Ferkan Metin 4233468 | MSc Design for Interaction Graduation Thesis March 2020

In collaboration with:

envision
Visio
Delft Design Labs (Pilot)

AI-powered smart glasses that empower visually impaired people to achieve greater independence and social integration.

Enhancing reliability of artificial intelligence by providing the opportunity for reciprocal learning between AI and its users.

In this project I created a concept for smartglasses that use artificial intelligence features from the Envision app that allows visually impaired people (VIPs) to become more independent. Since AI is not always reliable, human assistance is added by providing live feed to a sighted helper (companion) as an interim solution. The companion app concept allows sighted helpers to aid VIPs in certain situations with additional information such as location, the ability to screenshot or message during a call or recording the video. A reciprocal learning model is introduced on how the AI can be improved by both sighted helpers and the users of the smartglasses. This aims to improve the AI outcome and overall experience for the visually impaired person.

Chair: S. U. Boess
Mentor: D. Lomas

A visually impaired person using the AI-features of the smartglasses.

AI FEATURES:

- Turn text into speech
- Scan multiple pages
- Describe scenes
- Scan a barcode
- Find people
- Find objects

Computer vision helps visually impaired people in capturing images and turning this into spoken information. This is done by working on a concept implemented on the Google Glass. By tapping on the side, the user is able to access AI features shown on the left. Swiping to the front and back on the touch pad allows the VIP to navigate through the menu which speaks out menu items.

Since AI is a developing discipline, the fine skills of humans may sometimes be required. This is where the human assistance plays a role where a person without sight can video call a person.

AI fails and the VIP turns to human assistance (companion)

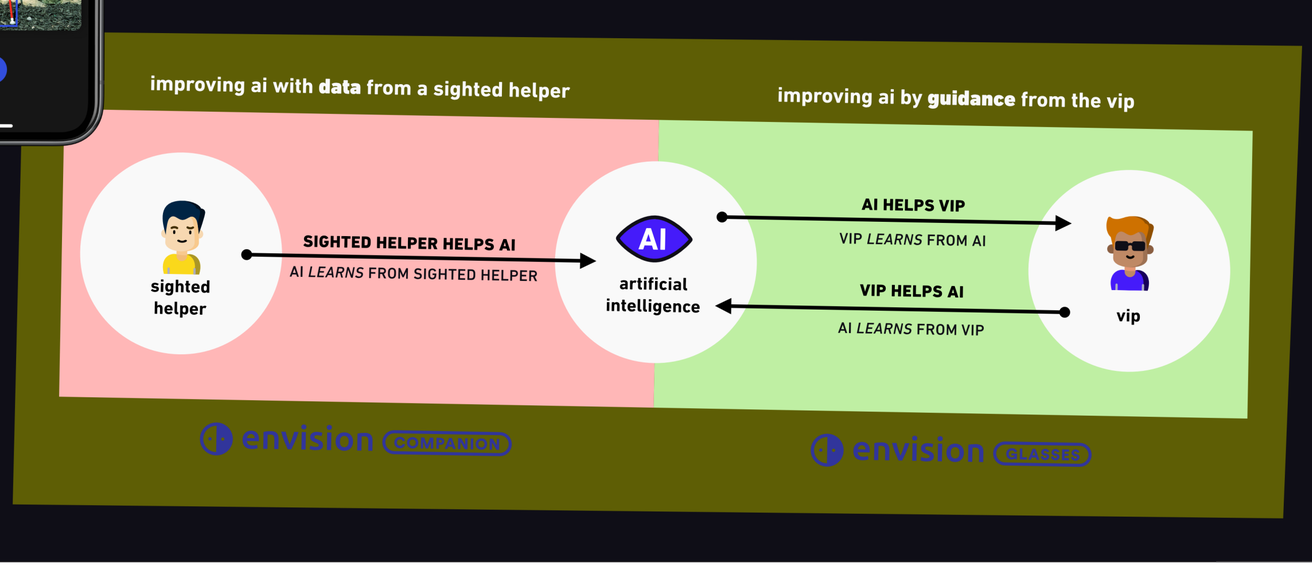
A companion can be a friend or family member, but also a volunteer or paid helper. This menu is accessed on the smartglasses.

The companion is a sighted helper that aids the VIP

The sighted helper gets a call from a VIP. The helper gets a live feed captured from the camera of the smartglasses of the VIP. In this case the sighted helper guides the VIP to a specific location by using the implemented augmented reality tool and location information shared by the VIP. Others available tools are messaging, taking a screenshot or recording the video for the VIP.

...and improves the AI.

Below a reciprocal learning model is introduced. This shows that the VIP improves the AI by offering guidance with the camera of the smartglasses. The sighted helper either helps the VIP directly shown on the left, or adds data to the system so that the AI recognizes objects and is able to help the VIP without having to make a call to a person. This improves the AI in two ways.



TU Delft

Faculty of Industrial Design Engineering

Delft University of Technology