MEGN540 Project Proposal: Delivery Rover

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1. Concept and Requirements

We will build a mobile delivery robot. Upon activation, the robot will identify the person nearest to it, drive to that person, and deliver a payload. The system must have the ability to:

1. Listen for and react to an activation signal.
2. Identify persons in its FOV and target the nearest person to it (if any).
2. Drive to that person in a straight line on a flat, carpeted surface.
3. Stop upon arriving at the person and deliver the payload.

2. Budget and Plan

Budget: $300 ($100 per team member).

Initial Plan: We will plan our work/deliverables in two-week increments to keep tabs on progress and enable us to react quickly to any issues that arise. Table 1 shows a first-pass plan describing these increments.

Table 1: Initial project plan.

Milestone	Date	Description	Requirements
1	2024-02-07	Material acquisition and planning	• Bill of Materials created
2	2024-02-21	Software module design	…
3	2024-03-06	Prototype build and PCB design	…
4	2024-03-20	Software implementation	…
5	2024-04-10	Software implementation	…
6	2024-04-24	Prototype refinement	…
7	2024-04-30	Demonstration	• Project is demonstrated to the class.
8	2024-05-05	Report	• The project report is finalized and submitted.

3. System Components

3.1. Sensing and Affecting

- **Sensors:** Stereo camera (RGB-D) for visual odometry, depth estimation, and object detection. Wheel encoders for motion control.
- **Affectors:** DC motors to power the robot's drivetrain. Servos to actuate the payload delivery mechanism.

3.2. Software

- Visual odometry module for depth perception and pose estimation.
- Object detection module for person identification.
- Path planning module for trajectory generation.
- Motion control module to power motors and follow the trajectory.

3.3. PCB

- We will

4. Prototyping

- Result in a functional prototype