MEEN 689 – Robotic Perception
Term Project- Proposal

Topic

Audio-based Indoor Navigation for Visually Impaired Using Indoor Localization on Mobile Phone

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Abstract

Navigating in unfamiliar indoor locations is difficult for visually impaired or blind people. A very huge proportion of people use smart phones on daily basis. The idea is to use the same smart phone that is equipped with various sensors such as GPS, IMU and camera to localize oneself, and identify objects around. With the advancements in Simultaneous Localization and Mapping (SLAM), one can localize themselves with respect to a three-dimensional point cloud and infer distances from static objects/ obstacles along a path/route. The point cloud could be generated using LIDAR combined with cameras, to obtain (x,y,z) as well as (R,G,B) data combined. Later, the phone camera will be used to cross reference with the point cloud and combined with Inertial Measurement Unit (IMU) to make position estimates. The position estimates can be obtained using particle filters or Kalman filters. Once, the position estimates cross an acceptable threshold, distances from objects are computed and communicated with the user. With enough processing power, the information can be communicated in real-time