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.In this project, the magnetic sensor in the Android phones, 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. Finally, Lighthouse team created a platform for dynamic indoor obstacles mapping, which included an Obstacle API, a processing platform and an Android application to give user feedback. After testing, the quality of the project meet client's standards.

2. ACHIEVEMENTS

2.1. API

Obstacle API in this project provided communication between sensors and processing platform.

2.2. Processing platform

The processing platform is based on Spark,

2.3. Android application

An android application can show user's the details of the surroundings.

3. EVALUATION

4. IMPACT

Microsoft will

For visually impaired users, this product helped to solve the problems they meet in an unfamiliar indoor environment. With this product, the blind people and partly-sighted people will no longer depend on others. This project not only help with them moving around without barriers but also enrich their living experience with higher confidence.

5. CHALLENGES
6. LESSONS LEARNT