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MS course Project Proposal

RoboMapperX

Project Description:

RoboMapperX aims to create an autonomous robot capable of navigating and mapping open areas while avoiding obstacles. The project makes use of a husky car model equipped with a DIY Stereo Camera and OpenCV for depth mapping, along with the YOLOv3 model for object detection, and PyBullet is used as simulation tool. By addressing challenges such as object detection, obstacle avoidance, and autonomous navigation, RoboMapperX seeks to provide an efficient and cost-effective solution applicable in various scenarios.

Literature Review:

YOLO v3-Tiny: Object Detection and Recognition using one stage improved model: This paper introduced an improved model for object detection and recognition, offering valuable insights for implementing the YOLOv3 algorithm in this project.(Link)
Autonomous Mobile Robot Navigation in Indoor Environments: Mapping, Localization, and Planning: This has paper discussed about strategies for autonomous navigation in indoor environments, providing insights into mapping, localization, and planning techniques relevant to this project.(Link)
ROBOG: An autonomously navigating vehicle based on road detection for unstructured road: This paper has explored a vehicle navigation system based on road detection, offering valuable algorithms for obstacle detection and navigation in unstructured environments.(Link)

Resources:

- PyBullet for real-time physics simulation.
- OpenCV for image processing and depth mapping.
- ImageAI library for implementing the YOLOv3 algorithm.
- Google Colab for model training and experimentation.
- LabelImg for annotation of training data.

Conclusion:

RoboMapperX aims to integrate advanced robotics and deep learning techniques to develop an autonomous mapping robot capable of operating in diverse environments. This project seeks to address challenges in autonomous navigation, object detection, and obstacle avoidance. Through a focus on efficiency, cost-effectiveness, and real-world applicability.