MASTER THESIS Navigation and assistance using Augmented Reality
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POPULAR SCIENCE PAPER **Niclas Lövdahl**

Traditionally navigation has consisted of using paper maps or drawings to visualize the space to be navigated. How can Augmented Reality be used as an indoor navigation- and assistance tool?

Nowadays we use GPS applications to navigate around the world. This eliminates the issue of keeping track of your own position in relation to the map and will also help guide you with way points to your destination. However, GPS technology is not known to work very well indoors and precision is also an issue. Therefore most places (Shopping malls, entertainment facilities, libraries, etc) still uses paper maps. Could we use emerging technology such as Augmented Reality (AR) to help navigate inside facilities?

Modern AR headsets keeps track of and in real-time scans the physical environment to keep track of where the user is located in that physical space. This can be used to determine a users position and rotation in a room. Data can then be used to help guide or visualize the information needed for a user to navigate a space and perform what ever tasks the user is set up to do. Visualization and information output of this data can be presented to the user using holographic models attached in the physical space improving the mapping between data and real world. This gets rid of the use of external screens or paper maps and improves possibilities of information output and real world assistance to the user.

The purpose of this master thesis was to explore how AR can be used as a tool for navigating indoor facilities. It was possible to determine the position of the user in the given context. Furthermore the position data was used to implement features such as pathfinding and interactive 3D maps through holographic visualisations in AR. The main focus when creating the features were to solve issues regarding traditional navigation and take advantage of AR and its design benefits.

The final prototype was constructed to fit use cases from the security and surveillance industry. A user study was conducted and the results showed that participants were successful in completing the tasks with a low amount of perceived workload. Results also showed that the usability of the prototype proved to be above average and participants showed overall positive consensus toward using this kind of system for navigation.

There are hardware limitations to AR headsets that can be a deal breaker for using it for navigation purposes. The scenarios where it have the potential to be used require the user to be able to wear the headset for longer periods of time with comfort. As of today AR headsets are not advanced enough to use and implement into everyday living. However, the technology is in its early days and there are possibilities that it will improve to the degree where it can eliminate user interfaces as we know it.