



TAGORE ENGINEERING COLLEGE

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Department of Computer Science and Engineering

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Subject :PROJECT PRESENTATION

Role-Play Activity for Project Presentation: Raspberry Pi-Based Obstacle Avoiding Car

This role-play activity engages students by having them assume roles relevant to the development and implementation of a **Raspberry Pi-based obstacle-avoiding car** using an **ultrasonic sensor** and **Pi camera**. The project integrates concepts from robotics, electronics, programming, and problem-solving.

1. Overview of the Project

Project Topic:

Obstacle Avoiding Car Using Raspberry Pi, Ultrasonic Sensor, and Pi Camera

Objective:

To develop and present a functional prototype of an autonomous car that avoids obstacles using Raspberry Pi as the brain, an ultrasonic sensor for obstacle detection, and a Pi camera for real-time video streaming or image recognition.

Team Composition and Roles:

1. **Presenter 1: Robotics Engineer**
Role: Explain the mechanical design and movement system of the car.
2. **Presenter 2: Software Developer**
Role: Discuss the Python programming and algorithms that enable obstacle avoidance and camera integration.
3. **Presenter 3: Electronics Expert**
Role: Detail the electronic components used (Raspberry Pi, motor driver, ultrasonic sensor, Pi camera) and their connections.

3. Presentation Structure

A. Introduction (5 minutes)

Presenter 3 - introduces the project, outlines its importance in the field of autonomous vehicles, and introduces the team members along with their respective roles.

Key Points:

- Objective: Build a low-cost, obstacle-avoiding car using Raspberry Pi.

- Core Components: Ultrasonic sensor, Pi camera, Raspberry Pi, and motor driver.
 - Real-world applications: Self-driving cars, robots, drones.
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B. Main Body (15-20 minutes)

1. Robotics Engineer (Presenter 1)

- Explain the mechanical design and assembly of the car, including the chassis, wheels, and motor system.
- Discuss how the motors and wheels are controlled using the Raspberry Pi and motor driver board.

Demonstration: Show how the car moves forward and turns when encountering obstacles.

2. Electronics Expert (Presenter 3)

- Explain the electronic components and how they are connected.
 - Raspberry Pi as the central controller.
 - Ultrasonic sensor for obstacle detection (working principle and placement on the car).
 - Motor driver for controlling the movement.
 - Pi camera for real-time vision.
- Discuss the circuit diagram and show how the components are integrated.

Demonstration: Show a live prototype of the wiring and connections.

3. Software Developer (Presenter 2)

- Explain the Python code used to control the car's movement and detect obstacles using the ultrasonic sensor.
- Highlight the logic behind obstacle detection (e.g., if the ultrasonic sensor detects an object within a certain distance, the car turns).
- Discuss the integration of the Pi camera for real-time video streaming.

Demonstration: Run the code live and show the car avoiding obstacles in real-time.

C. Interaction & Demonstration (5-10 minutes)

- **Live Demonstration:** The entire team collaborates to showcase the car avoiding obstacles in real time, emphasizing each component's role.
- **Q&A or Discussion:**
 - The **Robotics Engineer** might ask the **Software Developer** about optimizing the car's movement for smoother turns.
 - The **Data Scientist** can ask the **Electronics Expert** about potential hardware upgrades to integrate more sensors.
 - The audience can ask questions about the project's challenges, how to enhance it, and possible future applications.

D. Conclusion (5 minutes)

(Presenter 1) summarizes the project's accomplishments, highlights future potential (e.g., adding machine learning for better decision-making), and discusses any limitations they faced during development (e.g., battery life, processing speed of Raspberry Pi). Each team member gives a final statement about their role.

