MId term proposal ENPM08X

What will be done?

How it will be done?

**Component description:**

This project involves the development of a Perception Module for Human Obstacle Detection and Tracking for a ACME Robotics product.

**Brief explanation of importance:**

Assuming an industrial environment/warehouse setup where there is constant human robot interaction on the ground. The industry contains automated guided vehicles for the transportation of mechanical/electrical components in an industry setup and products in a warehouse setup. There is an urgent need for a way to avoid imminent collision between humans and AGVs. Although the pedestrians on the shopfloor/warehouse can be wary of the AGVs there has to be a way for the AGVs to detect the human obstacles to avoid collision and collateral damage. We are going to develop a perception module which will be interfaced with the AGV to constantly detect and track moving humans.

This ACME Robotics Product will use vision data alongside the sensor feedback, to avoid collision and choose a different path to traverse through the environment.

The data provided by this module will further be used alongside the point cloud information gathered from lidar sensor of the surroundings for the AGV to choose a path to avoid collision.

Diagram: Product

Design and development process: TDD, AIP

Programming language used: C++

Technologies: Makefile, Cmake, cpplint, cppcheck, clangd

Libraries: OpenCV, Math,

Algorithms:

Potential Risks and their mitigation: Improper labeling and training of a human detection model, this will cause issues in functionality of the vision module and might lead to unprecedented circumstances. We are mitigating this issue by using transfer learning. ( backup: pre-trained model.

The team consists of only two people, so there is no third teammate who can be a design keeper as such. So the design keping duty will be mutually shared based on conceptual competency of the existing teammates.

This project will be implemented as pair programming where there will be timely switching between driver and navigator roles, we mutually plan to share the design keeping duty. Git version control will be used with consistent and clear commit history to track the updates. More than one branch will be created in the repository for the team to work and each pull request will be merged after thorough inspection by the significant other. Software development processes like TDD and AIP will be used.