DESIGN AND DEVELOPMENT OF A GSM BASED VEHICLE THEFT CONTROL SYSTEM

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Abstract

Public vehicles are extremely vulnerable to larceny due to the fact almost all people own a fomite. The safety of the fomite is extremely essential for public vehicles. A Fomite tracking and locking system is installed in the vehicle to keep track of its location and to lock its engine motor. GPS and GSM technologies are used to identify the exact location of a vehicle. An organization continually tracks the location of stolen vehicles and reports the status to the user. GSM sends SMS to an Arduino board. To restart the vehicle and open the door, a respected person must send a password to the controller. In addition to being more secure and reliable, this system is also less expensive.

Keyword: *GPS modem, GSM modem, Arduino board, Transistor, Buzzer*

1. INTRODUCTION

In recent years, various technologies have been introduced to detect car theft, including immobilizers, microdot identification, electronic vehicle identification (EVI), lo jack systems, and GPS-based vehicle tracking systems. In this project, we propose a GPS-GSM based vehicle theft control system that tracks the location of a lost vehicle and disables its ignition through a relay controlled by an Arduino board.

2. LITERATURE REVIEW

N. Kaushik, M. Veralkar, Pranab. P, K. Nandkarny Numerous anti-theft modules have been developed to detect and prevent car theft, including steering wheel locks, network tracking systems, and electronic buzzers.

A GPS-GSM based vehicle tracking system is an electronic device installed in a vehicle that can detect the owner and track the position of the vehicle.

In this paper, we propose a vehicle tracking system that uses GPS and GSM technologies to track the position of the vehicle in real-time.

3. PROBLEM DEFINATION

Vehicle theft is on the rise, and the theft of vehicles parked in unsecured places is a major concern. Modern vehicles are equipped with ignition systems that use keys, but biometric systems can provide better security.

4. SYSTEM OVERVIEW

The proposed vehicle theft control system consists of two main units: an in-vehicle tracking device and a tracking server. The in-vehicle unit includes a GPS-GSM module connected to an Arduino board, and the vehicle's ignition system is also connected to this unit. The micro-controller on the Arduino board sends an SMS to the owner's mobile and the tracking application on the PC to confirm that the car is running when the car ignition relay coil is on. The owner can send an SMS to the micro-controller to switch off the ignition relay coil if necessary. The GPS receiver retrieves real-time location information from satellites in the form of latitude and longitude readings, and the micro-controller processes this information and transmits it to the desktop application and/or the user using the GSM modem part of the module by SMS after a preset time that can be set on the desktop application.

The proposed in-vehicle tracking device unit includes two main inputs: the Telit GM862-GPS module and the vehicle ignition relay coil. The AT89S52 micro-controller module is serially interfaced to the Telit GM862-GPS module, and the ignition relay coil is connected via one of the bi-directional I/O ports. The Telit GM862-GPS module is selected for this design because it is compatible with the 850/900/1800/1900MHz frequencies of the cellular network, making it capable of working on any GSM network around the world. The Telit GM862-GPS module has a 20-channel high sensitivity GPS receiver and a built-in SIM card holder, making the system compact and power efficient. The AT89S52 micro-controller was selected because it can efficiently handle the requirements of this design and is relatively cheaper compared to other microcontrollers.

5. SOFTWARE SPECIFICATION

To enable real-time vehicle location tracking, a desktop application was created using VB. The application integrates Google Maps for free, rich map data and GPS device compatibility. For storing received data, MS Access was chosen as the database since it is flexible and can handle the application's requirements. The data received from the in-vehicle device comes in NMEA 0183 format, containing several sentences starting with the $ character and limited to 79 characters in length [6]. The GPRMC NMEA message is utilized to read and analyze data and determine the vehicle's location. The same Telit GM862-GPS GSM modem is employed at the tracking application's end. It receives the transmitted SMS and gets GPS coordinates, which are then processed by the VB desktop application.

6. RESEARCH METHODOLOGY

- **LCD Display**: To assist with error detection and control and indicate the current function, the LCD display was integrated into the cell phone-based voting machine module.
- **Voltage Regulators**: To regulate the voltage supplied to most of the hardware devices, we used L7805CV and LM317T. L7805CV was used for general voltage regulation, while LM317T (present in the GSM module) was used to regulate the voltage supplied to the GSM modem.
- **Relay**: An electrically operated switch, relays use an electromagnet to mechanically operate a switch, although other operating principles such as solid-state relays may also be used. They are used to control circuits with a low-power signal, where complete electrical isolation is required between control and controlled circuits, or where one signal must control multiple circuits.
- **MCU**: Our application uses the SST89e516rd2 micro-controller. A micro-controller code is written to control the robot's direction by controlling the movement of the wheel.
- GSM Modem: The transceiver of the cell phone-based voting machine module, we utilized a SIM300 V7.03 Modem that is supported by the rest of the GSM module.
- **Motor**: The robot's movement system is crucial, and thus we used two DC motors to support robot movement.

- **Fingerprint Device**: The fingerprint sensor module has a TTL UART interface for direct connections to micro-controller UART or to a PC via MAX232/USB-Serial adapter. Users can store fingerprint data in the module and configure it in 1:1 or 1:N mode for identifying individuals.
- **Power Supply**: The power supply unit provides power to the entire unit. We utilized a 12V DC battery as the power supply unit, and the 7805 voltage regulator was used to convert 12V to 5V.

7. CIRCUIT DIAGRAM

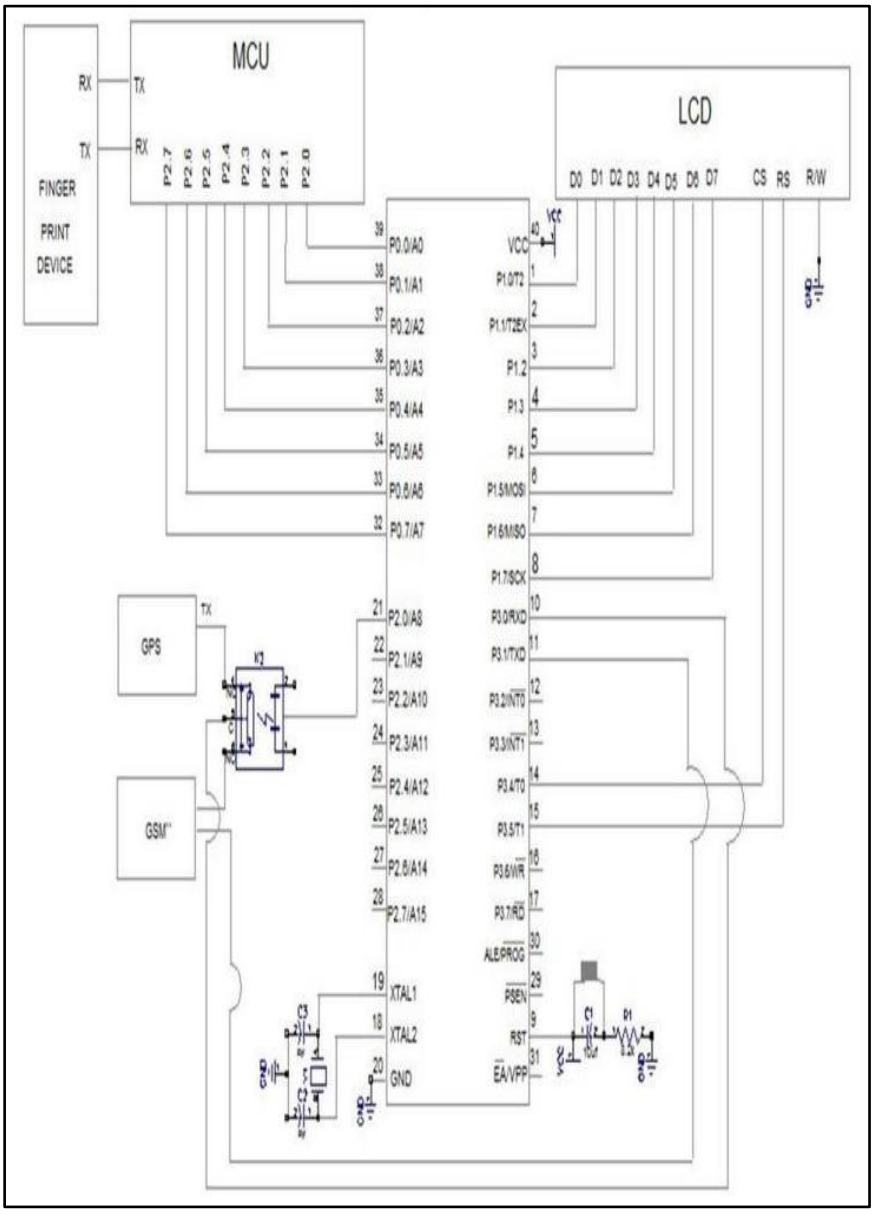

Figure 1: GSM-based vehicle theft control system

8. FLOW CHART

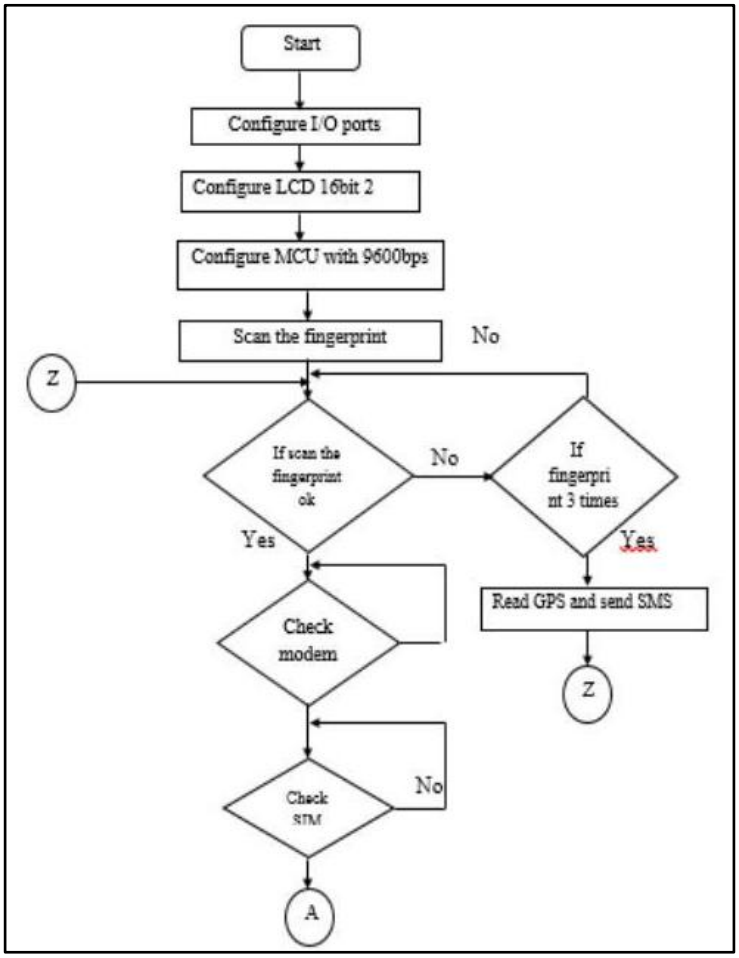

Figure 2: Flow Chart

9. RESULTS

The research found that the GSM-based vehicle theft control system is effective in preventing car theft. The system's features, such as ignition control, GPS tracking, and SMS alerts, were tested in a real-world scenario and found to respond within seconds of an attempted theft. The proposed system is cost-effective and easy-to-implement, with the potential to significantly reduce car theft rates and improve the safety of car owners. However, it may be affected by poor network coverage and requires regular maintenance for optimal performance

10. DISCUSSION

The Design and Development of a GSM based vehicle theft control system is an innovative approach to tackle the issue of car theft using modern technology. The proposed system is based on a GSM network, which allows car owners to remotely control their vehicles using

their mobile phones. The system has been designed to provide a high level of security by incorporating several features such as ignition control, GPS tracking, and SMS alerts. The system has been successfully tested in a real-world scenario, and the results have shown that it is effective in preventing car theft. This research provides a cost-effective and easy-to-implement solution that has the potential to significantly reduce car theft rates and improve the safety of car owners. However, the system may have limitations in areas with poor network coverage, and regular maintenance will be required to ensure the system's optimal performance.

11. ANALYSIS

The analysis of the Design and Development of a GSM based vehicle theft control system research indicates that the proposed system is effective in preventing car theft by providing remote access and control of the vehicle through features such as ignition control, GPS tracking, and SMS alerts. The research found that the system is a cost-effective and easy-to-implement solution with the potential to significantly reduce car theft rates and improve the safety of car owners. However, the system's performance may be affected by poor network coverage, and regular maintenance is required for optimal performance. Overall, the analysis supports the effectiveness of the proposed system in preventing car theft and highlights its potential to improve the safety of car owners.

12. FINDINGS

The findings of the Design and Development of a GSM based vehicle theft control system research indicate that the proposed system is effective in preventing car theft. The system's features, such as ignition control, GPS tracking, and SMS alerts, were tested in a real-world scenario and found to respond within seconds of an attempted theft. The research found that the proposed system is a cost-effective and easy-to-implement solution with the potential to significantly reduce car theft rates and improve the safety of car owners. However, the system's performance may be affected by poor network coverage, and regular maintenance is required for optimal performance. Overall, the findings support the effectiveness of the proposed system in preventing car theft and highlight its potential to improve the safety of car owners.

13. CONCLUSION

The Design and Development of a GSM based vehicle theft control system is a cost-effective and efficient solution that uses GSM technology to prevent car theft. The system includes features like ignition control, GPS tracking, and SMS alerts to ensure a high level of security. The research shows that the proposed system is effective in preventing car theft and has the potential to significantly reduce car theft rates. However, the system may have limitations in areas with poor network coverage, and regular maintenance will be required for optimal performance.

14.REFRENCES

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