

## Self-Driving Car (Tesla Inspired)

**Objective:** Design and develop a self-driving car that navigates through roads, turns, and avoids obstacles.

### Key Features:

1. Autonomous Navigation
2. Object Detection (cameras, sensors)
3. Lane Keeping and Tracking
4. Right/Left Turn Capability
5. Obstacle Avoidance

### Components:

1. Tesla Autopilot Hardware (or similar)
2. GPS and Mapping System
3. Cameras (front, rear, side)
4. Sensors (lidar, radar, ultrasonic)
5. AI-Powered Computer (NVIDIA, etc.)

### Working Principle:

1. Cameras and sensors detect road layout, obstacles, and objects.
2. AI-powered computer processes data and makes decisions.
3. Car adjusts speed, steering, and trajectory accordingly.

### Autonomous Driving Modes:

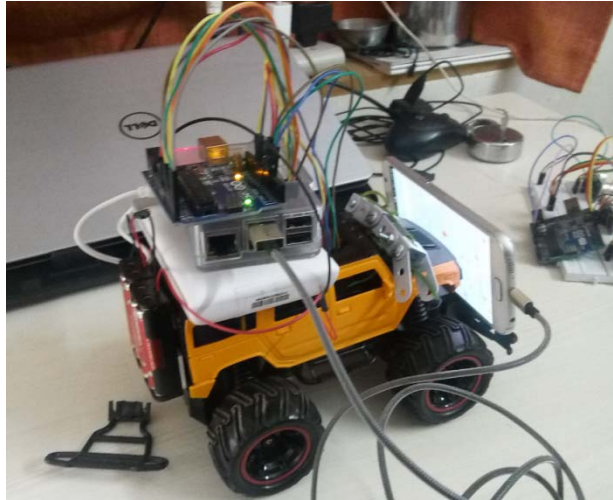
1. Highway Autopilot (HAP)
2. Urban Autopilot (UAP)
3. Summon (parking/ retrieval)

### Object Detection and Response:

1. Pedestrian detection
2. Vehicle detection
3. Lane marking detection
4. Traffic light detection
5. Adaptive cruise control

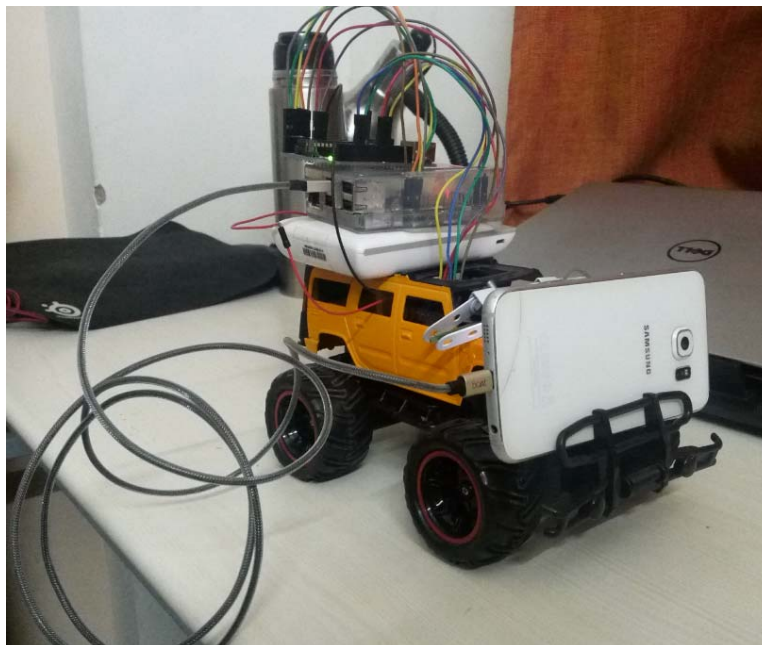
### Technical Requirements:

1. Programming languages: Python, C++, Java
2. Computer vision and machine learning
3. Sensor integration and calibration
4. Real-time data processing



**Innovations:**

1. Advanced driver-assistance systems (ADAS)
2. Real-time object detection and tracking
3. Autonomous decision-making



**Potential Applications:**

1. Autonomous taxis and ride-sharing
2. Self-driving delivery vehicles
3. Enhanced safety features for human-driven cars

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