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.

Obstacle Detection and Guard Bot part

Options considered:
- SharpIR
- Ultrasonic
- TOF (Time-of-Flight)

Selected Sensor:
- TOF VL6180V1 Proximity Sensor

Reasons for Selection:
- Accuracy: The TOF VL6180V1 offers high accuracy in measuring distances, making it suitable for precise obstacle detection.
- No Effects from Light: Unlike sharp IR sensors, this TOF sensor is less affected by ambient light, which ensures reliable performance in various lighting conditions.
- Small Physical Size: The compact size of the TOF VL6180V1 makes it a good fit for the robot, allowing for flexible integration.
- Ranging from 0 to 62cm, (Offeres a higher range than other sensors)

Drawbacks of other sensors:
- SharpIR sensors might be affected by the environmental lighting conditions.
- Ultrasonic sensors may have limitations in accuracy and performance in certain conditions.
- Physical size of the ultrasonic sensor is high compared to TOF sensor.
- Minimum distance of other sensors are not sufficient enough for the required task. (Ultra sonic - 20cm to 16.5m , Sharp IR sensor - 10cm to 80cm)

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.

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