Narrow Space Explorer

Introduction:

Autonomous mobile robots have become integral in various missions and tasks, typically operating in spacious or well-lighted environments. However, there exists a significant challenge when these robots navigate through narrow spaces, such as pipelines or alleys, where traditional navigation methods face limitations, particularly in low-light conditions.

Objective:

The primary objective of this term project is to design and implement a small-scale autonomous mobile robot capable of effectively traversing in narrow and potentially low-light environments, this will be achieved by integrating advanced sensors, such as ultrasonic or radar sensors, to enhance the robot's perception and navigation capabilities. The proposed project addresses a practical need in the field such as inspecting pipelines, exploring tight industrial spaces, or conducting search and rescue operations in areas inaccessible to humans such as post-fire disaster site.

Required Sensors – Ultrasonic sensor:

Incorporate ultrasonic sensors to enhance the robot's ability to detect and navigate through narrow spaces by dividing surrounding into couple parts such as front, right, left and so one, then utilized the sensor to detect the surrounding to determine the direction of the robot. The sensor will provide real-time data to the robot's control system, enabling adaptive and efficient navigation.

Demo description:

In the demo, we plan to use huge cardboards to mimic the narrow space or the narrow environment that our robot needs to pass. Starting with placing on the one end, the robot will automatically move toward the other end the robot will autonomously navigate towards the other end using the ultrasonic sensor to guide its path to get the target.