

Proposal of graduation project

Project Titel:

Design of Autonomous Vehicle Driving , Tracking and Monitoring

Presented By:

Abdelrahman Shrief

Sondos Reda

Asmaa Mohamed

Mohamed Alaa

Mohamed Hossam

Mohamed Nageh

Mahmoud Gaballah

Moamen Mohamed

Supervised By:

Prof. Gamal El-Sheikh

Prof. Esraa Elrefaey

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1. Introduction:

Vehicle theft is a widespread problem worldwide, resulting in significant financial loss and security concerns. Traditional security systems, such as car alarms, are often inadequate to deter theft. This project aims to develop a real-time, accurate vehicle location tracking and anti-theft system based on GSM technology. The system will enable seamless communication and data transfer, while also providing a security feature through SMS notifications or a mobile phone application in case of unauthorized movement of the vehicle or if the vehicle enters a restricted area.

2. Objectives:

- a) Implement a system that utilizes GSM technology to provide accurate real-time location tracking of vehicles.
- b) Design and integrate GPS and GSM modules to enable seamless communication and data transmission.
- c) Develop an alert system that notifies vehicle owners in case of unauthorized access or movement, utilizing SMS or mobile app notifications.
- d) Create an application interface for users to monitor vehicle location and status easily.
- e) Test and validate the system's performance under various conditions to ensure reliable tracking and theft prevention.
- f) Analyze the power consumption of the system to optimize it for long-term use without frequent recharging.
- g) Assess the security features of the system to identify potential vulnerabilities and enhance data protection.
- h) Identify potential future enhancements, such as integrating machine learning for predictive analytics or expanding the system's capabilities.

3. Methodology:

- a) Conduct a thorough review of existing research on vehicle tracking and anti-theft systems.
- b) Study relevant technologies, including:
 - GSM communication protocols for data transmission.
 - GPS for real-time location tracking.
 - Microcontrollers capabilities in interfacing with sensors and actuators.
 - Anti-theft mechanisms (engine shutdown, alarm systems, etc..).
- c) Security considerations in embedded systems (encryption, authentication).
- d) Software Development:
 - Develop a software for controlling and monitoring the vehicle.
 - Develop software platform for real-time data monitoring.
 - Design a database for storing vehicle data and logs.
 - Implement a reliable communication sequence.
- e) Hardware Development:
 - Choose a suitable Microcontroller.
 - Select advanced DC motors with encoders for better car movements.
 - Find a suitable GSM Module for communication.
 - Pick a suitable GPS Module for real-time location detection.
 - Use other communication solutions if needed.
- f) Testing & Evaluation:
 - The system will be tested under various conditions and scenarios to evaluate its response time, tracking accuracy, and remote-control functionality.
 - User evaluations will be conducted to assess the development of both the software and hardware components.

4. Expected Outcomes:

- a) The anti-theft vehicle system can track and report vehicle location in real-time even if the vehicle engine wasn't started.
- b) It can be connected to a software platform to monitor the car.
- c) The software platform would provide some options to control car speed and movements, monitor the car location or stop the car system if stolen.
- d) The system demonstrated reliable real-time location tracking through GPS integration, enabling remote monitoring of the vehicle's whereabouts.
- e) The system can detect unauthorized movement and trigger pre-programmed actions (e.g., sending alerts, kill the engine) proved effective in deterring theft attempts.

5. Resources Required:

- a) GPS module for location tracking.
- b) GSM module for communication.
- c) Microcontroller for system control.
- d) Mobile application.
- e) DC Motor.
- f) A suitable exterior kit for the vehicle.

6. Conclusion:

This project aims to enhance vehicle security by providing a real-time tracking and anti-theft system using GSM technology. Implementing this system significantly reduces vehicle theft incidents and gives vehicle owners peace of mind, as they can control their vehicle remotely and track its movements through a mobile application.