

MINI-PROJECT

Flood Fill–Based Autonomous Robot Navigation Using Webots

Objective

Develop and simulate an autonomous mobile robot that explores and solves a maze using the **Flood Fill algorithm**, implemented entirely within the **Webots simulation environment**.



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Description

The project uses **Webots** to model the robot, sensors, actuators, and maze environment. The robot controller, written in **C or Python**, represents the onboard **embedded microcontroller** and executes the Flood Fill navigation algorithm. Sensor data is processed to detect walls, update the internal maze map, and compute the shortest path to the goal.

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Methodology

1. Design a wheeled robot and a 4×4 (or larger) maze in Webots
2. Configure distance sensors and wheel motors
3. Implement Flood Fill algorithm in the Webots controller
4. Dynamically update maze costs as walls are discovered
5. Navigate the robot toward the goal using minimum-cost neighbors