



Explorative study towards supporting dredgers' control work by HoloLens

Introduction

control work by HoloLens

The worldwide company named Royal IHC proposed this graduation project. Royal IHC is a reliable supplier of dredge vessels. Trailing suction hopper dredger (TSHD) is one of the company's main products for port maintenance. A dredge operator is doing all the dredge control task in the dredge operator cockpit. The human-machine interface (HMI) of the dredge operator cockpit is developed on a perpetual basis. The system become more and more complex. Therefore, novice operators need to spend longer time in training in order to be fully efficient.

The latest interface technology augmented reality has attracted attention. Royal IHC is interested in head-mounted devices, especially HoloLens. Royal IHC sees the potential of HoloLens in terms of supporting the control tasks of dredge operators, but this assumption still needs to be proven by operational research. Therefore, the essence of this project is an explorative study, which is targeted to discover if there are possibilities of HoloLens to support dredge control work of novice operators.

Concepts

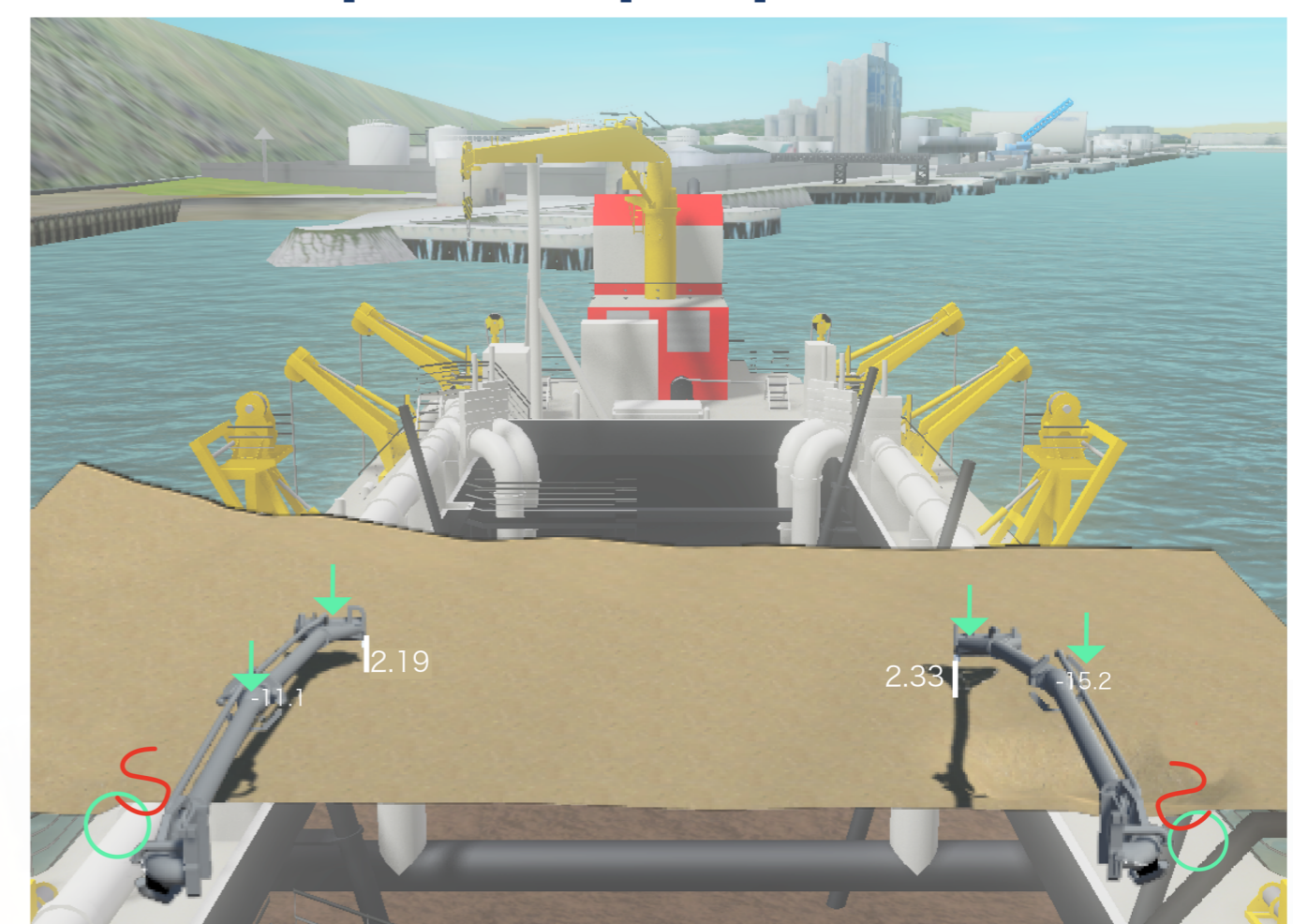
After technology research and user research, some tasks are selected and concepts are created. The core of the concepts is to extract this information and provide it in a more user-friendly way. The operator can then directly see the essential information through the HoloLens and will not be disturbed by other information, which is not relevant at the moment. The operator does not need to switch attention between screens and real world either. However, there are two different perspective for this concept: the first person's perspective and the third person's perspective.

The concepts were tested with IHC employees and students. It is found that:

- Compared with the current system, HoloLens applications can give the information in a more straightforward way.
- Compared with the current system, simplified signals with its spatial property in HoloLens applications are easier to understand.
- Thus, compared with the current system, HoloLens applications require less workload.

- With the third person's perspective, operators could have a more transparent overview of the situation than with the first person's perspective.
- It is easier for novice operators to learn the use of HoloLens applications than people without any dredge knowledge.

First person's perspective



Third person's perspective



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