CS460 - HW3

Group : 9

git : https://github.com/thanhle204/hw03.git

Assignment Goal & Requirements

The main goal is to make our robot explore **as much** of the hospital map as possible within the **300-second (5-minute)** time limit.

- **Obstacle Avoidance:** The code must safely handle walls and obstacles.
- **Distance Requirement:** The robot must travel a total distance of at least **10 meters**, regardless of the starting point.
- **Starting Points:** The program needs to be robust enough to handle **three different starting poses** defined in the world file.

Approach and Design

- Once the basic movement and sensor communication were working, we refined the obstacle-avoidance behavior. The robot continuously monitored LaserScan data and divided it into three general zones: front, left, and right. Instead of stopping completely, the robot attempted to keep moving whenever possible. If the front area became too close to a wall, the robot turned toward the side with more open space. We also added small steering adjustments when walls were detected on either side to help maintain forward progress in narrow hallways. This approach enabled smoother navigation inside the hospital map compared to simply stopping and turning in place.

Results

- The robot successfully performs basic obstacle avoidance and explores open spaces, but the reactive policy struggles in tight indoor rooms and intersections.
- The robot did not consistently reach 10 meters for all starting points.

AI Tool Usage

- ChatGPT
- Gemini
- Grok