Multi-Tasking Robot

This robotics project integrates four key features: an obstacle-avoiding car, a line follower robot, a Bluetooth control system, and a smart bin. **We develop a app to navigate all those features**.

Obstacle Avoiding Car

The obstacle-avoiding car feature enables the robot to detect and avoid obstacles in its path, allowing it to navigate autonomously in dynamic environments. Using an ultrasonic sensor placed at the front, the robot measures distances to detect objects and calculates how to adjust its course accordingly. A microcontroller processes the sensor data and controls the motors to steer the car away from obstacles, ensuring smooth, uninterrupted movement.

This function is ideal for areas with unpredictable obstacles, allowing the robot to adapt its path without user intervention. The obstacle-avoidance capability forms the backbone of the robot's navigation, providing a reliable foundation for autonomous movement.

Line Follower Robot

It's a simple line follower robot. The line follower robot component allows the robot to follow a predefined path, marked by a line on the ground. Using infrared (IR) sensors to detect the contrast between the line and the floor, the robot stays on track by adjusting its motor movements based on the sensor input. When the robot veers off the line, the sensors signal the microcontroller to correct its path and stay aligned with the line.

This functionality is especially useful in controlled settings, such as warehouses, where the robot can follow designated routes for efficient task execution.

Bluetooth Control System

The Bluetooth control system enables remote operation of the robot through a smartphone or Bluetooth-enabled device, allowing the user to switch between autonomous and manual modes. Using a Bluetooth module, such as the HC-05, connected to the microcontroller, users can send directional commands to control the robot's movements in real time.

A mobile app or custom interface provides a user-friendly platform to operate the robot remotely, granting greater control and flexibility. This feature is particularly advantageous for situations requiring precision, where the robot may need manual intervention to navigate confined spaces or perform specific tasks.

Smart Bin

The smart bin component automates waste collection by using sensors to detect objects and control a motorized lid. An ultrasonic sensor detects when an object, such as trash, is brought near the bin, triggering the microcontroller to open the lid via a servo motor. After a short delay, the lid closes automatically. The bin can also be monitored via Bluetooth, alerting users like LCD display when it is full and needs emptying.

This interactive feature allows the robot to act as a mobile waste management system, ideal for smart homes or offices. By integrating the smart bin with the robot's movement capabilities, this project

showcases practical applications for intelligent waste disposal in public or private spaces.