EN2533 Robot Design and Competition
Team AGNI

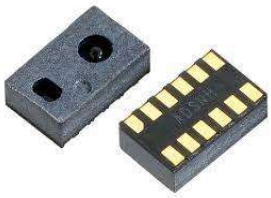
Sensors

In this report, we have included our sensor choices for the subtasks of obstacle detection, line following, sound detection, and colour detection for our robot. We have considered different sensor options, compared their alternatives, and provided our reasoning for the selected sensors.

<u>Obstacle Detection and Guard Bot part</u>

Options considered:

- SharpIR
- Ultrasonic
- TOF (Time-of-Flight)



Selected Sensor:

- Ultrasonic

Reasons for Selection:

- Cost-Effectiveness: Ultrasonic sensors are generally more cost-effective compared to TOF and sharpIR sensors. This fits with our budget constraints.
- Sufficient Range: Ultrasonic sensors offer a suitable range for obstacle detection, and they are effective at short to medium distances.
- Reliability in Object Detection: Ultrasonic sensors perform well in detecting solid objects, making them suitable for obstacle avoidance scenarios. They are particularly effective in scenarios where the obstacles are not highly reflective.

Drawbacks of other sensors:

- SharpIR sensors might be affected by environmental lighting conditions.
- The minimum distance of Sharp IR sensors is not sufficient enough for the required task.

Line Following

Options considered:

- IR Array
- Separate IR Sensors

Selected Sensor:

- IR Array

Reasons for Selection:

- Line Detection Coverage: An IR Array provides a wider coverage area for detecting lines or tracks, making it more efficient for line-following tasks.
- Simplicity: Using an IR Array simplifies the sensor setup as it typically contains multiple IR sensors in a single package, reducing wiring and complexity.

Colour Detection

Options considered:

- TCS230
- TCS3200 (TCS3200 is the updated version of TCS230)

Selected Sensor:

- TCS230 Colour Sensor

Reasons for Selection:

- Accuracy: The TCS230 is known for its high accuracy in color detection, making it suitable for distinguishing a wide range of colors.
- Versatility: It can detect a broad spectrum of colors, making it a versatile choice for tasks that require distinguishing between various hues.

Sound Detection

Options considered:

- MD0220 Voice Sound Detection Mic Sensor

Selected Sensor:

- MD0220 Voice Sound Detection Mic Sensor

Reasons for Selection:

- Purpose-Specific: The MD0220 is designed specifically for voice and sound detection, making it a suitable choice for applications where you need to respond to sound cues or commands.
- Voice Detection: This sensor is optimized for voice detection, which can be advantageous in scenarios where the robot needs to react to voice commands or environmental sounds.

In conclusion, the selected sensors were chosen based on their suitability and performance for the respective tasks. Each sensor offers advantages over its alternatives, ensuring that our robot performs its subtasks with accuracy and efficiency.

Team Members -

- Sahan Abeyrathna - 210005H
- Lasitha Amarasinghe - 210031H
- Ruchira Abeywardhane - 210015M
- Rajitha Niroshan - 210433R
- S.Thamirawaran - 210629A