Registration Form

TEAM INFORMATION

Team Name/Project Title: Semantic Simultaneous Localization and Mapping

Department: Computer Science

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PROJECT INFORMATION

Description:

Semantic simultaneous localization and mapping is a cutting edge new technology combining real time deep neural network image recognition and artificial intelligence based autonomous navigation.

Abstract:

Simultaneous Localization and Mapping problem, poses the possibility of an unmanned mobile robot placed in an unknown environment with an ability to incrementally build a feature map while simultaneously estimating its location with respect to this map. Algorithms allow the robot to navigate based on its perception of noisy sensor data in tandem with inference performed on its abstracted data. Applications to this technology include entering unknown or dangerous environments and supplying a detailed 3D map of its surroundings, other interesting applications include autonomous vehicles and augmented reality. The goal of this SLAM project is to create an optimized real-time design and implement an end-to-end baseline prototype of an autonomous mapping and localization solution with an indoor land robot equipped with an RGB-D sensor from which an enhanced, novel approach can be derived. Modern SLAM approaches focus on metric representations such as Point Cloud and TSDF. Metric map representations have two main drawbacks. Firstly they are incredibly memory intensive each one uses a large number of parameters points, and voxels for Point Cloud, and TSDF respectively. The second issue with these representations is that they can only model the geometry of a map at a low level. While a point cloud map may contain the geometry of a room it does not carry the semantic concept of a room. Our approach intends to bridge this gap between just knowing a map, and understanding a map.