : up
16	3	2	rechterhand naar voren	Keypoints : right hand Direction : to the front

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
16	3	2	linkerhand naar links	Keypoints : left hand Direction : to the left
16	3	2	de krant adres	Keypoints : None, no effect Direction : to the back
16	3	2	linkerhand naar rechts	Keypoints : left hand Direction : to the right
16	3	2	jij kan daar rechts	Keypoints : None, no effect Direction : to the right
16	3	2	linkerhand naar rechts	Keypoints : left hand Direction : to the right
16	3	2	linkerarm naar rechts	Keypoints : left elbow + left hand Direction : to the right
16	3	2	terug	History : Back to previous pose
16	3	2	klaar	Keypoints : None, no effect
16	3	2	stop	End of round
16	1	3	nee	Alter pose randomly
16	1	3	nee	Alter pose randomly
16	1	3	stop	End of round
16	2	3	Ik ga naar achteren	Keypoints : None, no effect Direction : to the back ERROR : don’t understand
16	2	3	We gaan naar achteren	Keypoints : None, no effect Direction : to the back ERROR : don’t understand
16	2	3	lichaam naar achteren	Keypoints : neck Direction : to the back
16	2	3	stop	End of round

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
16	3	3	lichaam fietsen naar voren	Keypoints : neck Direction : to the front
16	3	3	stop	End of round
17	1	0	nee	Alter pose randomly
17	1	0	nee	Alter pose randomly
17	1	0	nee	Alter pose randomly
17	1	0	nee	Alter pose randomly
17	1	0	stop maar	End of round
17	2	0	rechterhand omhoog	Keypoints : right hand Direction : up
17	2	0	stop	End of round
17	3	0	linkerbovenarm een beetje omhoog	Keypoints : left elbow Direction : up Magnitude : -
17	3	0	linkerhand een beetje omhoog	Keypoints : left hand Direction : up Magnitude : -
17	3	0	linkerhand een beetje omhoog	Keypoints : left hand Direction : up Magnitude : -
17	3	0	linkerbovenarm een beetje omhoog	Keypoints : left elbow Direction : up Magnitude : -
17	3	0	ziekenhuis	Keypoints : None, no effect
17	3	0	linkerhand teveel	Keypoints : left hand Direction : to the left
17	3	0	linkerhand naar binnen	Keypoints : left hand Direction : to the left

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
17	3	0	linkerhand	Keypoints : left hand Direction : to the left
17	3	0	linkerhand een beetje omhoog	Keypoints : left hand Direction : up Magnitude : -
17	3	0	Ik haal een beetje omhoog	Keypoints : None, no effect Direction : up Magnitude : -
17	3	0	linkerhand een beetje omhoog	Keypoints : left hand Direction : up Magnitude : -
17	3	0	rechterbovenarm omhoog	Keypoints : right elbow Direction : up
17	3	0	rechterbovenarm	Keypoints : right elbow
17	3	0	een beetje naar beneden	Keypoints : None, no effect Direction : down Magnitude : -
17	3	0	rechterarm een beetje naar beneden	Keypoints : right elbow + right hand Direction : down Magnitude : -
17	3	0	rechterhand om omhoog	Keypoints : right hand Direction : up
17	3	0	beetje naar binnen	Keypoints : None, no effect Magnitude : -
17	3	0	linkerbovenarm een beetje naar rechts	Keypoints : left elbow Direction : to the right Magnitude : -
17	3	0	stop	End of round
17	1	1	stop	End of round
17	2	1	lichaam naar voren	Keypoints : neck Direction : to the front
17	2	1	rechterhand omhoog	Keypoints : right hand Direction : up

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
17	2	1	rechterbovenarm naar links	Keypoints : right elbow Direction : to the left
17	2	1	rechterbovenarm naar rechts	Keypoints : right elbow Direction : to the right
17	2	1	rechterhand naar boven	Keypoints : right hand Direction : up
17	2	1	stop	End of round
17	3	1	lichaam een beetje naar voren	Keypoints : neck Direction : to the front Magnitude : -
17	3	1	iets meer	History : A little more
17	3	1	stop	End of round
17	1	2	nee	Alter pose randomly
17	1	2	nee	Alter pose randomly
17	1	2	nee	Alter pose randomly
17	1	2	stop	End of round
17	2	2	lichaam naar achteren	Keypoints : neck Direction : to the back
17	2	2	naar links	Keypoints : None, no effect Direction : to the left ERROR : don’t understand
17	2	2	lichaam naar links	Keypoints : neck Direction : to the left
17	2	2	rechterbovenarm omlaag	Keypoints : right elbow Direction : down
17	2	2	rechterhand naar beneden	Keypoints : right hand Direction : down

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
17	2	2	stop	End of round
17	3	2	rechterhand een beetje naar voren	Keypoints : right hand Direction : to the front Magnitude : -
17	3	2	terug	History : Back to previous pose
17	3	2	rechterbovenarm een beetje naar links	Keypoints : right elbow Direction : to the left Magnitude : -
17	3	2	terug	History : Back to previous pose
17	3	2	rechterbovenarm een feestje naar voren	Keypoints : right elbow Direction : to the front
17	3	2	terug	History : Back to previous pose
17	3	2	stop	End of round
17	1	3	nee	Alter pose randomly
17	1	3	nee	Alter pose randomly
17	1	3	nee	Alter pose randomly
17	1	3	nee	Alter pose randomly
17	1	3	stop	End of round
17	2	3	Ik ga naar voren	Keypoints : None, no effect Direction : to the front ERROR : don’t understand
17	2	3	lichaam naar voren	Keypoints : neck Direction : to the front
17	2	3	rechterhand naar achteren	Keypoints : right hand Direction : to the back

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
17	2	3	linkerbovenarm naar boven	Keypoints : left elbow Direction : up
17	2	3	stop	End of round
17	3	3	lichaam iets naar	Keypoints : neck Magnitude : –
17	3	3	lichaam	Keypoints : neck
17	3	3	lichaam iets naar voren	Keypoints : neck Direction : to the front Magnitude : –
17	3	3	rechterhand iets naar achteren	Keypoints : right hand Direction : to the back Magnitude : –
17	3	3	linkerhand iets naar achter	Keypoints : left hand Direction : to the back Magnitude : –
17	3	3	stop	End of round
18	1	0	nee	Alter pose randomly
18	1	0	stop	End of round
18	2	0	lichaam naar voren	Keypoints : neck Direction : to the front
18	2	0	rechterhand	Keypoints : right hand Direction : to the right
18	2	0	rechterhand omhoog	Keypoints : right hand Direction : up
18	2	0	rechterhand naar voren	Keypoints : right hand Direction : to the front
18	2	0	rechterhand naar voren	Keypoints : right hand Direction : to the front
18	2	0	rechterhand draaien	Keypoints : right hand Direction : to the right

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
18	2	0	rechteronderarm naar voren	Keypoints : right hand Direction : to the front
18	2	0	rechteronderarm naar voren	Keypoints : right hand Direction : to the front
18	2	0	stop	End of round
18	3	0	lichaam naar voren	Keypoints : neck Direction : to the front
18	3	0	rechteronderarm naar boven	Keypoints : right hand Direction : up
18	3	0	terug	History : Back to previous pose
18	3	0	stop	End of round
18	1	1	nee	Alter pose randomly
18	1	1	stop	End of round
18	2	1	Barcelona forum	Keypoints : None, no effect ERROR : don’t understand
18	2	1	lichaam naar voren	Keypoints : neck Direction : to the front
18	2	1	onder	Keypoints : None, no effect Direction : down ERROR : don’t understand
18	2	1	rechteronderarm naar achter	Keypoints : right hand Direction : to the back
18	2	1	rechterhandbagage	Keypoints : None, no effect ERROR : don’t understand
18	2	1	restaurant Vandaag	Keypoints : right hand ERROR : don’t understand
18	2	1	rechterhand naar 8	Keypoints : right hand Direction : to the back

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
18	2	1	rechterhand naar lies	Keypoints : right hand Direction : to the left
18	2	1	restaurant naar links	Keypoints : right hand Direction : to the left
18	2	1	linkerhand naar beneden	Keypoints : left hand Direction : down
18	2	1	linkerhand naar beneden	Keypoints : left hand Direction : down
18	2	1	stop	End of round
18	3	1	lichaam naar voren	Keypoints : neck Direction : to the front
18	3	1	rechterarm naar achteren	Keypoints : right elbow + right hand Direction : to the back
18	3	1	stop	End of round
18	1	2	nee	Alter pose randomly
18	1	2	nee	Alter pose randomly
18	1	2	stop	End of round
18	2	2	rechterarm gestrekt	Keypoints : right elbow + right hand ERROR : don’t understand
18	2	2	rechterarm naar voren	Keypoints : right elbow + right hand Direction : to the front
18	2	2	rechterarm naar voren	Keypoints : right elbow + right hand Direction : to the front
18	2	2	linkeronderarm naar boven	Keypoints : left hand Direction : up

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
18	2	2	onderarm naar boven	Keypoints : None, no effect Direction : up ERROR : don't understand
18	2	2	linkeronderarm naar boven	Keypoints : left hand Direction : up
18	2	2	stop	End of round
18	3	2	rechterarm naar voren	Keypoints : right elbow + right hand Direction : to the front
18	3	2	rechterarm naar volgen	Keypoints : right elbow + right hand Direction : to the front
18	3	2	stop	End of round
18	1	3	nee	Alter pose randomly
18	1	3	nee	Alter pose randomly
18	1	3	nee	Alter pose randomly
18	1	3	nee	Alter pose randomly
18	1	3	nee	Alter pose randomly
18	1	3	stop	End of round
18	2	3	linkerarm naar boven	Keypoints : left elbow + left hand Direction : up
18	2	3	rechterarm naar links	Keypoints : right elbow + right hand Direction : to the left
18	2	3	rechterarm naar lied	Keypoints : right elbow + right hand Direction : to the left

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
18	2	3	stop	End of round
18	3	3	linkerarm omhoog	Keypoints : left elbow + left hand Direction : up
18	3	3	rechterarm naar links	Keypoints : right elbow + right hand Direction : to the left
18	3	3	terug	History : Back to previous pose
18	3	3	stop	End of round
19	1	0	nee	Alter pose randomly
19	1	0	nee	Alter pose randomly
19	1	0	nee	Alter pose randomly
19	1	0	nee	Alter pose randomly
19	1	0	stop	End of round
19	2	0	lichaam naar voren	Keypoints : neck Direction : to the front
19	2	0	rechterarm omhoog	Keypoints : right elbow + right hand Direction : up
19	2	0	rechtaan omlaag	Keypoints : None, no effect Direction : down ERROR : don’t understand
19	2	0	omlaag	Keypoints : None, no effect Direction : down ERROR : don’t understand
19	2	0	rechterarm omlaag	Keypoints : right elbow + right hand Direction : down

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
19	2	0	linkerarm omhoog	Keypoints : left elbow + left hand Direction : up
19	2	0	rechterarm vandaag	Keypoints : right elbow + right hand ERROR : don't understand
19	2	0	ligt eraan hoe laag	Keypoints : None, no effect Direction : to the left + up + down ERROR : don't understand
19	2	0	ligt eraan hoe laat	Keypoints : None, no effect Direction : to the left + up ERROR : don't understand
19	2	0	regenradar omlaag	Keypoints : None, no effect Direction : down ERROR : don't understand
19	2	0	rechterarm omlaag	Keypoints : right elbow + right hand Direction : down
19	2	0	linkerarm naar voren	Keypoints : left elbow + left hand Direction : to the front
19	2	0	linkerarm naar voren	Keypoints : left elbow + left hand Direction : to the front
19	2	0	linkerarm naar voren	Keypoints : left elbow + left hand Direction : to the front
19	2	0	stop	End of round
19	3	0	lichaam naar voren	Keypoints : neck Direction : to the front
19	3	0	rechterarm een klein beetje omhoog	Keypoints : right elbow + right hand Direction : up Magnitude : -
19	3	0	linkereen klein beetje omhoog	Keypoints : None, no effect Direction : up Magnitude : -

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
19	3	0	linkerarm een klein beetje omhoog	Keypoints : left elbow + left hand Direction : up Magnitude : -
19	3	0	iets meer omhoog	History : A little more
19	3	0	stop	End of round
19	1	1	nee	Alter pose randomly
19	1	1	nee	Alter pose randomly
19	1	1	nee	Alter pose randomly
19	1	1	nee	Alter pose randomly
19	1	1	stop	End of round
19	2	1	Ik ga naar voren	Keypoints : None, no effect Direction : to the front ERROR : don’t understand
19	2	1	lichaam naar voren	Keypoints : neck Direction : to the front
19	2	1	rechterarm omhoog	Keypoints : right elbow + right hand Direction : up
19	2	1	stop	End of round
19	3	1	lichaam naar voren	Keypoints : neck Direction : to the front
19	3	1	lichaam naar voren	Keypoints : neck Direction : to the front
19	3	1	rechteraan omhoog	Keypoints : None, no effect Direction : up

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
19	3	1	rechterarm omhoog	Keypoints : right elbow + right hand Direction : up
19	3	1	rechterarm iets naar achter	Keypoints : right elbow + right hand Direction : to the back Magnitude : –
19	3	1	rechterarm iets daarvoor	Keypoints : right elbow + right hand Magnitude : –
19	3	1	rechterarm iets daarvoor	Keypoints : right elbow + right hand Magnitude : –
19	3	1	arista 4	Keypoints : None, no effect Direction : to the back
19	3	1	rap	Keypoints : None, no effect
19	3	1	iets naar voren	Keypoints : None, no effect Direction : to the front Magnitude : –
19	3	1	rechterarm iets naar voren	Keypoints : right elbow + right hand Direction : to the front Magnitude : –
19	3	1	een beetje terug	History : Back to previous pose
19	3	1	rechterarm iets naar voren	Keypoints : right elbow + right hand Direction : to the front Magnitude : –
19	3	1	rechterarm omhoog	Keypoints : right elbow + right hand Direction : up
19	3	1	linkerarm omlaag	Keypoints : left elbow + left hand Direction : down
19	3	1	stop	End of round
19	1	2	nee	Alter pose randomly

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
19	1	2	nee	Alter pose randomly
19	1	2	nee	Alter pose randomly
19	1	2	nee	Alter pose randomly
19	1	2	stop	End of round
19	2	2	Verhoog	Keypoints : None, no effect ERROR : don't understand
19	2	2	rechterarm omhoog	Keypoints : right elbow + right hand Direction : up
19	2	2	rechterarm omhoog	Keypoints : right elbow + right hand Direction : up
19	2	2	linker	Keypoints : None, no effect Direction : to the left ERROR : don't understand
19	2	2	Lieke armen omhoog	Keypoints : left elbow + left hand + right elbow + right hand Direction : up
19	2	2	restaurant Vandaag	Keypoints : right hand ERROR : don't understand
19	2	2	rechterarm omlaag	Keypoints : right elbow + right hand Direction : down
19	2	2	rechterarm omlaag	Keypoints : right elbow + right hand Direction : down
19	2	2	rechterarm naar voren	Keypoints : right elbow + right hand Direction : to the front
19	2	2	wekker plaag	Keypoints : None, no effect Direction : down ERROR : don't understand

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
19	2	2	rechterarm blaag	Keypoints : right elbow + right hand Direction : down
19	2	2	rechterarm naar voren	Keypoints : right elbow + right hand Direction : to the front
19	2	2	stop	End of round
19	3	2	30	Keypoints : None, no effect Direction : to the back
19	3	2	rechterarm naar voren	Keypoints : right elbow + right hand Direction : to the front
19	3	2	rechterarm omlaag	Keypoints : right elbow + right hand Direction : down
19	3	2	lichaam in Stavoren	Keypoints : neck Direction : to the front
19	3	2	rechterarm naar voren	Keypoints : right elbow + right hand Direction : to the front
19	3	2	rechterarm omlaag	Keypoints : right elbow + right hand Direction : down
19	3	2	luchthavenvervoer	Keypoints : None, no effect
19	3	2	ligt eraan waar horen	Keypoints : None, no effect Direction : to the front
19	3	2	rechterarm naar voren	Keypoints : right elbow + right hand Direction : to the front
19	3	2	stop	End of round
19	1	3	nee	Alter pose randomly
19	1	3	nee	Alter pose randomly

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
19	1	3	stop	End of round
19	2	3	lichaam naar voren	Keypoints : neck Direction : to the front
19	2	3	Ik ga naar voren	Keypoints : None, no effect Direction : to the front ERROR : don't understand
19	2	3	lichaam naar voren	Keypoints : neck Direction : to the front
19	2	3	rechterarm omhoog	Keypoints : right elbow + right hand Direction : up
19	2	3	linkerarm omhoog	Keypoints : left elbow + left hand Direction : up
19	2	3	stop	End of round
19	3	3	Navigeer naar voren	Keypoints : None, no effect Direction : to the front
19	3	3	lichaam naar voren	Keypoints : neck Direction : to the front
19	3	3	lichaam naar voren	Keypoints : neck Direction : to the front
19	3	3	rechterarm naar voren	Keypoints : right elbow + right hand Direction : to the front
19	3	3	Lieke carnaval	Keypoints : None, no effect Direction : to the left
19	3	3	linkerarm naar voren	Keypoints : left elbow + left hand Direction : to the front
19	3	3	rechterarm naar voren	Keypoints : right elbow + right hand Direction : to the front
19	3	3	stop	End of round

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
20	1	0	nee	Alter pose randomly
20	1	0	nee	Alter pose randomly
20	1	0	nee	Alter pose randomly
20	1	0	stop	End of round
20	2	0	linkerarm naar boven	Keypoints : left elbow + left hand Direction : up
20	2	0	linkerarm naar boven	Keypoints : left elbow + left hand Direction : up
20	2	0	linkerhand naar boven	Keypoints : left hand Direction : up
20	2	0	linkerhand naar boven	Keypoints : left hand Direction : up
20	2	0	likken Arno	Keypoints : None, no effect Direction : to the left ERROR : don’t understand
20	2	0	linkerarm naar boven	Keypoints : left elbow + left hand Direction : up
20	2	0	linkerhand naar rechts	Keypoints : left hand Direction : to the right
20	2	0	stop	End of round
20	3	0	linkerelleboog naar beneden	Keypoints : left elbow Direction : down
20	3	0	linkerhand naar voren	Keypoints : left hand Direction : to the front
20	3	0	linkerelleboog naar voren	Keypoints : left elbow Direction : to the front
20	3	0	linkerhand	Keypoints : left hand Direction : to the left

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
20	3	0	linkerhanden achter	Keypoints : left hand Direction : to the back
20	3	0	linkerarm naar voren	Keypoints : left elbow + left hand Direction : to the front
20	3	0	linkerarm naar rechts	Keypoints : left elbow + left hand Direction : to the right
20	3	0	linkerhand omhoog	Keypoints : left hand Direction : up
20	3	0	linkerelleboog naar rechts	Keypoints : left elbow Direction : to the right
20	3	0	linkerarm naar voren	Keypoints : left elbow + left hand Direction : to the front
20	3	0	carnivore	Keypoints : None, no effect
20	3	0	rechterarm hoor	Keypoints : right elbow + right hand Direction : to the front
20	3	0	rechterhand omhoog	Keypoints : right hand Direction : up
20	3	0	rechterarm naar rechts	Keypoints : right elbow + right hand Direction : to the right
20	3	0	hand naar boven	Keypoints : left hand + right hand Direction : up
20	3	0	rechterarm naar voren	Keypoints : right elbow + right hand Direction : to the front
20	3	0	linkerelleboog beetje nodig	Keypoints : left elbow Magnitude : -
20	3	0	stop	End of round
20	1	1	stop	End of round

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
20	2	1	stop	End of round
20	3	1	rechterarm naar voren	Keypoints : right elbow + right hand Direction : to the front
20	3	1	rechterhand naar voren	Keypoints : right hand Direction : to the front
20	3	1	rechterhand omhoog	Keypoints : right hand Direction : up
20	3	1	vingers spreiden	Keypoints : None, no effect
20	3	1	linkerhand beetje naar voor	Keypoints : left hand Direction : to the front Magnitude : -
20	3	1	linkerelleboog beetje naar voren	Keypoints : left elbow Direction : to the front Magnitude : -
20	3	1	rechterelleboog beetje naar boven	Keypoints : right elbow Direction : up Magnitude : -
20	3	1	linkerelleboog beetje naar rechts	Keypoints : left elbow Direction : to the right Magnitude : -
20	3	1	rechterelleboog beetje naar beneden	Keypoints : right elbow Direction : down Magnitude : -
20	3	1	beetje naar rechts	Keypoints : None, no effect Direction : to the right Magnitude : -
20	3	1	rechterhand beetje naar links	Keypoints : right hand Direction : to the left Magnitude : -
20	3	1	rechterelleboog naar voren	Keypoints : right elbow Direction : to the front
20	3	1	rechterarm omhoog	Keypoints : right elbow + right hand Direction : up
20	3	1	stop	End of round

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
20	1	2	nee	Alter pose randomly
20	1	2	stop	End of round
20	2	2	linkerhand naar boven	Keypoints : left hand Direction : up
20	2	2	rechterhand naar beneden	Keypoints : right hand Direction : down
20	2	2	top	End of round
20	2	2	stop	End of round
20	3	2	omhoog	Keypoints : None, no effect Direction : up
20	3	2	linkerarm omhoog	Keypoints : left elbow + left hand Direction : up
20	3	2	linkerhand naar rechts	Keypoints : left hand Direction : to the right
20	3	2	linkerhand naar rechts	Keypoints : left hand Direction : to the right
20	3	2	linkerarm beetje naar boven	Keypoints : left elbow + left hand Direction : up Magnitude : -
20	3	2	linkerhand beetje naar boven	Keypoints : left hand Direction : up Magnitude : -
20	3	2	rechterarm beetje naar voren	Keypoints : right elbow + right hand Direction : to the front Magnitude : -
20	3	2	lichten aan	Keypoints : None, no effect Direction : to the back
20	3	2	rechterarm naar voren	Keypoints : right elbow + right hand Direction : to the front

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
20	3	2	rechterarm beetje naar rechts	Keypoints : right elbow + right hand Direction : to the right Magnitude : -
20	3	2	rechterhand Pinterest	Keypoints : right hand Direction : to the right
20	3	2	linkerhand beetje naar boven	Keypoints : left hand Direction : up Magnitude : -
20	3	2	rechterhand beetje naar beneden	Keypoints : right hand Direction : down Magnitude : -
20	3	2	stop	End of round
20	1	3	nee	Alter pose randomly
20	1	3	nee	Alter pose randomly
20	1	3	stop	End of round
20	2	3	lichaam naar voren	Keypoints : neck Direction : to the front
20	2	3	stop	End of round
20	3	3	horen	Keypoints : None, no effect Direction : to the front
20	3	3	licht naar voren	Keypoints : neck Direction : to the front
20	3	3	lichaam naar voren	Keypoints : neck Direction : to the front
20	3	3	Ik ga naar voren	Keypoints : None, no effect Direction : to the front
20	3	3	Hoorn	Keypoints : None, no effect Direction : to the front

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
20	3	3	rechterarm	Keypoints : right elbow + right hand
20	3	3	estar naar boven	Keypoints : None, no effect Direction : up
20	3	3	lichaam verder komen	Keypoints : neck Direction : to the front
20	3	3	rechterarm naar voren	Keypoints : right elbow + right hand Direction : to the front
20	3	3	restaurant naar boven	Keypoints : right hand Direction : up
20	3	3	rechterarm naar boven	Keypoints : right elbow + right hand Direction : up
20	3	3	rechterhand naar boven	Keypoints : right hand Direction : up
20	3	3	Bel carnaval	Keypoints : None, no effect
20	3	3	rechterelleboog naar boven	Keypoints : right elbow Direction : up
20	3	3	rechterhand naar boven	Keypoints : right hand Direction : up
20	3	3	linkerhand daarvoor	Keypoints : left hand Direction : to the left
20	3	3	linkerarm naar voren	Keypoints : left elbow + left hand Direction : to the front
20	3	3	linkerarm naar voren	Keypoints : left elbow + left hand Direction : to the front
20	3	3	linkerarm naar boven	Keypoints : left elbow + left hand Direction : up
20	3	3	rechtervoorband naar voren	Keypoints : None, no effect Direction : to the front

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
20	3	3	linkerelleboog naar rechts	Keypoints : left elbow Direction : to the right
20	3	3	linkerelleboog naar boven	Keypoints : left elbow Direction : up
20	3	3	linkerhand naar rechts	Keypoints : left hand Direction : to the right
20	3	3	rechterhand naar voren	Keypoints : right hand Direction : to the front
20	3	3	rechterarm naar voren	Keypoints : right elbow + right hand Direction : to the front
20	3	3	linkerarm naar voren	Keypoints : left elbow + left hand Direction : to the front
20	3	3	stop	End of round
21	1	0	nee	Alter pose randomly
21	1	0	nee	Alter pose randomly
21	1	0	nee	Alter pose randomly
21	1	0	nee	Alter pose randomly
21	1	0	nee	Alter pose randomly
21	1	0	nee	Alter pose randomly
21	1	0	nee	Alter pose randomly
21	1	0	nee	Alter pose randomly
21	1	0	nee	Alter pose randomly
21	1	0	nee	Alter pose randomly

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
21	1	0	nee	Alter pose randomly
21	1	0	nee	Alter pose randomly
21	1	0	stop	End of round
21	2	0	lichaam naar voren	Keypoints : neck Direction : to the front
21	2	0	lichaam naar voren	Keypoints : neck Direction : to the front
21	2	0	wekker onderarm naar boven	Keypoints : None, no effect Direction : up ERROR : don't understand
21	2	0	linkeronderarm naar boven	Keypoints : left hand Direction : up
21	2	0	stop	End of round
21	3	0	We gaan naar voren	Keypoints : None, no effect Direction : to the front
21	3	0	lichaam naar voren	Keypoints : neck Direction : to the front
21	3	0	rechterarm omhoog	Keypoints : right elbow + right hand Direction : up
21	3	0	plug	Keypoints : None, no effect
21	3	0	terug	History : Back to previous pose
21	3	0	terug	History : Back to previous pose
21	3	0	terug	History : Back to previous pose
21	3	0	rechterarm naar onderen	Keypoints : right elbow + right hand Direction : down

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
21	3	0	rechterarm naar Ommeren	Keypoints : right elbow + right hand
21	3	0	stop	End of round
21	1	1	nee	Alter pose randomly
21	1	1	nee	Alter pose randomly
21	1	1	nee	Alter pose randomly
21	1	1	nee	Alter pose randomly
21	1	1	nee	Alter pose randomly
21	1	1	stop	End of round
21	2	1	rechterhand naar achteren	Keypoints : right hand Direction : to the back
21	2	1	rechterhand naar links	Keypoints : right hand Direction : to the left
21	2	1	linkerhand naar onderen	Keypoints : left hand Direction : down
21	2	1	stop	End of round
21	3	1	rechterbovenarm naar boven	Keypoints : right elbow Direction : up
21	3	1	8:30	Keypoints : None, no effect
21	3	1	rechterbovenarm naar achteren	Keypoints : right elbow Direction : to the back
21	3	1	het lichaam naar voren	Keypoints : neck Direction : to the front

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
21	3	1	rechterbovenarm naar boven	Keypoints : right elbow Direction : up
21	3	1	Westerbork	Keypoints : None, no effect
21	3	1	rechterbovenarm	Keypoints : right elbow
21	3	1	rechterbovenarm naar onderen	Keypoints : right elbow Direction : down
21	3	1	restaurant Eindhoven	Keypoints : right hand
21	3	1	rechterbovenarm naar achteren	Keypoints : right elbow Direction : to the back
21	3	1	Geef de hond naar achteren	Keypoints : left hand + right hand Direction : to the back
21	3	1	linkerarm naar voren	Keypoints : left elbow + left hand Direction : to the front
21	3	1	linkerarm naar Zwolle	Keypoints : left elbow + left hand
21	3	1	linkerarm naar voren	Keypoints : left elbow + left hand Direction : to the front
21	3	1	linkerarm beetje naar papa	Keypoints : left elbow + left hand Magnitude : -
21	3	1	stop	End of round
21	1	2	nee	Alter pose randomly
21	1	2	nee	Alter pose randomly
21	1	2	nee	Alter pose randomly
21	1	2	nee	Alter pose randomly

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
21	1	2	stop	End of round
21	2	2	rechteronderarm naar boven	Keypoints : right hand Direction : up
21	2	2	rechteronderarm naar rechts	Keypoints : right hand Direction : to the right
21	2	2	rechterarm naar links	Keypoints : right elbow + right hand Direction : to the left
21	2	2	stop	End of round
21	3	2	cryptogram	Keypoints : None, no effect
21	3	2	rechterarm omhoog	Keypoints : right elbow + right hand Direction : up
21	3	2	linkerarm omhoog	Keypoints : left elbow + left hand Direction : up
21	3	2	linkerarm	Keypoints : left elbow + left hand
21	3	2	linkerarm naar voren	Keypoints : left elbow + left hand Direction : to the front
21	3	2	stop	End of round
21	1	3	nee	Alter pose randomly
21	1	3	nee	Alter pose randomly
21	1	3	nee	Alter pose randomly
21	1	3	stop	End of round
21	2	3	lichaam naar voren	Keypoints : neck Direction : to the front

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
21	2	3	lichaam naar voren	Keypoints : neck Direction : to the front
21	2	3	terug	Keypoints : None, no effect ERROR : don't understand
21	2	3	lichaam na 8 uur	Keypoints : neck Direction : to the back
21	2	3	linkerarm naar boven	Keypoints : left elbow + left hand Direction : up
21	2	3	linkeronderarm naar achteren	Keypoints : left hand Direction : to the back
21	2	3	volgende Arno boren	Keypoints : None, no effect Direction : to the front ERROR : don't understand
21	2	3	linkeronderarm naar voren	Keypoints : left hand Direction : to the front
21	2	3	linkerhand naar onderen	Keypoints : left hand Direction : down
21	2	3	naar boven	Keypoints : None, no effect Direction : up ERROR : don't understand
21	2	3	naar boven	Keypoints : None, no effect Direction : up ERROR : don't understand
21	2	3	ligt tegen hand naar boven	Keypoints : left hand + right hand Direction : up
21	2	3	stop	End of round
21	3	3	het lichaam naar voren	Keypoints : neck Direction : to the front
21	3	3	linkerarm naar links	Keypoints : left elbow + left hand Direction : to the left
21	3	3	linkerbovenarm een beetje omhoog	Keypoints : left elbow Direction : up Magnitude : -

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
21	3	3	terug	History : Back to previous pose
21	3	3	linkerhand een beetje omhoog	Keypoints : left hand Direction : up Magnitude : -
21	3	3	linkerarm een beetje naar links	Keypoints : left elbow + left hand Direction : to the left Magnitude : -
21	3	3	restaurant een beetje naar voren	Keypoints : right hand Direction : to the front Magnitude : -
21	3	3	rechterarm een beetje naar voren	Keypoints : right elbow + right hand Direction : to the front Magnitude : -
21	3	3	nog een beetje naar volgen	History : A little more
21	3	3	zet de arm naar voren	Keypoints : left elbow + left hand + right elbow + right hand Direction : to the front
21	3	3	volgende	Keypoints : None, no effect
21	3	3	rechterarm naar voren	Keypoints : right elbow + right hand Direction : to the front
21	3	3	vechten	Keypoints : None, no effect Direction : to the back + to the right
21	3	3	Zet mijn alarm naar onder	Keypoints : None, no effect Direction : down
21	3	3	rechten voor ouderen	Keypoints : None, no effect Direction : to the front
21	3	3	rechterhand	Keypoints : right hand Direction : to the right
21	3	3	rechterhand	Keypoints : right hand Direction : to the right

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
21	3	3	zeg dan naar onderen	Keypoints : None, no effect Direction : down
21	3	3	restaurant vrouw omwille	Keypoints : right hand
21	3	3	rechterhand naar onderen	Keypoints : right hand Direction : down
21	3	3	terug	History : Back to previous pose
21	3	3	stop	End of round
22	1	0	nee	Alter pose randomly
22	1	0	nee	Alter pose randomly
22	1	0	stop	End of round
22	2	0	restaurant omhoog	Keypoints : right hand Direction : up
22	2	0	stop	End of round
22	3	0	licht aan	Keypoints : neck
22	3	0	lichaam	Keypoints : neck
22	3	0	lichaam in Stavoren	Keypoints : neck Direction : to the front
22	3	0	lichaam bezig	Keypoints : neck
22	3	0	restaurant omhoog	Keypoints : right hand Direction : up
22	3	0	Wehkamp	Keypoints : None, no effect

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
22	3	0	linkerhand omhoog	Keypoints : left hand Direction : up
22	3	0	stop	End of round
22	1	1	stop	End of round
22	2	1	lichaam naar voren	Keypoints : neck Direction : to the front
22	2	1	stop	End of round
22	3	1	lichaam naar voren	Keypoints : neck Direction : to the front
22	3	1	stop	End of round
22	1	2	nee	Alter pose randomly
22	1	2	nee	Alter pose randomly
22	1	2	stop	End of round
22	2	2	linkerhand omhoog	Keypoints : left hand Direction : up
22	2	2	linkerelleboog omhoog	Keypoints : left elbow Direction : up
22	2	2	linkerhand omhoog	Keypoints : left hand Direction : up
22	2	2	Vertaal naar Engels	Keypoints : None, no effect ERROR : don’t understand
22	2	2	Vertaal naar Duits	Keypoints : None, no effect ERROR : don’t understand
22	2	2	Vertaal naar rechts	Keypoints : None, no effect Direction : to the right ERROR : don’t understand

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
22	2	2	restaurant Haarlem	Keypoints : right hand ERROR : don't understand
22	2	2	restaurants Haarlem	Keypoints : right hand ERROR : don't understand
22	2	2	rechterhand naar rechts	Keypoints : right hand Direction : to the right
22	2	2	rechterhand naar rechts	Keypoints : right hand Direction : to the right
22	2	2	rechterelleboog omlaag	Keypoints : right elbow Direction : down
22	2	2	Vertel een grap	Keypoints : None, no effect ERROR : don't understand
22	2	2	Vertaal naar rechts	Keypoints : None, no effect Direction : to the right ERROR : don't understand
22	2	2	rechtdoor naar rechts	Keypoints : None, no effect Direction : to the right ERROR : don't understand
22	2	2	restaurant naar rechts	Keypoints : right hand Direction : to the right
22	2	2	rechterhand Opzij	Keypoints : right hand Direction : to the right
22	2	2	stop	End of round
22	3	2	linkerhand	Keypoints : left hand Direction : to the left
22	3	2	linkerhand naar rechts	Keypoints : left hand Direction : to the right
22	3	2	linkerelleboog naar links	Keypoints : left elbow Direction : to the left
22	3	2	vertalen naar Engels	Keypoints : None, no effect
22	3	2	restaurant Opzij	Keypoints : right hand

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
22	3	2	Vertaal naar Engels	Keypoints : None, no effect
22	3	2	stop	End of round
22	1	3	nee	Alter pose randomly
22	1	3	nee	Alter pose randomly
22	1	3	stop	End of round
22	2	3	lichaam naar voren	Keypoints : neck Direction : to the front
22	2	3	rechterhand naar rechts	Keypoints : right hand Direction : to the right
22	2	3	linkerhand	Keypoints : left hand Direction : to the left
22	2	3	links	Keypoints : None, no effect Direction : to the left ERROR : don’t understand
22	2	3	linkerhand naar rechts	Keypoints : left hand Direction : to the right
22	2	3	stop	End of round
22	3	3	lichaam naar voren	Keypoints : neck Direction : to the front
22	3	3	stop	End of round
23	1	0	nee	Alter pose randomly
23	1	0	stop	End of round
23	2	0	licht aan naar voren	Keypoints : neck Direction : to the front

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
23	2	0	linkerhand naar voren	Keypoints : left hand Direction : to the front
23	2	0	linkerhand naar achteren	Keypoints : left hand Direction : to the back
23	2	0	linkerhand naar voren	Keypoints : left hand Direction : to the front
23	2	0	linkerelleboog naar achteren	Keypoints : left elbow Direction : to the back
23	2	0	linkerelleboog naar rechts	Keypoints : left elbow Direction : to the right
23	2	0	linkerhand naar rechts	Keypoints : left hand Direction : to the right
23	2	0	restaurant naar achteren	Keypoints : right hand Direction : to the back
23	2	0	Rijd naar elleboog naar achteren	Keypoints : left elbow + right elbow Direction : to the back
23	2	0	linkerhand naar voren	Keypoints : left hand Direction : to the front
23	2	0	linkerhand naar voren	Keypoints : left hand Direction : to the front
23	2	0	linkeronderarm naar voren	Keypoints : left hand Direction : to the front
23	2	0	linkeronderarm naar voren	Keypoints : left hand Direction : to the front
23	2	0	rechterhand naar rechts	Keypoints : right hand Direction : to the right
23	2	0	rechterelleboog naar Lelystad	Keypoints : right elbow ERROR : don’t understand
23	2	0	rechterelleboog naar links	Keypoints : right elbow Direction : to the left
23	2	0	rechteronderarm naar voren	Keypoints : right hand Direction : to the front

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
23	2	0	rechterelleboog naar achteren	Keypoints : right elbow Direction : to the back
23	2	0	rechterelleboog naar links	Keypoints : right elbow Direction : to the left
23	2	0	rechterhand naar voren	Keypoints : right hand Direction : to the front
23	2	0	rechteronderarm naar voren	Keypoints : right hand Direction : to the front
23	2	0	linkerelleboog naar rechts	Keypoints : left elbow Direction : to the right
23	2	0	rechterhand naar voren	Keypoints : right hand Direction : to the front
23	2	0	restaurant Agora	Keypoints : right hand ERROR : don’t understand
23	2	0	rechteronderarm naar voren	Keypoints : right hand Direction : to the front
23	2	0	rechterhand naar voren	Keypoints : right hand Direction : to the front
23	2	0	rechteronderarm naar voren	Keypoints : right hand Direction : to the front
23	2	0	rechterhand naar voren	Keypoints : right hand Direction : to the front
23	2	0	rechterbovenarm naar links	Keypoints : right elbow Direction : to the left
23	2	0	rechterelleboog naar achteren	Keypoints : right elbow Direction : to the back
23	2	0	rechteronderarm naar links	Keypoints : right hand Direction : to the left
23	2	0	zeker hand akkoorden	Keypoints : left hand + right hand ERROR : don’t understand
23	2	0	linkerhand naar voren	Keypoints : left hand Direction : to the front

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
23	2	0	linkerbovenarm naar rechts	Keypoints : left elbow Direction : to the right
23	2	0	rechterbovenarm naar beneden	Keypoints : right elbow Direction : down
23	2	0	stop	End of round
23	3	0	lichaam iets naar voren	Keypoints : neck Direction : to the front Magnitude : –
23	3	0	lichaam een beetje naar achteren	Keypoints : neck Direction : to the back Magnitude : -
23	3	0	stop	End of round
23	1	1	nee	Alter pose randomly
23	1	1	nee	Alter pose randomly
23	1	1	nee	Alter pose randomly
23	1	1	stop	End of round
23	2	1	lichaam naar voren	Keypoints : neck Direction : to the front
23	2	1	rechterhand omhoog	Keypoints : right hand Direction : up
23	2	1	linkerhand naar achteren	Keypoints : left hand Direction : to the back
23	2	1	linkerhand naar beneden	Keypoints : left hand Direction : down
23	2	1	linkerhanden achteren	Keypoints : left hand Direction : to the back
23	2	1	linkerhand naar voren	Keypoints : left hand Direction : to the front

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
23	2	1	linkerhand naar beneden	Keypoints : left hand Direction : down
23	2	1	linkerhand naar beneden	Keypoints : left hand Direction : down
23	2	1	linkeronderarm naar beneden	Keypoints : left hand Direction : down
23	2	1	stop	End of round
23	3	1	rechterhand iets naar achteren	Keypoints : right hand Direction : to the back Magnitude : –
23	3	1	rechterhand een beetje naar voren	Keypoints : right hand Direction : to the front Magnitude : -
23	3	1	linkerhand een beetje naar achteren	Keypoints : left hand Direction : to the back Magnitude : -
23	3	1	rechterelleboog een beetje naar voren	Keypoints : right elbow Direction : to the front Magnitude : -
23	3	1	rechterhand een beetje naar voren	Keypoints : right hand Direction : to the front Magnitude : -
23	3	1	stop	End of round
23	1	2	nee	Alter pose randomly
23	1	2	nee	Alter pose randomly
23	1	2	stop	End of round
23	2	2	rechterhand naar voren	Keypoints : right hand Direction : to the front
23	2	2	linkerelleboog naar achteren	Keypoints : left elbow Direction : to the back

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
23	2	2	rechterelleboog naar voren	Keypoints : right elbow Direction : to the front
23	2	2	linkerhand naar rechts	Keypoints : left hand Direction : to the right
23	2	2	rechteronderarm naar beneden	Keypoints : right hand Direction : down
23	2	2	rechterelleboog naar links	Keypoints : right elbow Direction : to the left
23	2	2	linkerelleboog naar rechts	Keypoints : left elbow Direction : to the right
23	2	2	rechteronderarm naar rechts	Keypoints : right hand Direction : to the right
23	2	2	linkeronderarm naar rechts	Keypoints : left hand Direction : to the right
23	2	2	linkerhand naar boven	Keypoints : left hand Direction : up
23	2	2	rechterbovenarm naar beneden	Keypoints : right elbow Direction : down
23	2	2	rechterbovenarm naar beneden	Keypoints : right elbow Direction : down
23	2	2	rechteronderarm naar voren	Keypoints : right hand Direction : to the front
23	2	2	rechterhand naar Hoorn	Keypoints : right hand Direction : to the front + to the right
23	2	2	rechterhand naar voren	Keypoints : right hand Direction : to the front
23	2	2	rechteronderarm naar voren	Keypoints : right hand Direction : to the front
23	2	2	rechteronderarm naar voren	Keypoints : right hand Direction : to the front
23	2	2	rechterhand naar voren	Keypoints : right hand Direction : to the front

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
23	2	2	stop	End of round
23	3	2	rechteronderarm iets omlaag	Keypoints : right hand Direction : down Magnitude : –
23	3	2	rechteronderarm een beetje omhoog	Keypoints : right hand Direction : up Magnitude : -
23	3	2	linkerarm een beetje naar achteren	Keypoints : left elbow + left hand Direction : to the back Magnitude : -
23	3	2	linkerhand een beetje naar rechts	Keypoints : left hand Direction : to the right Magnitude : -
23	3	2	rechterhand naar rechts	Keypoints : right hand Direction : to the right
23	3	2	terug	History : Back to previous pose
23	3	2	rechteronderarm naar rechts	Keypoints : right hand Direction : to the right
23	3	2	terug	History : Back to previous pose
23	3	2	rechterelleboog naar rechts	Keypoints : right elbow Direction : to the right
23	3	2	terug	History : Back to previous pose
23	3	2	rechterhand naar voren	Keypoints : right hand Direction : to the front
23	3	2	stop	End of round
23	1	3	nee	Alter pose randomly
23	1	3	nee	Alter pose randomly

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
23	1	3	nee	Alter pose randomly
23	1	3	nee	Alter pose randomly
23	1	3	nee	Alter pose randomly
23	1	3	nee	Alter pose randomly
23	1	3	stop	End of round
23	2	3	lichaam naar voren	Keypoints : neck Direction : to the front
23	2	3	linkerarm naar achteren	Keypoints : left elbow + left hand Direction : to the back
23	2	3	linkerhand naar achteren	Keypoints : left hand Direction : to the back
23	2	3	handen naar achteren	Keypoints : left hand + right hand Direction : to the back
23	2	3	Handen Omhoog	Keypoints : left hand + right hand Direction : up
23	2	3	stop	End of round
23	3	3	lichaam naar voren	Keypoints : neck Direction : to the front
23	3	3	linkervoorarm naar achteren	Keypoints : left hand Direction : to the back
23	3	3	rechterhand voorarm iets naar achteren	Keypoints : right hand Direction : to the back Magnitude : –
23	3	3	iets terug	History : A little less

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
23	3	3	linkerelleboog iets omhoog	Keypoints : left elbow Direction : up Magnitude : –
23	3	3	terug	History : Back to previous pose
23	3	3	linkerbovenarm iets naar achteren	Keypoints : left elbow Direction : to the back Magnitude : –
23	3	3	linkerarm iets naar achteren	Keypoints : left elbow + left hand Direction : to the back Magnitude : –
23	3	3	terug	History : Back to previous pose
23	3	3	linkerarm iets omlaag	Keypoints : left elbow + left hand Direction : down Magnitude : –
23	3	3	linkeronderarm iets naar achteren	Keypoints : left hand Direction : to the back Magnitude : –
23	3	3	linkeronderarm iets naar voren	Keypoints : left hand Direction : to the front Magnitude : –
23	3	3	terug	History : Back to previous pose
23	3	3	stop	End of round
24	1	0	nee	Alter pose randomly
24	1	0	nee	Alter pose randomly
24	1	0	nee	Alter pose randomly
24	1	0	nee	Alter pose randomly
24	1	0	nee	Alter pose randomly

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
24	1	0	nee	Alter pose randomly
24	1	0	nee	Alter pose randomly
24	1	0	nee	Alter pose randomly
24	1	0	nee	Alter pose randomly
24	1	0	nee	Alter pose randomly
24	1	0	nee	Alter pose randomly
24	1	0	nee	Alter pose randomly
24	1	0	nee	Alter pose randomly
24	1	0	nee	Alter pose randomly
24	1	0	nee	Alter pose randomly
24	1	0	nee	Alter pose randomly
24	1	0	nee	Alter pose randomly
24	1	0	nee	Alter pose randomly
24	1	0	nee	Alter pose randomly
24	1	0	nee	Alter pose randomly
24	1	0	nee	Alter pose randomly
24	1	0	stop	End of round

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
24	2	0	linkerArmando	Keypoints : None, no effect ERROR : don't understand
24	2	0	linkerarm omhoog	Keypoints : left elbow + left hand Direction : up
24	2	0	linkervoorarm	Keypoints : left hand ERROR : don't understand
24	2	0	linkervoor armen omhoog	Keypoints : left elbow + left hand + right elbow + right hand Direction : up
24	2	0	linkerarm omlaag	Keypoints : left elbow + left hand Direction : down
24	2	0	linkervoor voorarm omhoog	Keypoints : left hand + right hand Direction : up
24	2	0	rechterarm naar voren	Keypoints : right elbow + right hand Direction : to the front
24	2	0	rechterarm naar voren	Keypoints : right elbow + right hand Direction : to the front
24	2	0	oh	Keypoints : None, no effect Direction : to the back ERROR : don't understand
24	2	0	stop	End of round
24	3	0	lichaam naar voren	Keypoints : neck Direction : to the front
24	3	0	linkerarm naar rechts	Keypoints : left elbow + left hand Direction : to the right
24	3	0	naar beneden	Keypoints : None, no effect Direction : down
24	3	0	linkerbovenarm	Keypoints : left elbow
24	3	0	hahaha	Keypoints : None, no effect

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
24	3	0	linkerbovenarm naar beneden	Keypoints : left elbow Direction : down
24	3	0	linkerbovenarm naar voren	Keypoints : left elbow Direction : to the front
24	3	0	linkerhand naar rechts	Keypoints : left hand Direction : to the right
24	3	0	rechterhand omhoog	Keypoints : right hand Direction : up
24	3	0	rechterhand omhoog	Keypoints : right hand Direction : up
24	3	0	stop	End of round
24	1	1	stop	End of round
24	2	1	stop	End of round
24	3	1	stop	End of round
24	1	2	nee	Alter pose randomly
24	1	2	stop	End of round
24	2	2	rechterarm omhoog	Keypoints : right elbow + right hand Direction : up
24	2	2	rechterarm omlaag	Keypoints : right elbow + right hand Direction : down
24	2	2	linkerarm omhoog	Keypoints : left elbow + left hand Direction : up
24	2	2	stop	End of round
24	3	2	linkerhand omhoog	Keypoints : left hand Direction : up

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
24	3	2	stop	End of round
24	1	3	nee	Alter pose randomly
24	1	3	nee	Alter pose randomly
24	1	3	nee	Alter pose randomly
24	1	3	nee	Alter pose randomly
24	1	3	nee	Alter pose randomly
24	1	3	nee	Alter pose randomly
24	1	3	nee	Alter pose randomly
24	1	3	stop	End of round
24	2	3	rechterarm omhoog	Keypoints : right elbow + right hand Direction : up
24	2	3	lichaam naar Lith	Keypoints : neck ERROR : don't understand
24	2	3	lichaam naar links	Keypoints : neck Direction : to the left
24	2	3	linkerarm naar beneden	Keypoints : left elbow + left hand Direction : down
24	2	3	linkerarm naar beneden	Keypoints : left elbow + left hand Direction : down
24	2	3	linkerhand naar beneden	Keypoints : left hand Direction : down
24	2	3	stop	End of round

Continuation of Table I.1

User ID	Controller ID	Round ID	Transcribed Command	Effect
24	3	3	lichaam iets naar voren	Keypoints : neck Direction : to the front Magnitude : –
24	3	3	nog iets naar voren	History : A little more
24	3	3	nog iets	History : A little more
24	3	3	handen boven je hoofd	Keypoints : left hand + right hand Direction : up
24	3	3	armen omhoog	Keypoints : left elbow + left hand + right elbow + right hand Direction : up
24	3	3	linkerarm naar rechts	Keypoints : left elbow + left hand Direction : to the right
24	3	3	weather	Keypoints : None, no effect
24	3	3	rechterarm	Keypoints : right elbow + right hand
24	3	3	stop	End of round

J

Experiment 2 - All similarity metrics per round for each test user

In this appendix we show the similarity metric for each round, per participant.

The round number denotes which of the sets of images we were using, and thus which pose we wanted to transfer upon the robot. Round 1 consisted of the image with two thumbs up (medium difficulty), round 2 consisted of the image with only the right arm raised (low difficulty), round 3 consisted of the image where the person was bend backwards and lifted their arms up slightly in mock fear (high difficulty).

On the right we can see the order that the participant was given the different conditions.

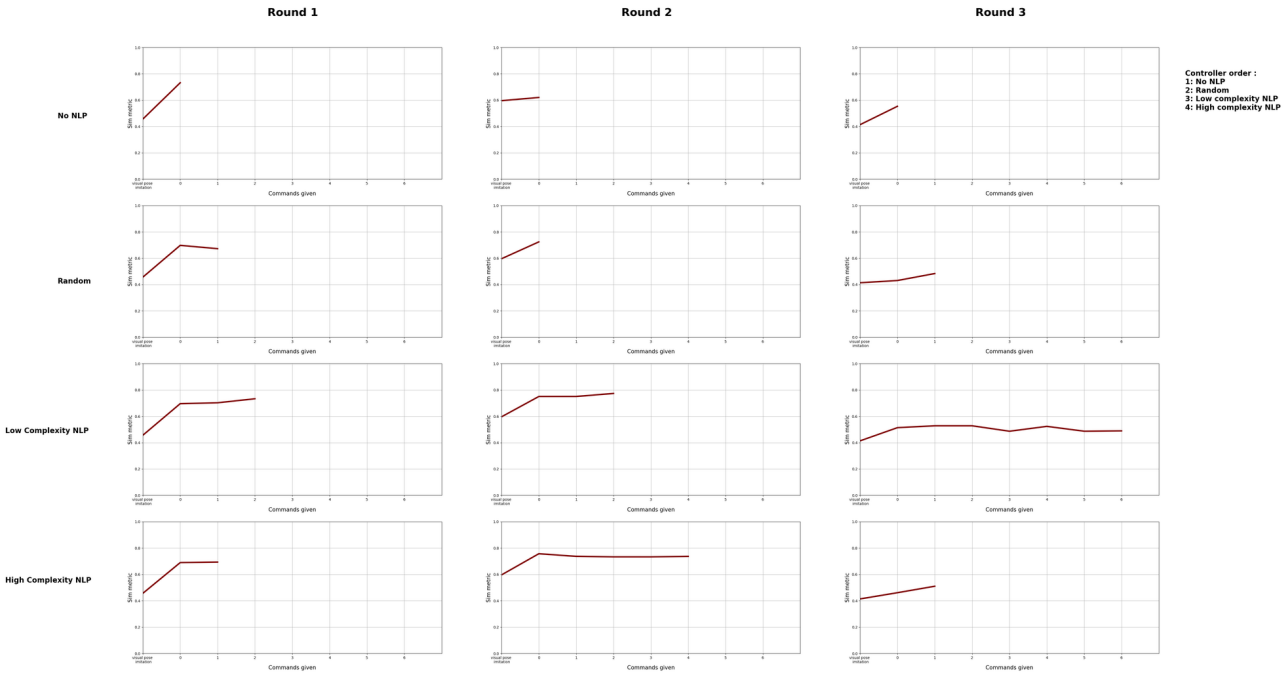


Figure J.1: Similarity metric for test user 1

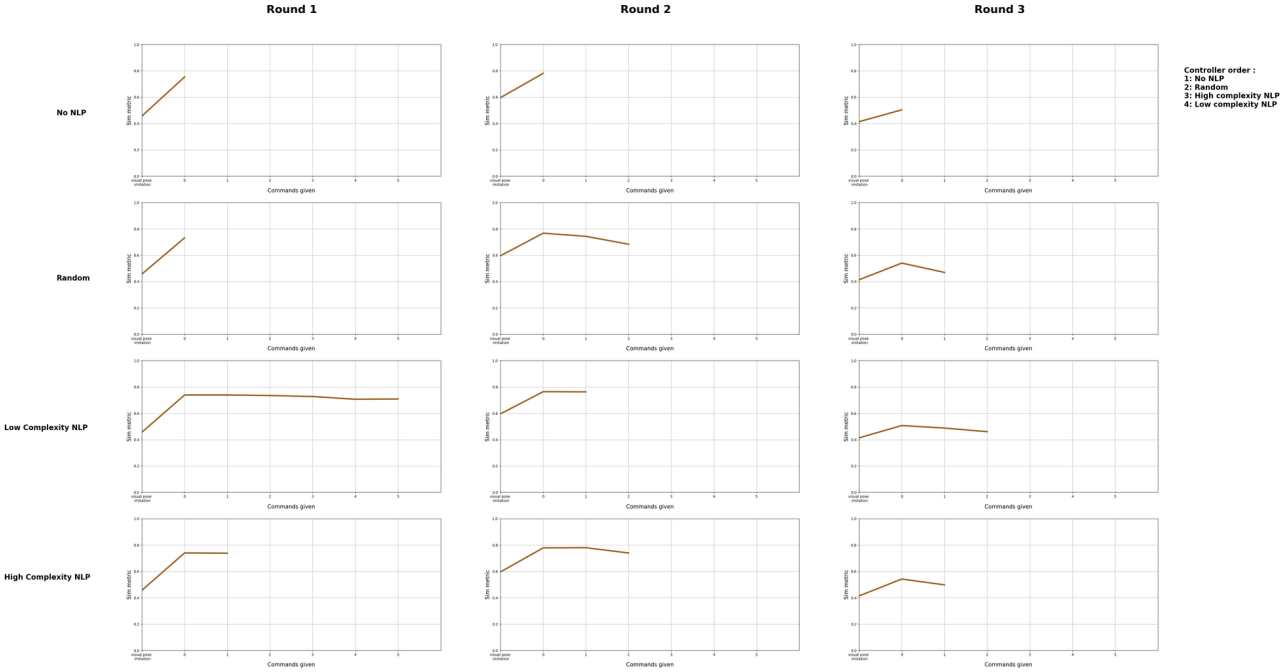


Figure J.2: Similarity metric for test user 2

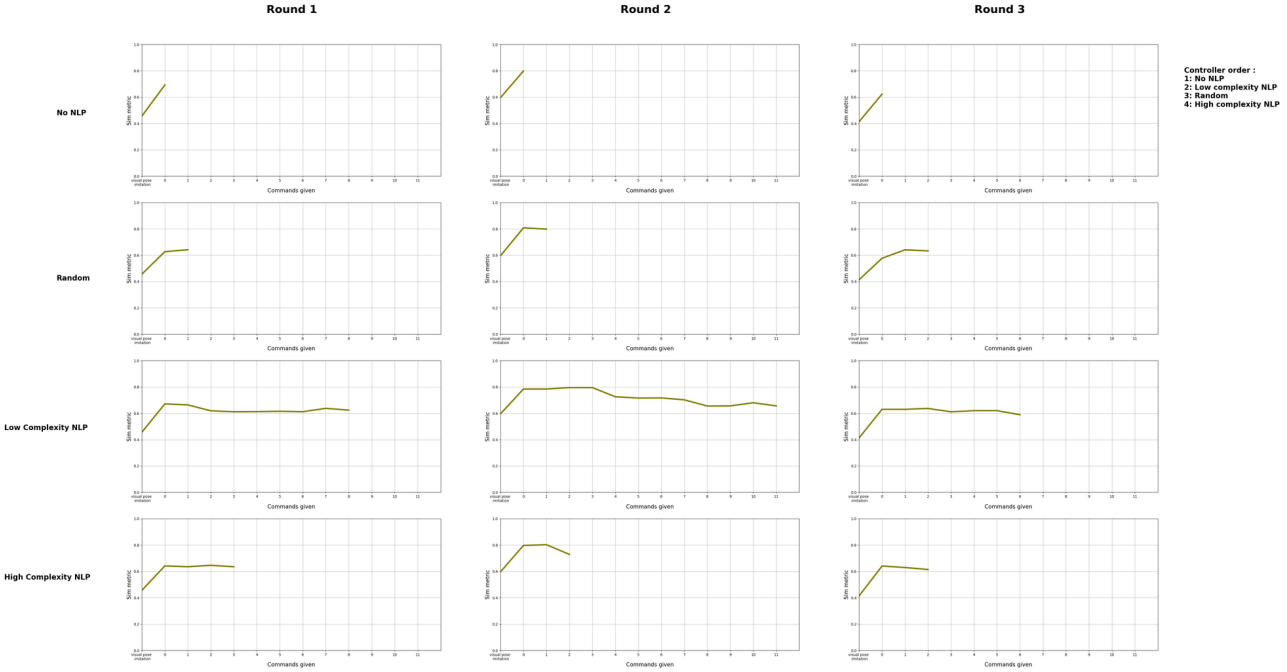


Figure J.3: Similarity metric for test user 3

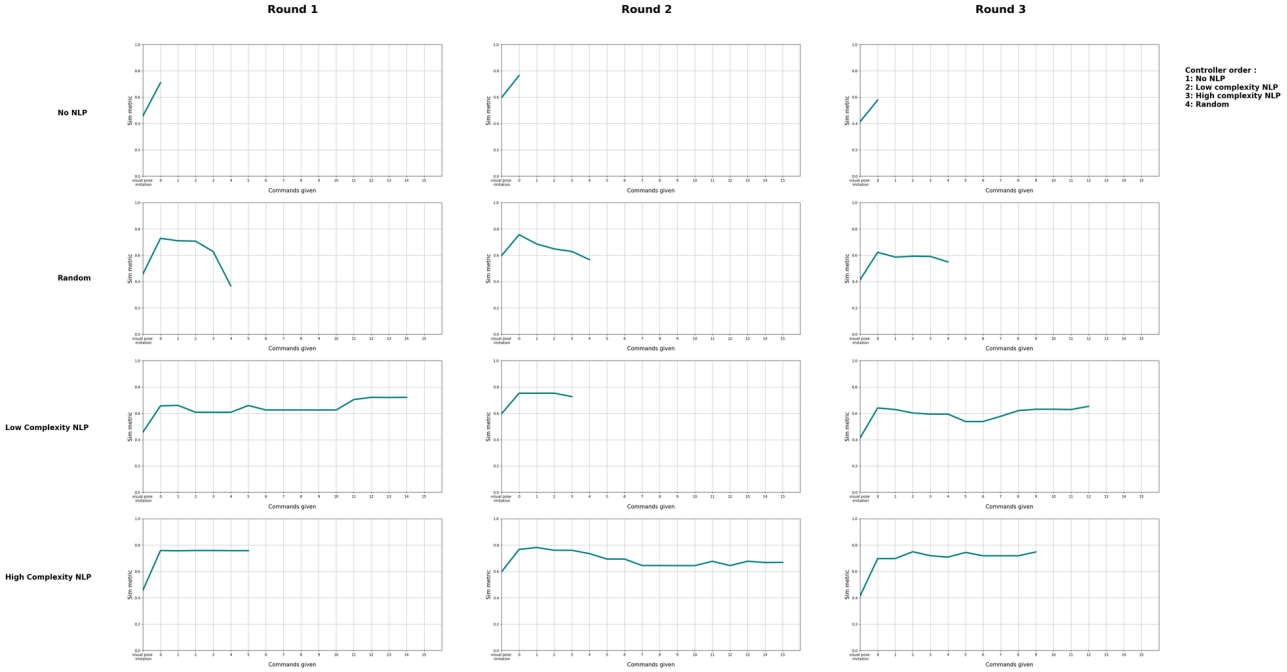


Figure J.4: Similarity metric for test user 4

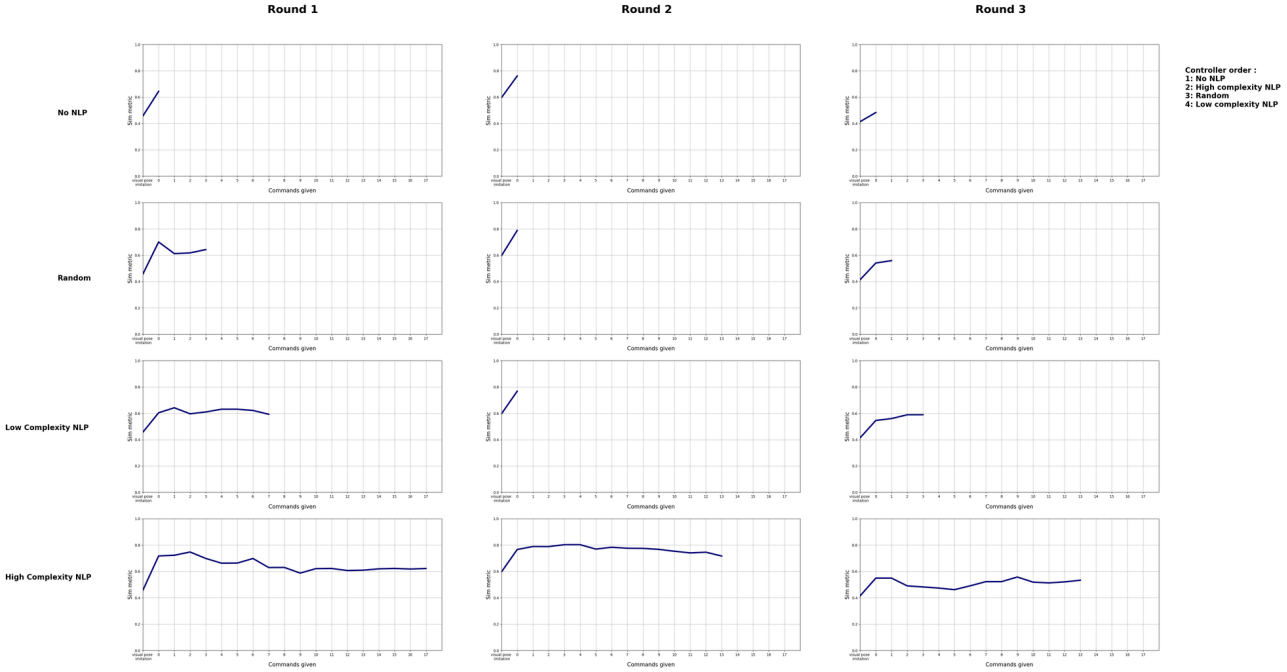


Figure J.5: Similarity metric for test user 5

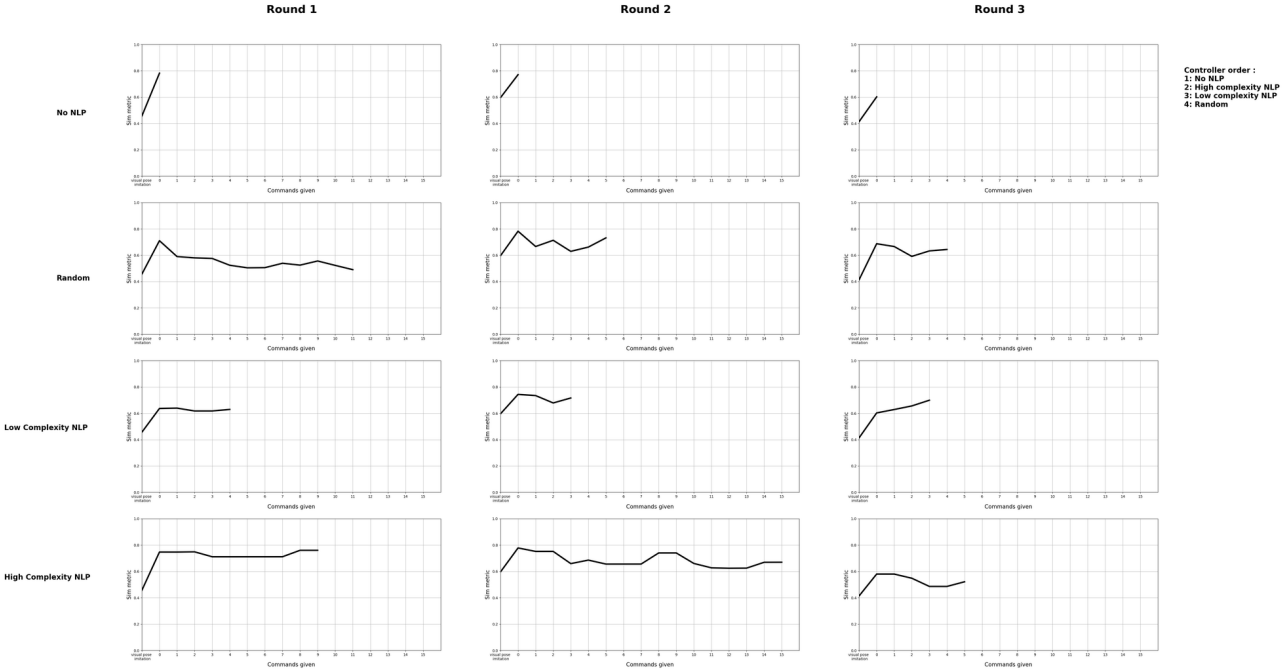


Figure J.6: Similarity metric for test user 6

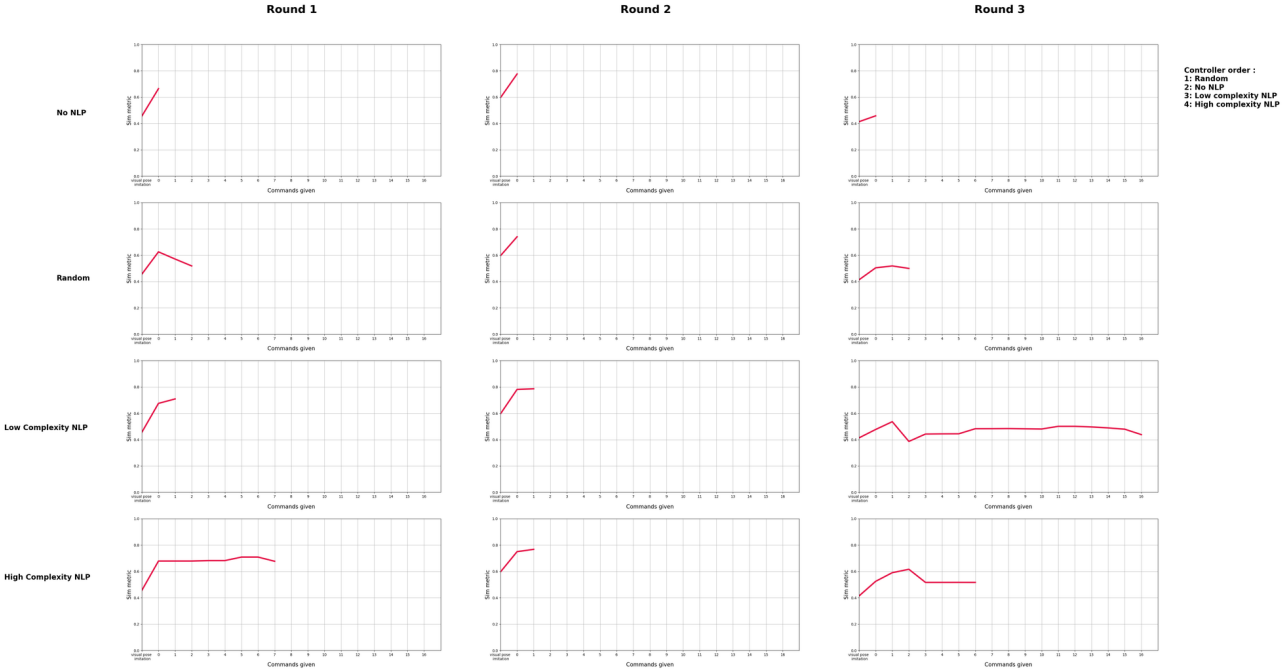


Figure J.7: Similarity metric for test user 7

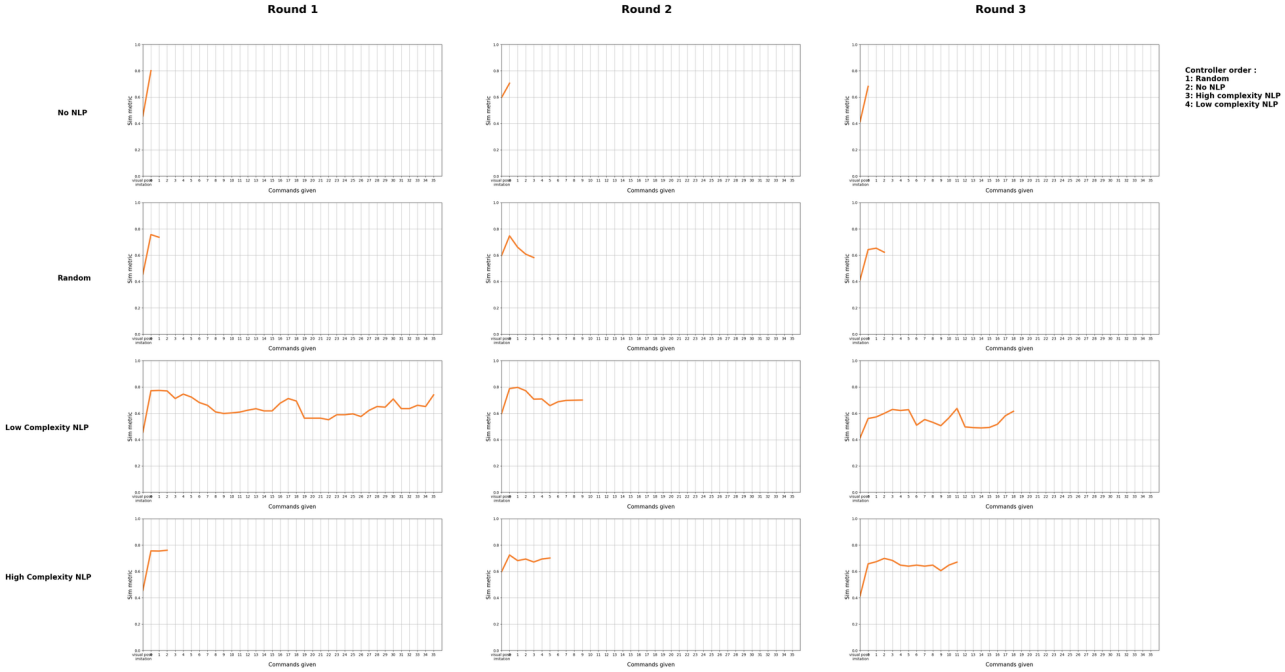


Figure J.8: Similarity metric for test user 8

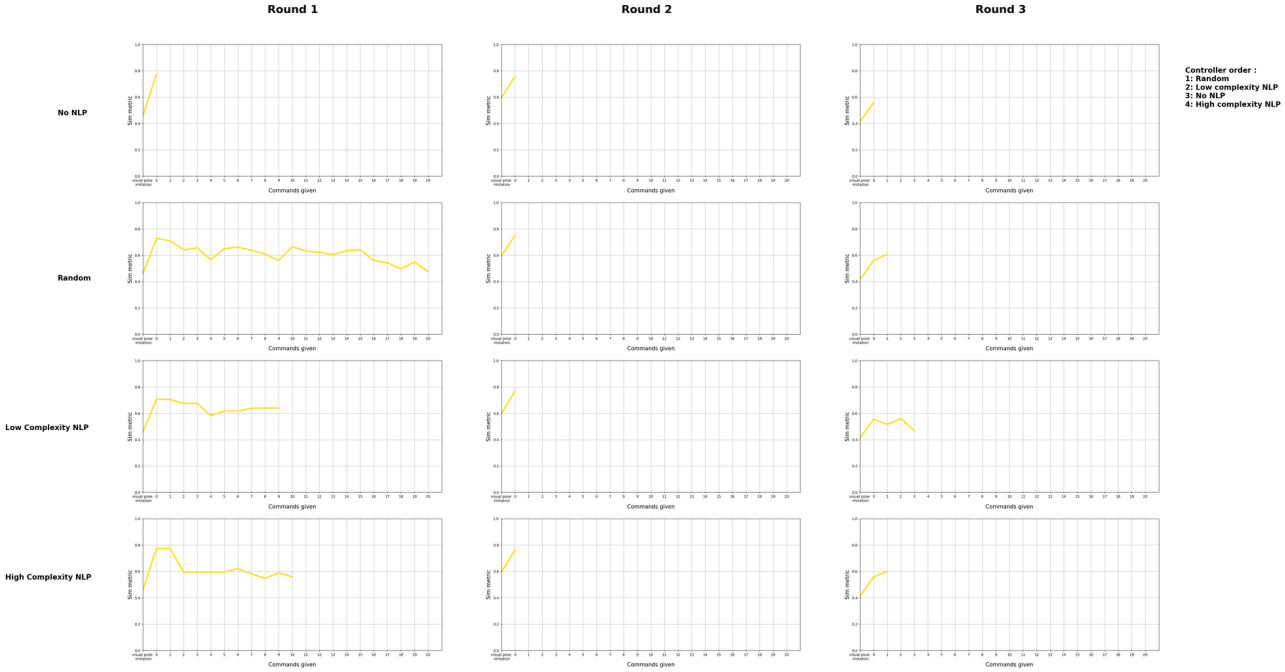


Figure J.9: Similarity metric for test user 9

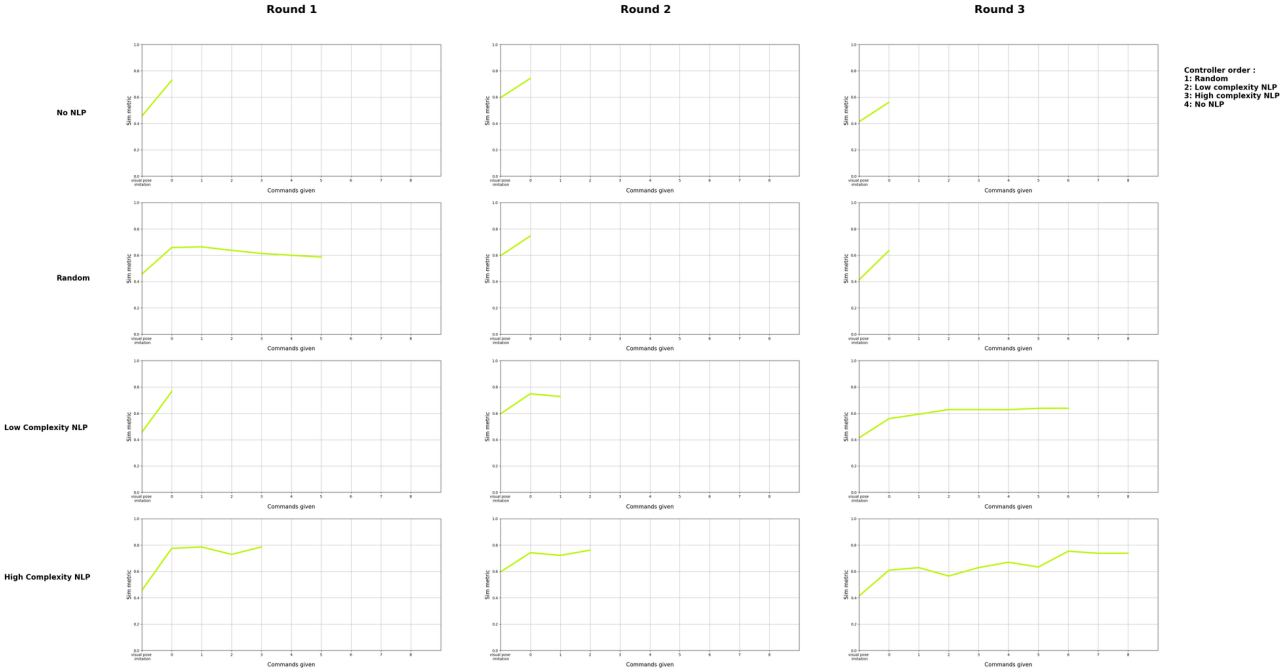


Figure J.10: Similarity metric for test user 10

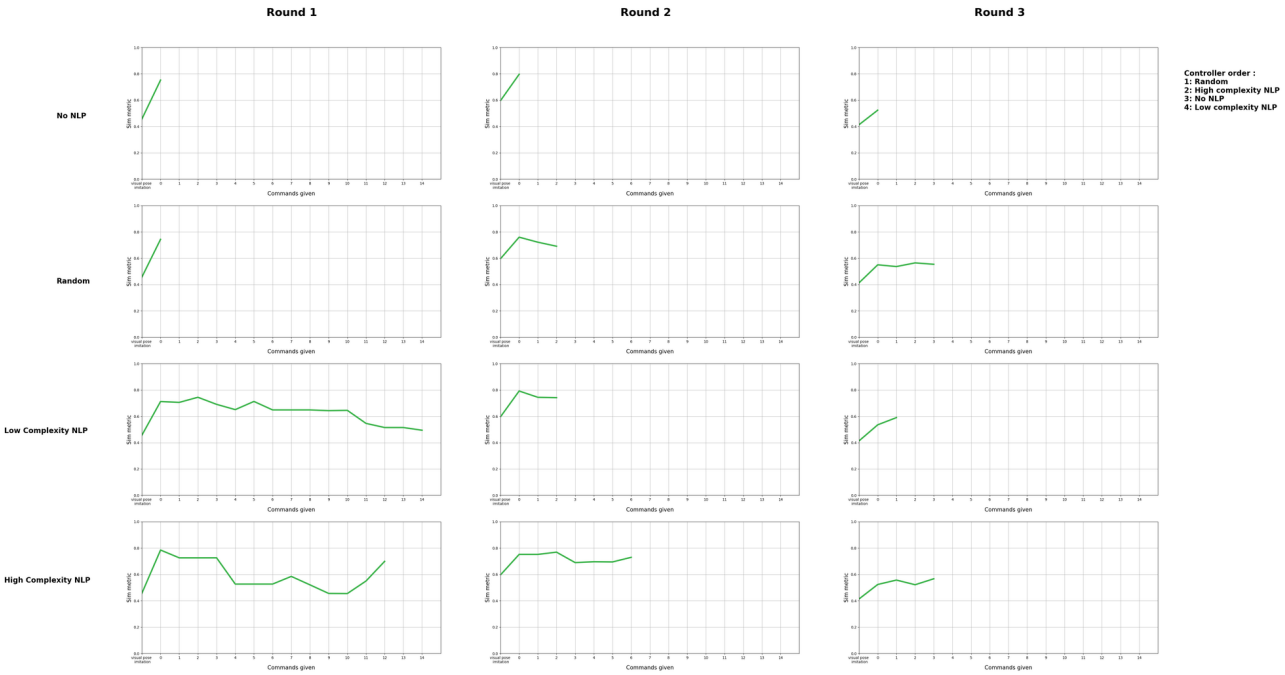


Figure J.11: Similarity metric for test user 11

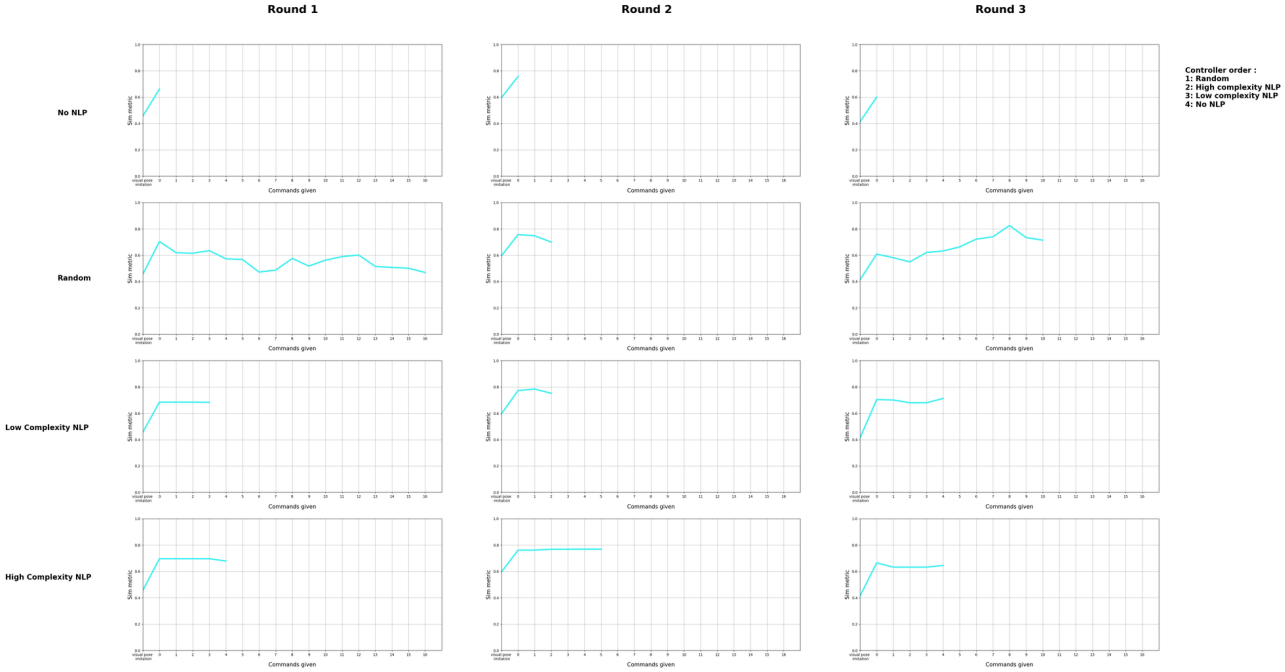


Figure J.12: Similarity metric for test user 12

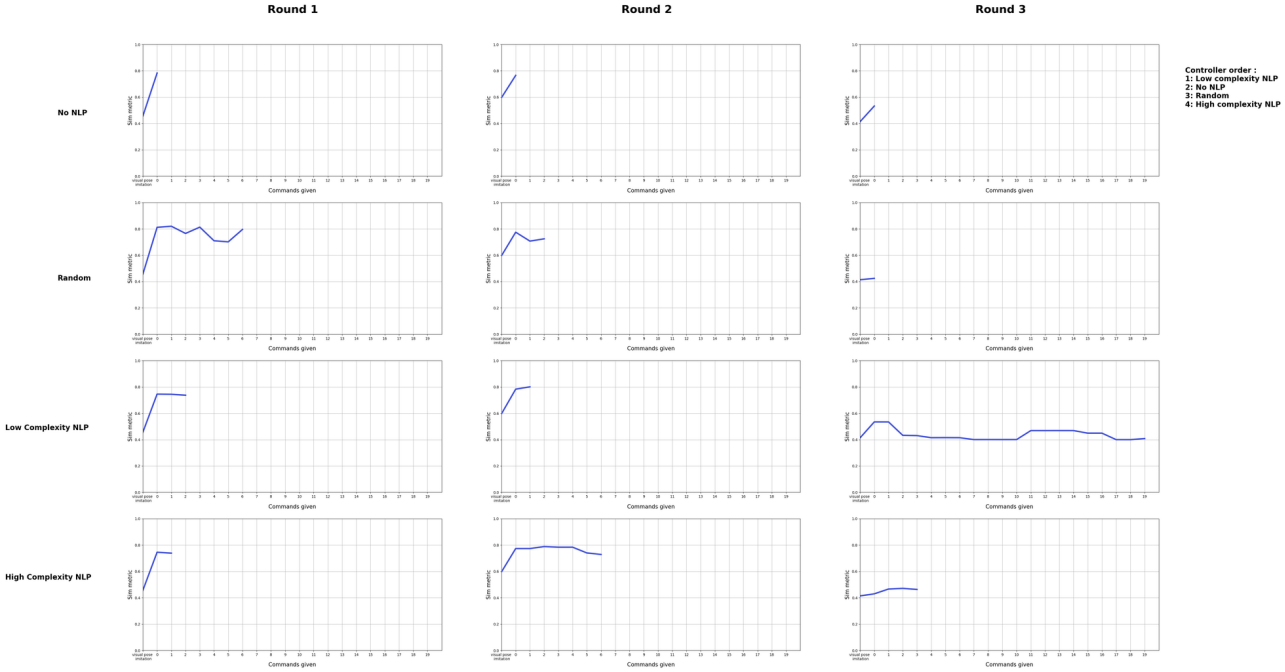


Figure J.13: Similarity metric for test user 13

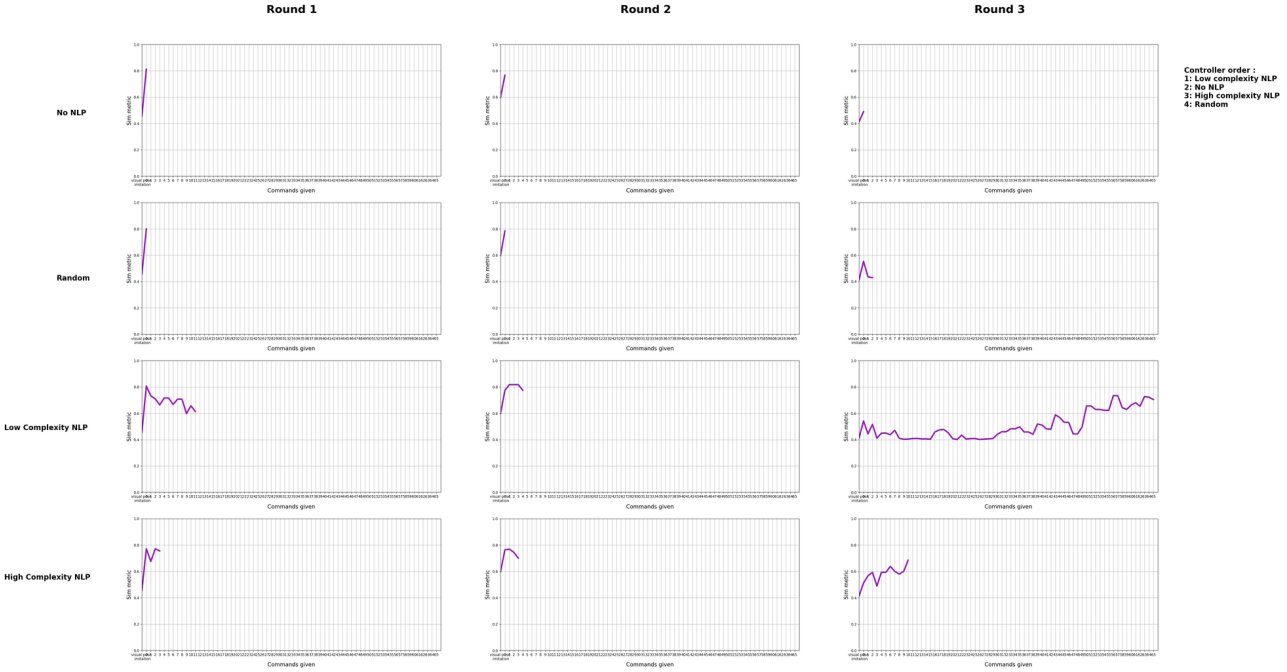


Figure J.14: Similarity metric for test user 14

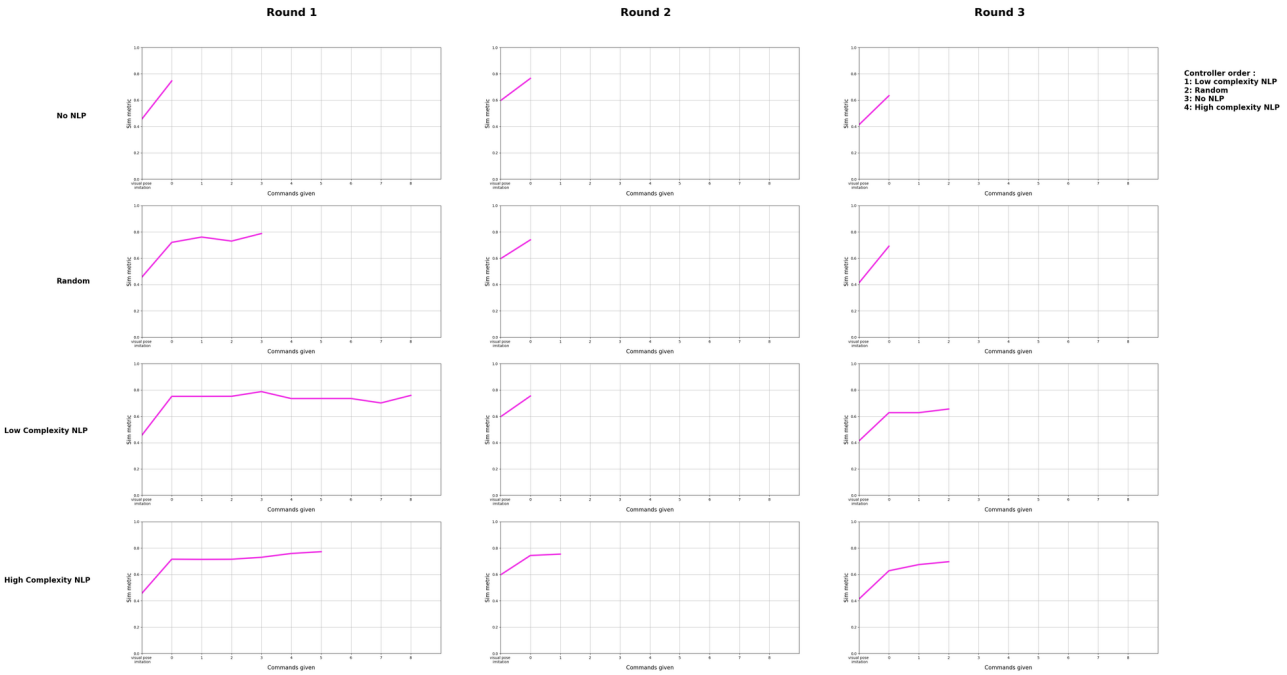


Figure J.15: Similarity metric for test user 15

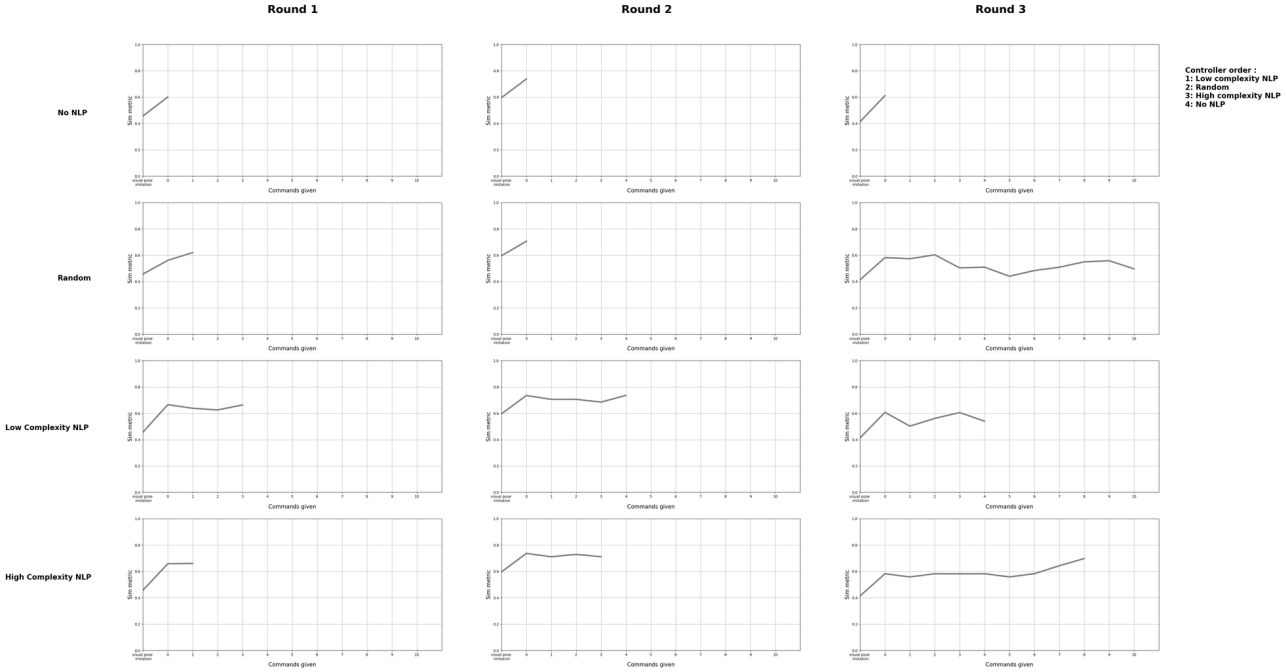


Figure J.16: Similarity metric for test user 16

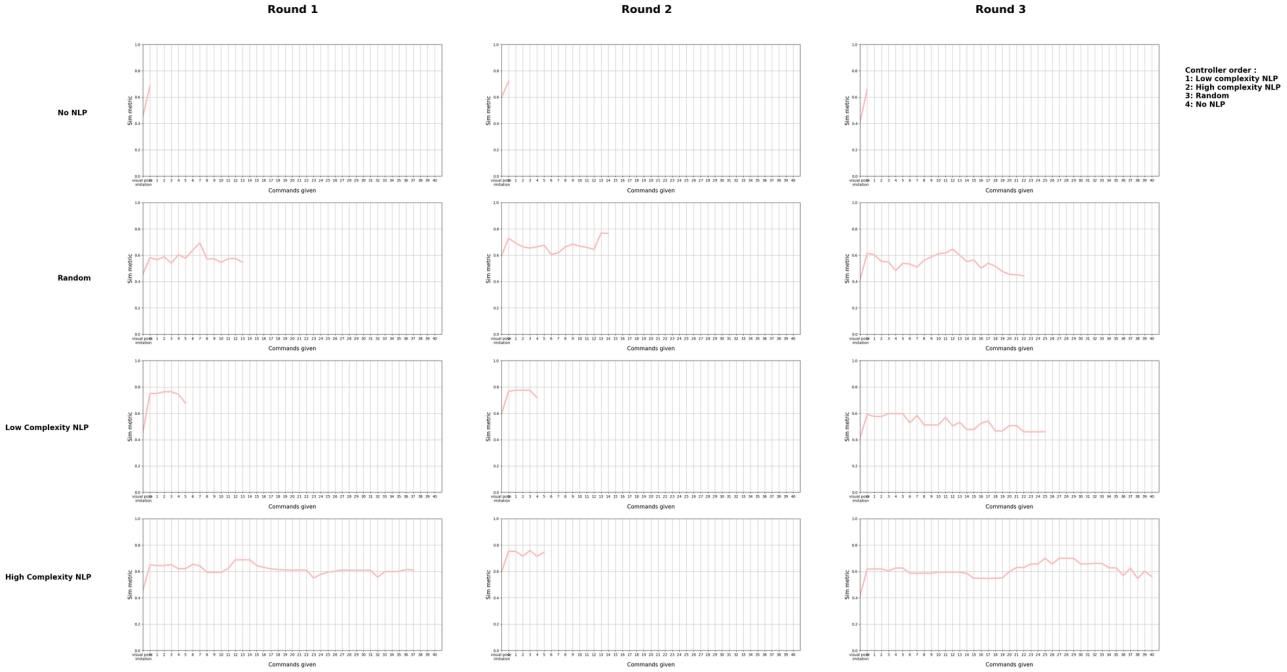


Figure J.17: Similarity metric for test user 17

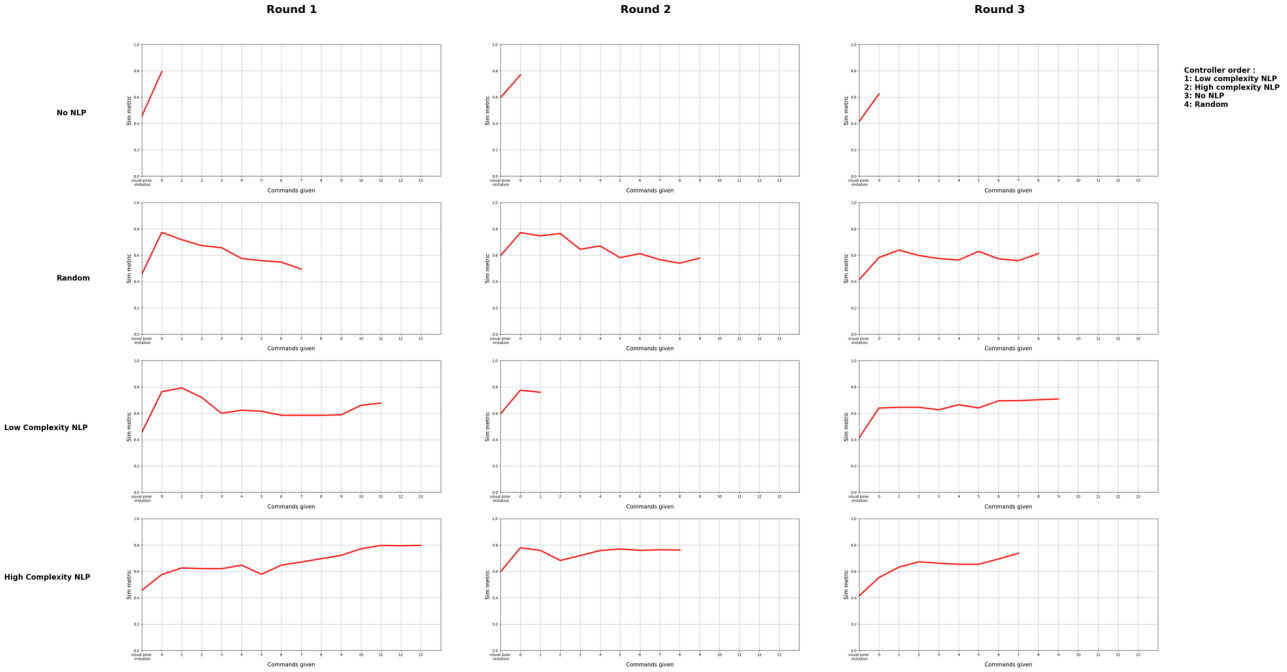


Figure J.18: Similarity metric for test user 18

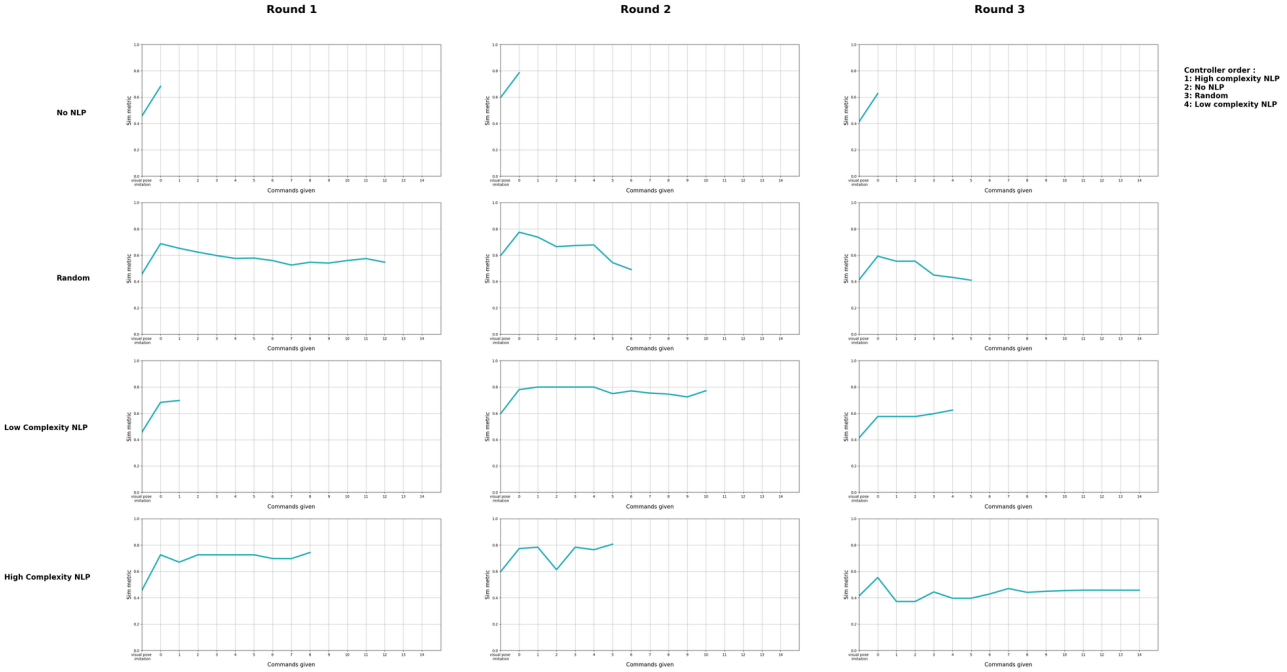


Figure J.19: Similarity metric for test user 19

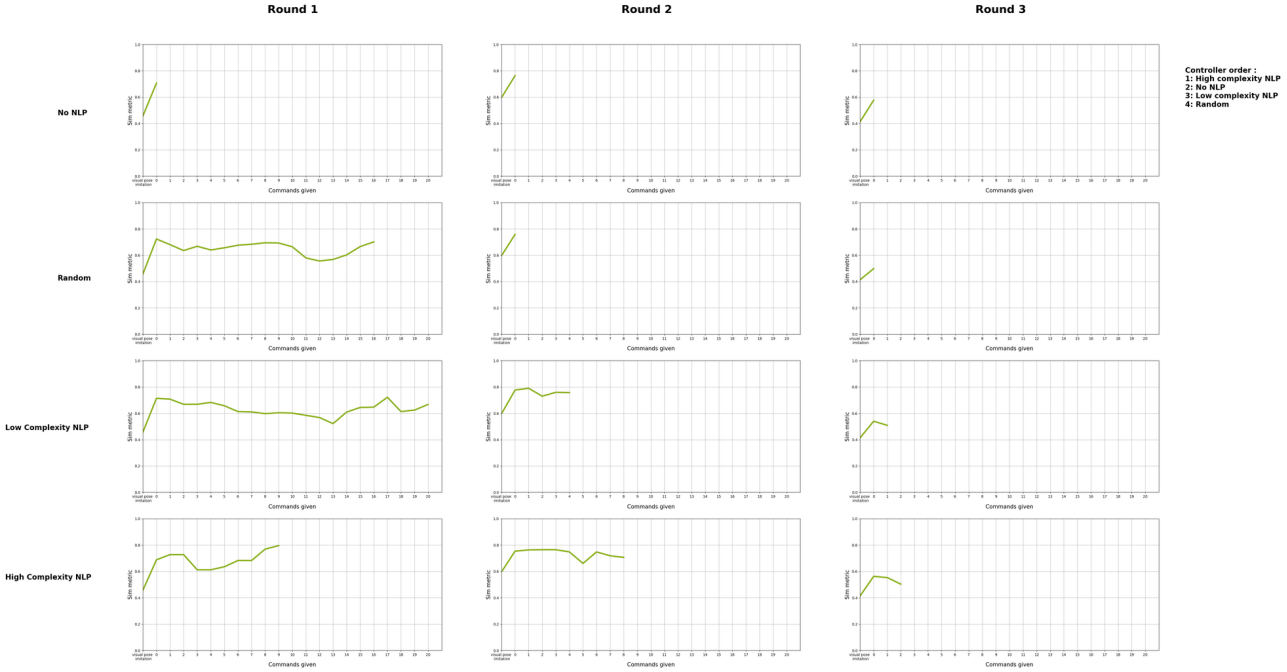


Figure J.20: Similarity metric for test user 20

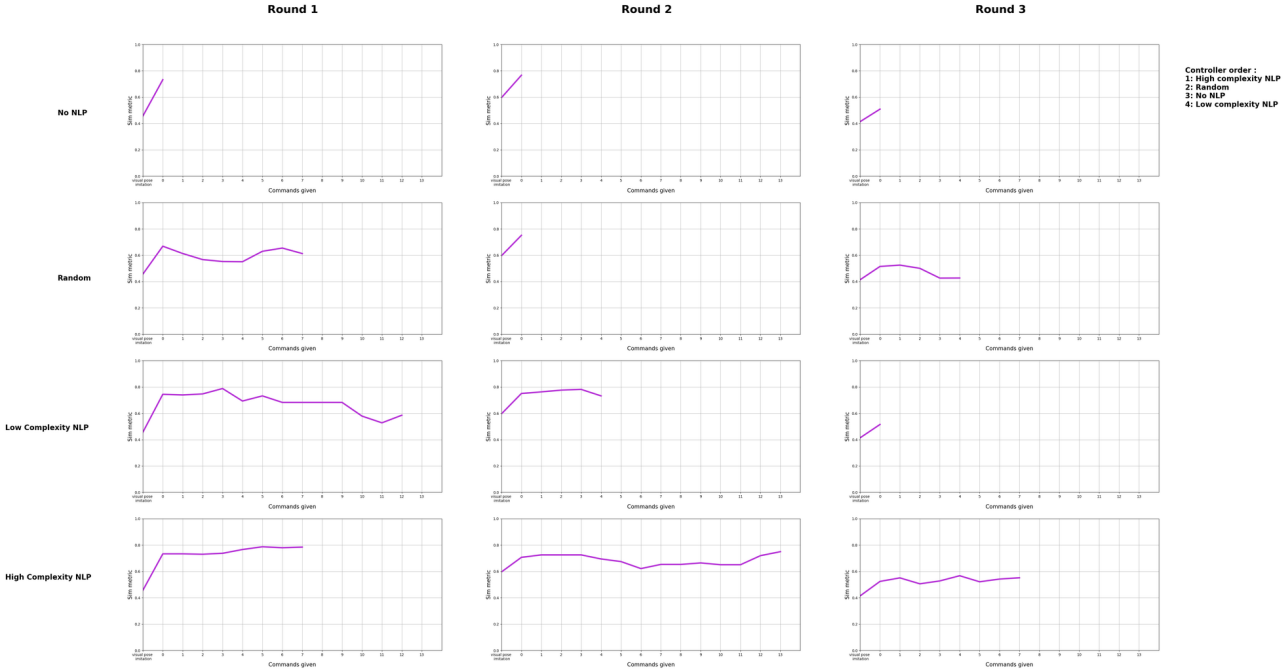


Figure J.21: Similarity metric for test user 21

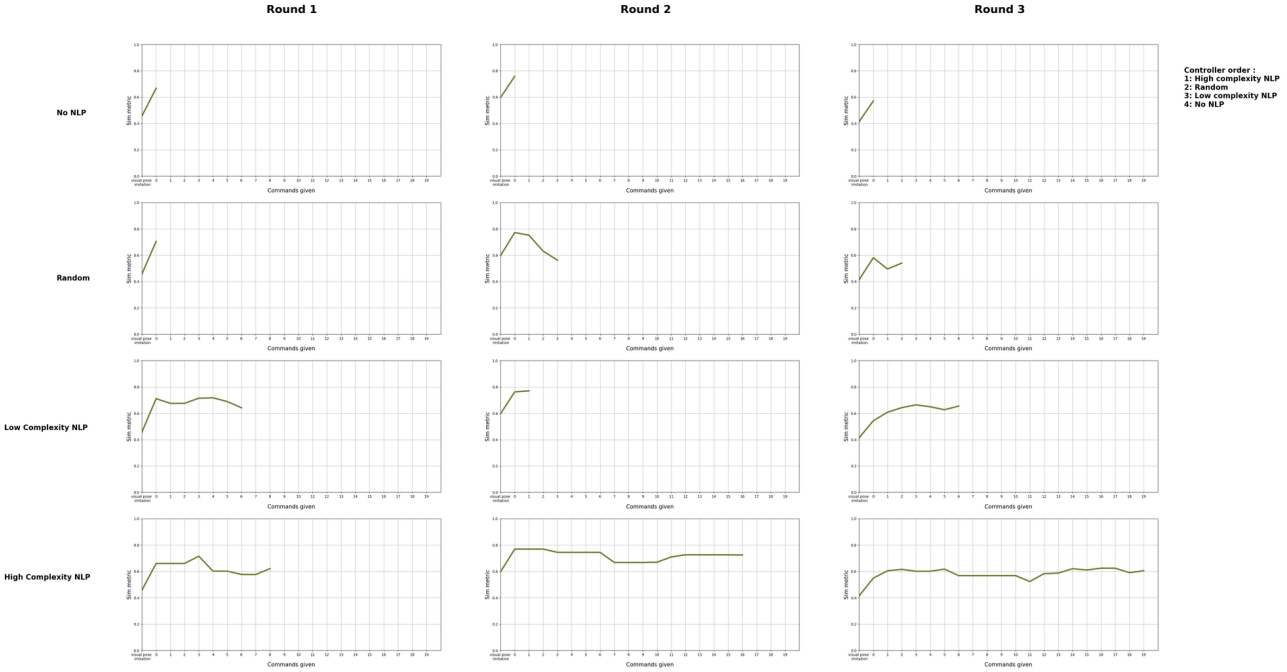


Figure J.22: Similarity metric for test user 22

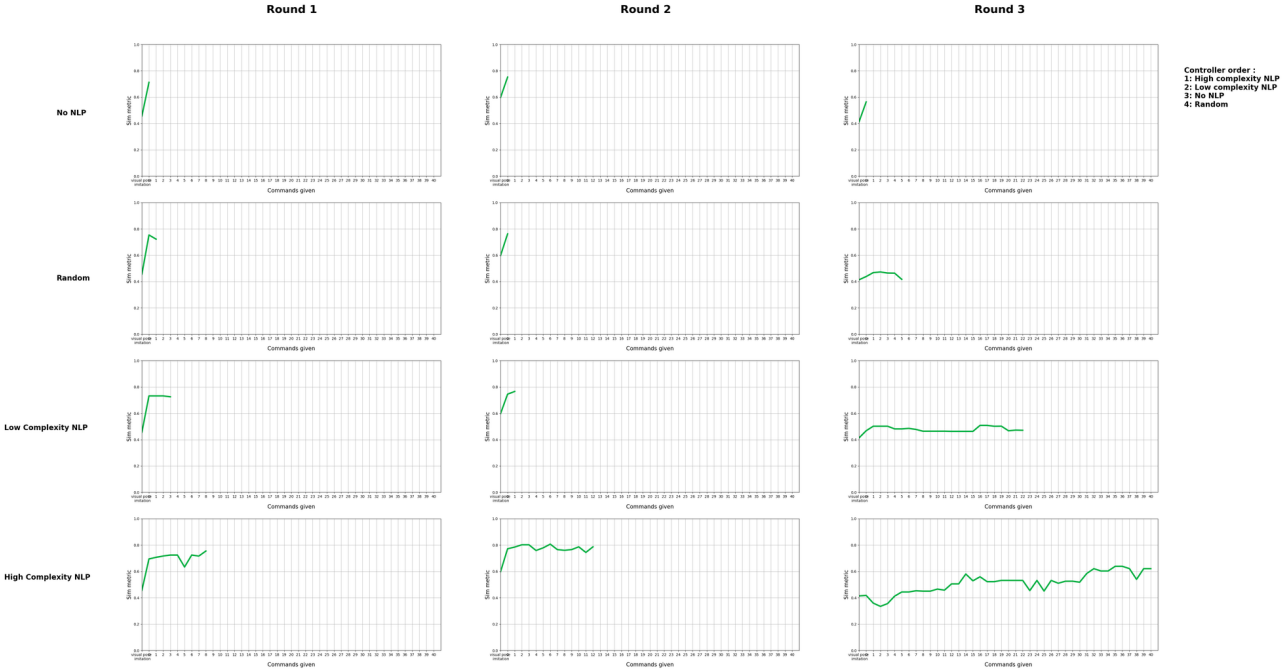


Figure J.23: Similarity metric for test user 23

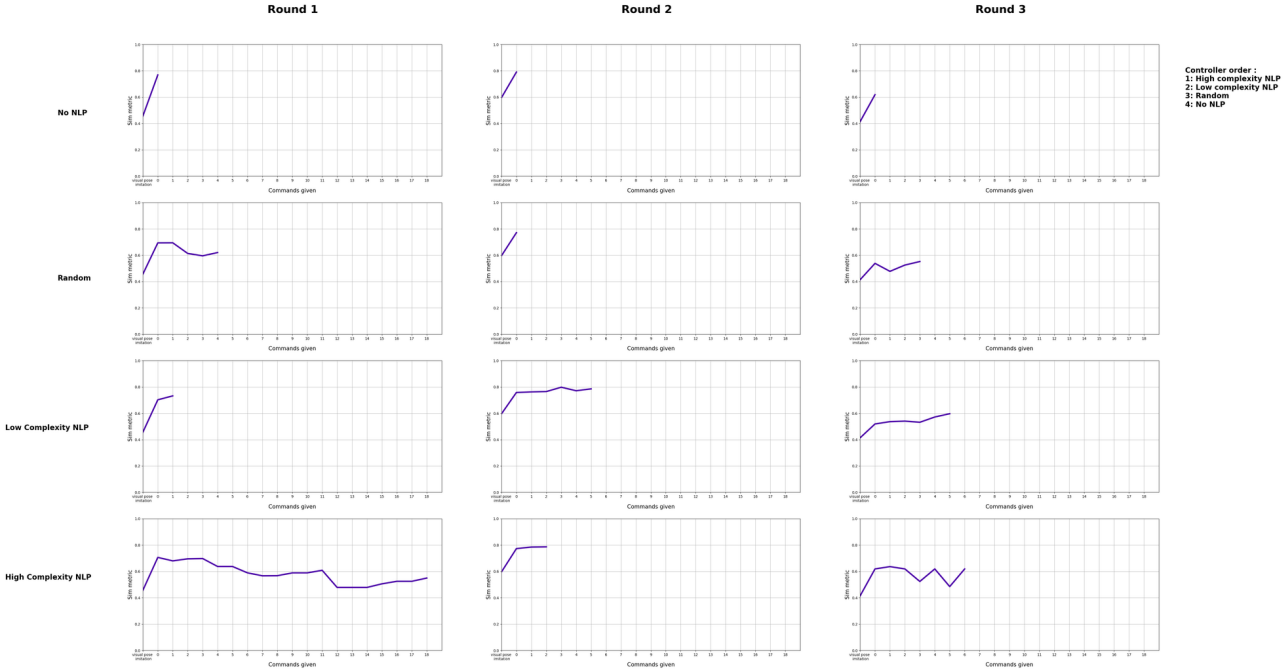


Figure J.24: Similarity metric for test user 24

K

Experiment 2 - Similarity metrics split out per limb, per controller

In this appendix we show the similarity metric for each round, per limb.

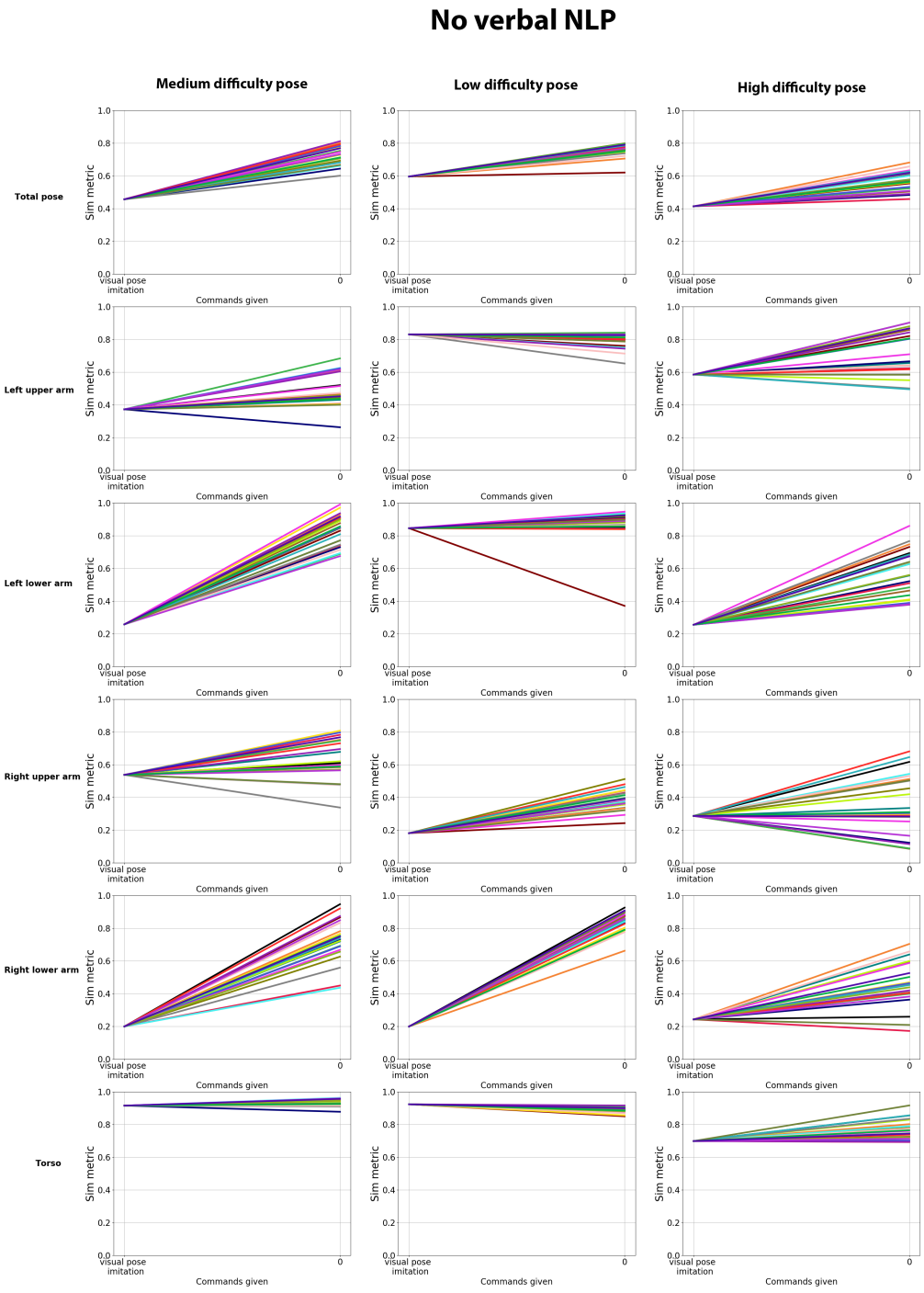


Figure K.1: Similarity metric split out per limb, for ”No NLP” condition

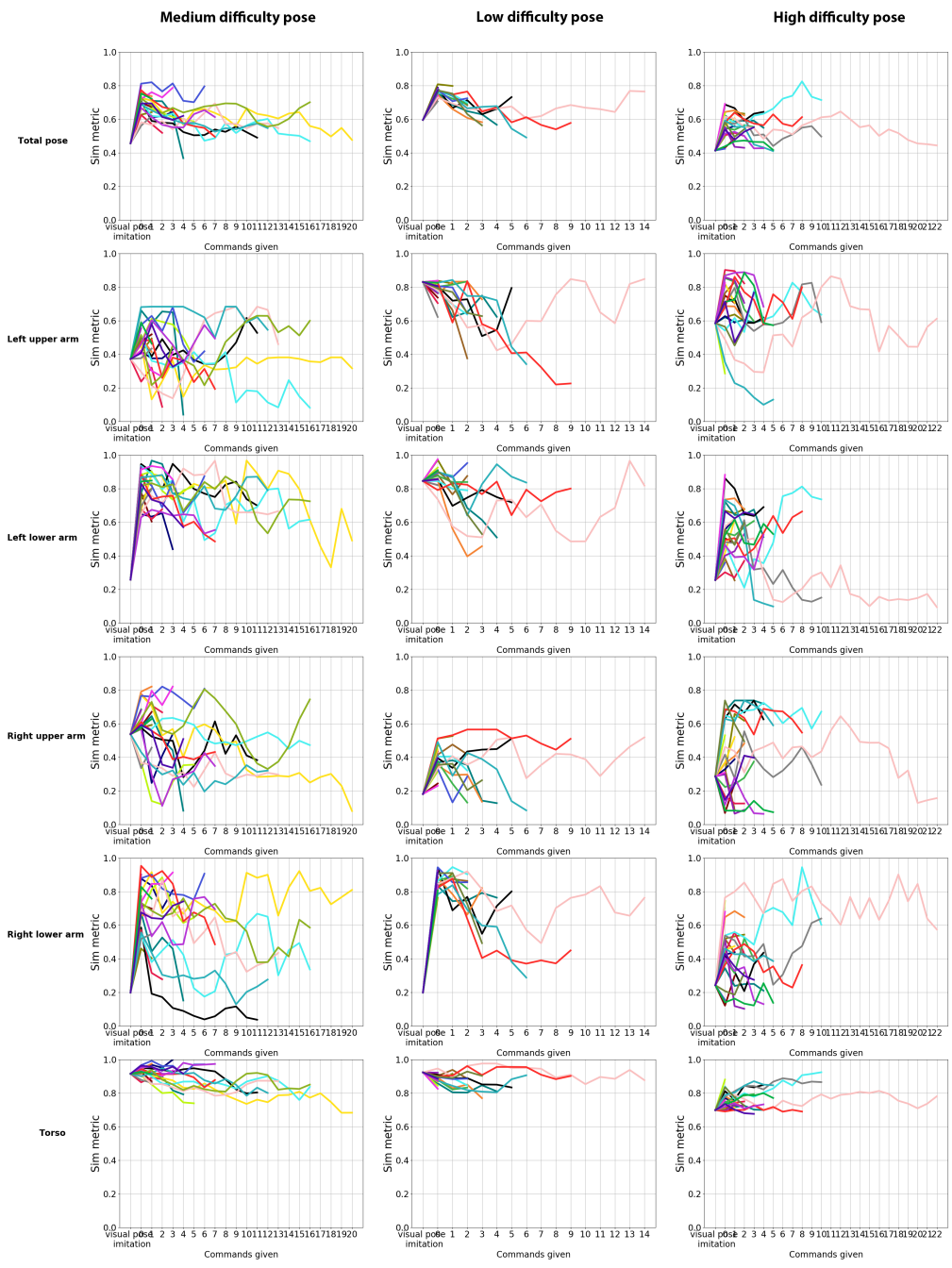


Figure K.2: Similarity metric split out per limb, for ”Random” condition

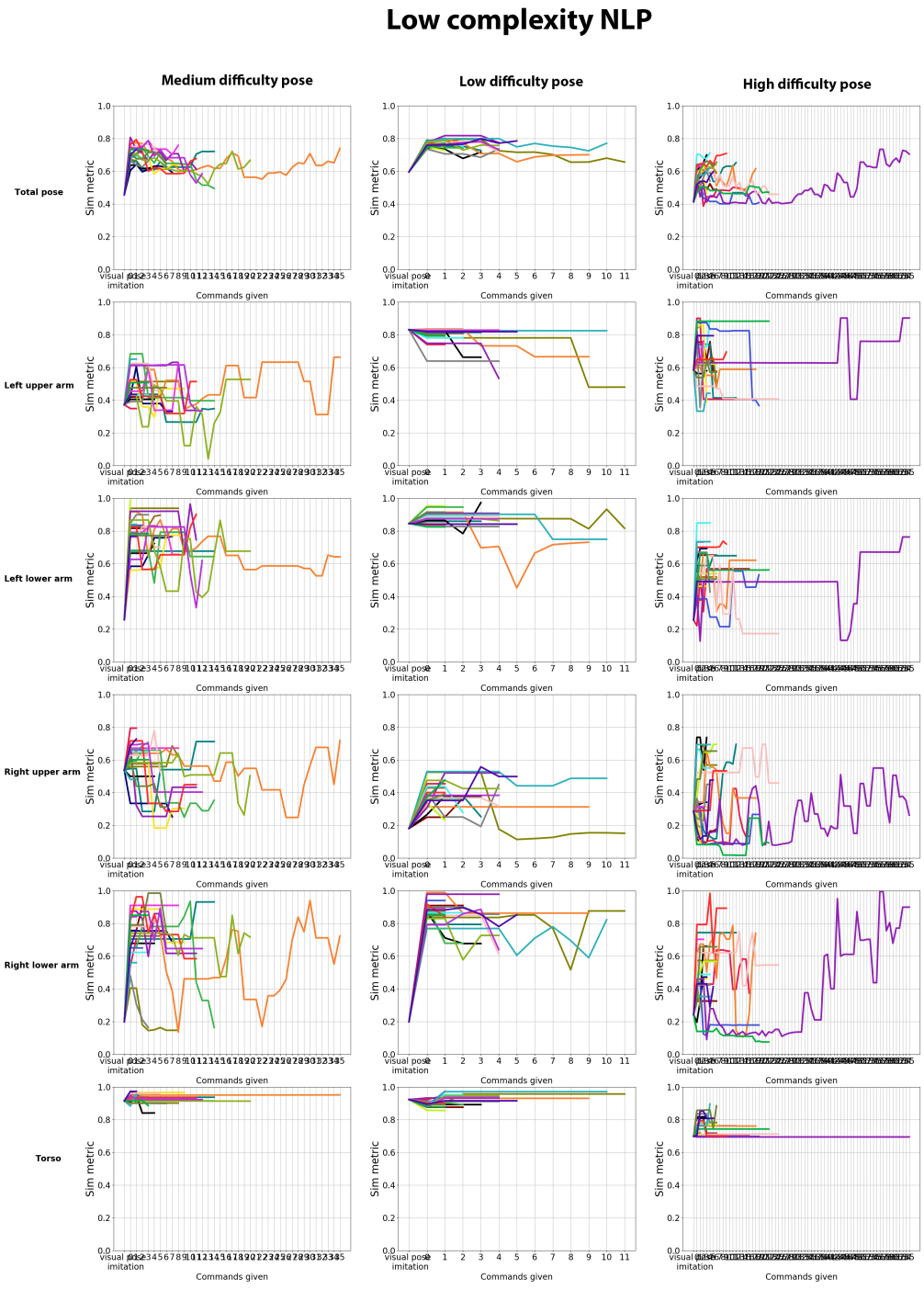


Figure K.3: Similarity metric split out per limb, for ”Low complexity NLP” condition

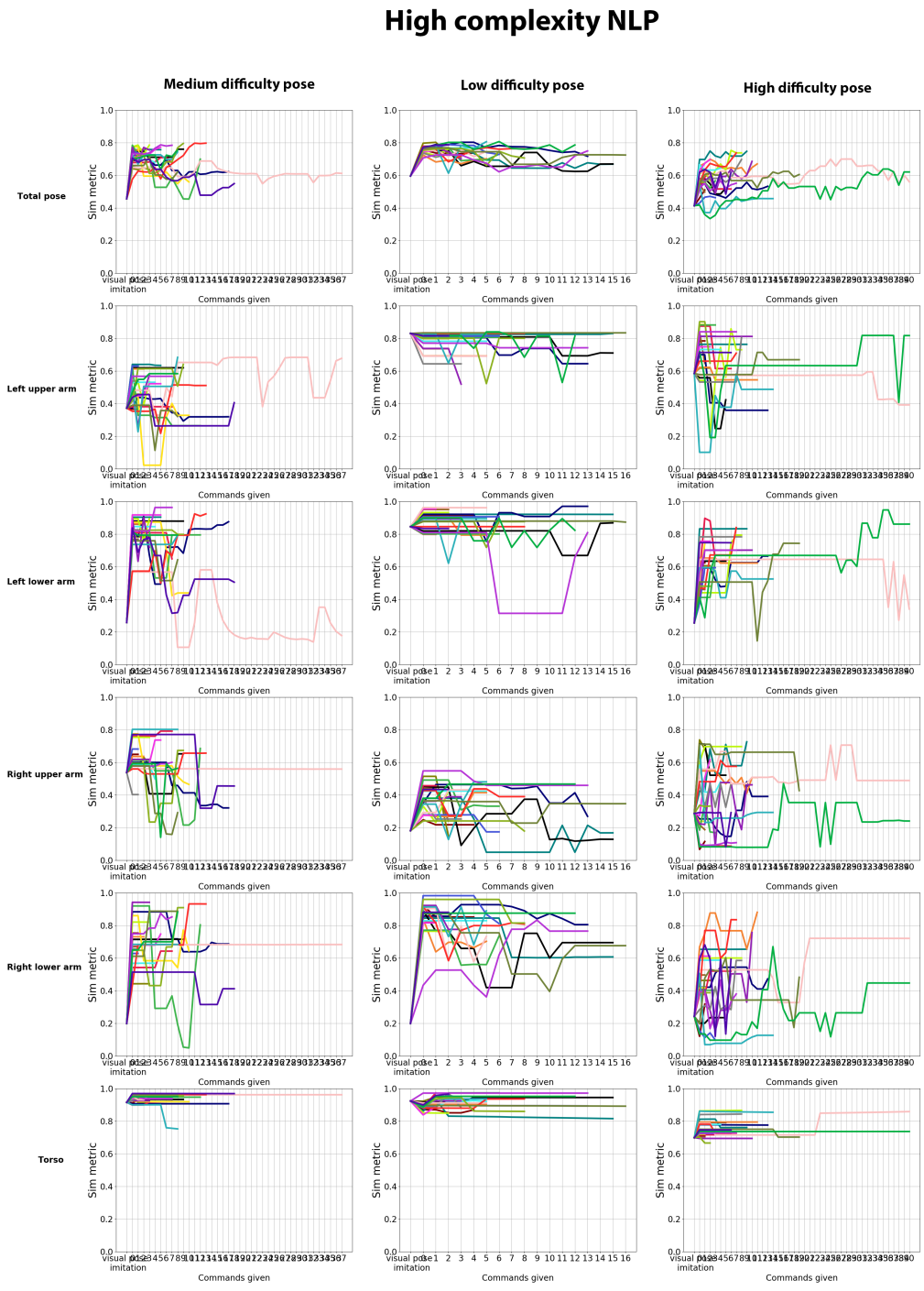


Figure K.4: Similarity metric split out per limb, for ”High complexity NLP” condition

Experiment 1 and 2 - images used from the TotalCapture dataset

The following sets of images were given to each participant during both experiments, to show them what pose they had to transfer upon the robot. The images remained available to them during the entire experiment and could be consulted at any time.

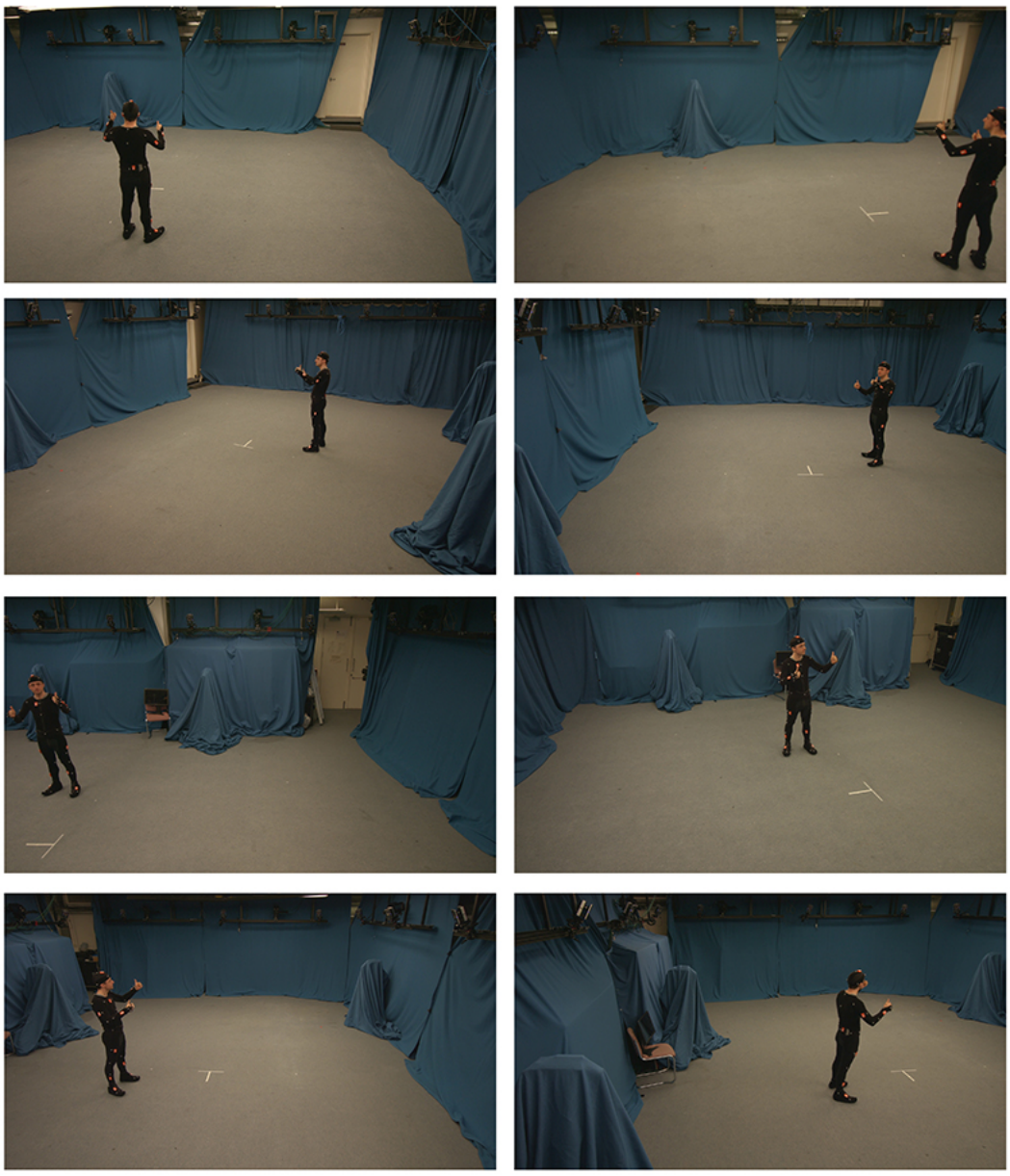


Figure L.1: The medium difficulty pose

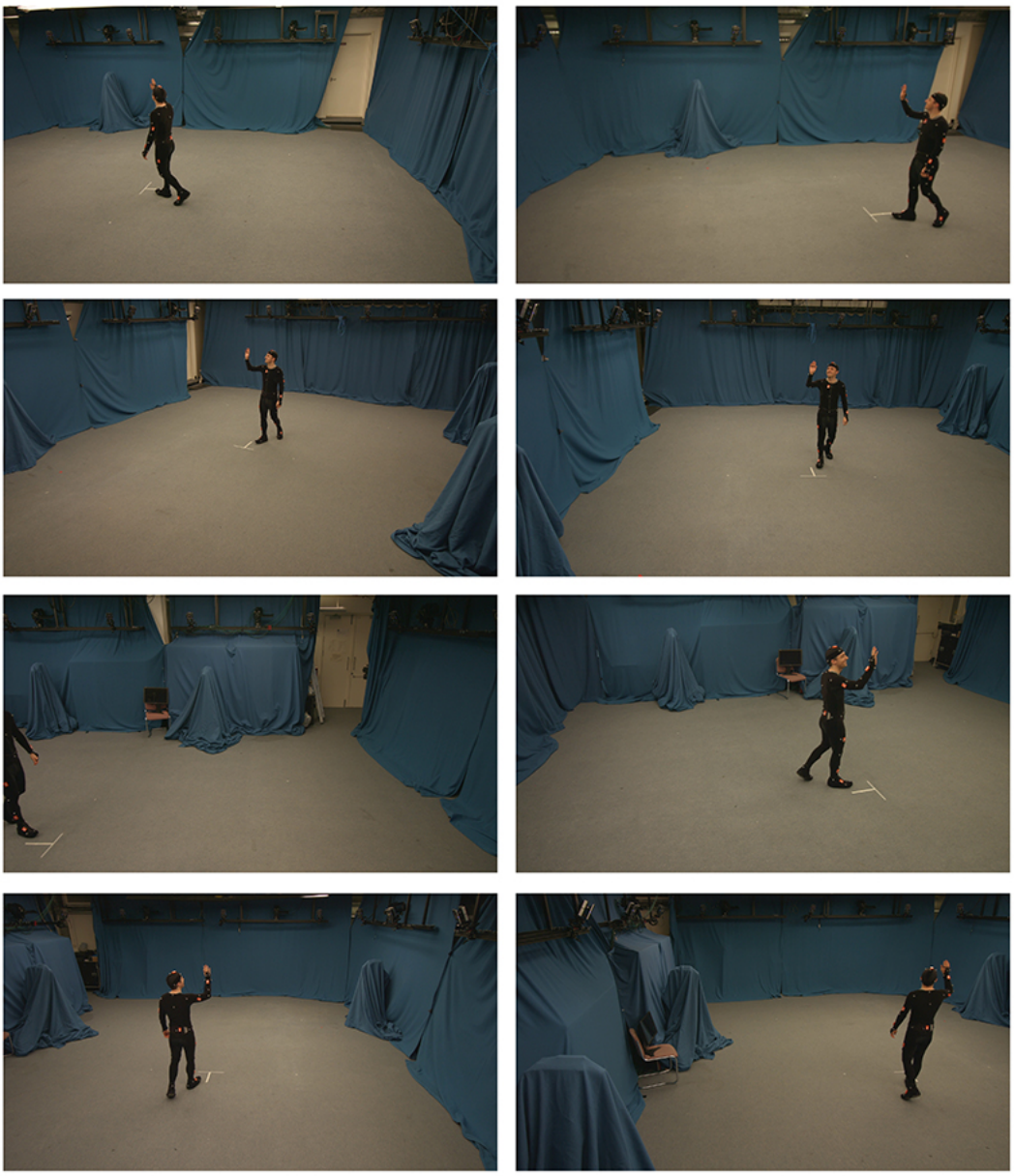


Figure L.2: The low difficulty pose

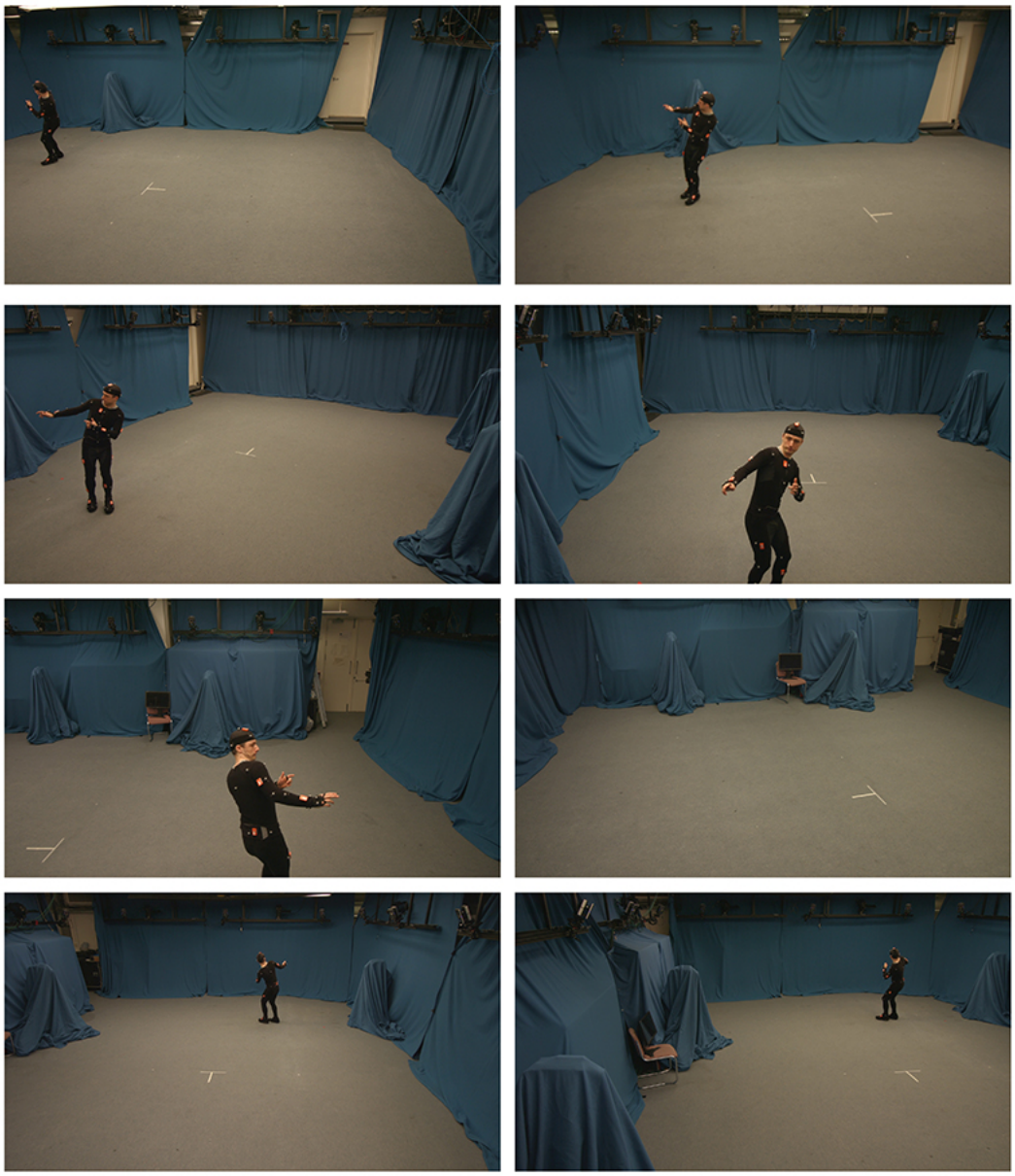


Figure L.3: The high difficulty pose

M

Experiment 1 and 2 - map of test location

In Figure M.1, an approximation of the test location can be found. Both experiments were performed at the offices of Interactive Robotics [1]. Other than the participant and the researcher, the offices were devoid of other people. The participant always interacted with the Pepper robot from a distance of 1.5m, which was determined to be a good distance for the Pepper to be able to see the participant and for the participant to be able to make themselves understood clearly without having to raise their voice. Efforts were made to minimize distractions for the participant, including covering the windows and removing all unnecessary items from the desks. The researcher had an unobstructed view of both robot and participant during both experiments.

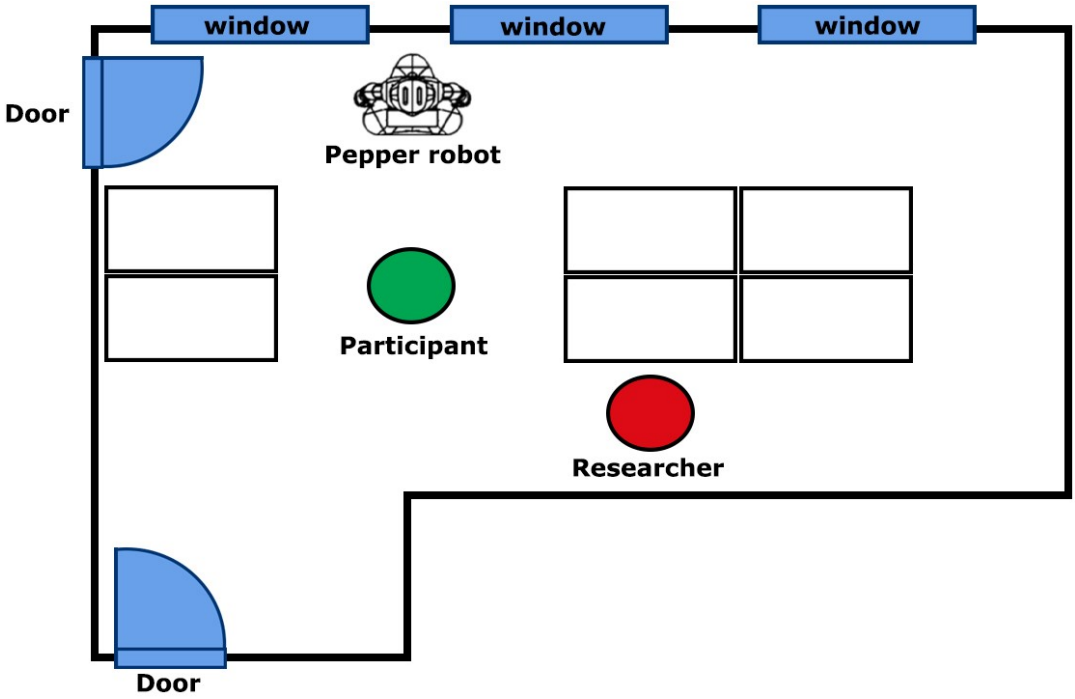


Figure M.1: The location of both experiments

[1] Interactive Robotics. (n.d.). Retrieved May 13, 2020, from https://interactive-robotics.com/