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### Indoor Navigation System for the Visually Impaired with User-centric Graph Representation and Vision Detection Assistance

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**Abstract**  
Independent navigation through unfamiliar indoor spaces is beset with barriers for the visually impaired. Hence, this issue impairs their independence, self-respect and self-reliance. In this thesis I will introduce a new indoor navigation system for the blind and visually impaired that is affordable for both the user and the building owners.

Outdoor vehicle navigation technical challenges have been solved using location information provided by Global Positioning Systems (GPS) and maps using Geographical Information Systems (GIS). However, GPS and GIS information is not available for indoor environments making indoor navigation, a challenging technical problem. Moreover, the indoor navigation system needs to be developed with the blind user in mind, i.e., special care needs to be given to vision free user interface.

In this project, I design and implement an indoor navigation application for the blind and visually impaired that uses RFID technology and Computer Vision for localization and a navigation map generated automatically based on environmental landmarks by simulating a user's behavior. The focus of the indoor navigation system is no longer only on the indoor environment itself, but the way the blind users can experience it. This project will try this new idea in solving indoor navigation problems for blind and visually impaired users.

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