Dynamic obstacle mapping for the visually impaired using sensor fusion.

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1. PROJECT CONTEXT AND OBJECTIVES

The Lighthouse team collaborated with Microsoft and the Guide Dog Associations to produce applications which can improve the living experience for the visually impaired users. Since few environments and applications were designed for the huge amount of blind and partly sighted individuals, the project aimed to relief the lack of available guide dogs in the UK and help the visually impaired participate in the society without relying on others the same way as the non-visually impaired.

Microsoft is both the sponsor and the client in this project. The particular field of study that the client wanted the team to explore was using wearable sensors which could be utilised by the visually impaired. Also, the client wanted low-cost, off-of-shelf hardware in this project. After analysing the requirements from the client, the Lighthouse team decided to find a way to improve the experience of visually impaired when entering an unfamiliar indoor environment. Finally, in this project, the magnetic sensor in the smartphone, the infrared sensor, the ultrasound sensor, camera were used with sensor fusion method, which is combining the data from all kinds of sensors and computing to get a better result than relying on the each type of sensor individually.

2. ACHIEVEMENTS

2.1. API

API provides communication between sensors and platform

2.2. Processing platform

process data and store data for further query

2.3. Android application

give user feedback of surroundings by querying the database

3. EVALUATION

4. IMPACT

5. CHALLENGES

6. LESSONS LEARNT

6.1. Management

6.2. Architecture design