

Advance Multi-Functional Vehicle Safety System

Bhushan Ramesh Aloni¹, Uday Bhatu Bachhav², Siddharth Santosh Sonawane³,
Kalpesh Madan Shewale⁴

¹*Assistant Professor, Department of Electrical Engineering, P. S. G. V. P. Mandals D. N. Patel College of Engineering Shahada, Dist. Nandurbar*

^{2,3,4}*Students, Department of Electrical Engineering, P. S. G. V. P. Mandals D. N. Patel College of Engineering Shahada, Dist. Nandurbar*

Abstract—In current world situation the security and theft prevention are the main areas. This can be prevented using GSM and GPS technology. This will help in identifying vehicle location when the vehicle is stolen. This GSM uses many new techniques which includes biometric recognition techniques, image processing technique, using with the development and application of raspberry pi technique in this application. This system uses biometric or fingerprint technique in order to on the ignition when the authorized person wants to run the vehicle. If an unauthorized person tries to run the vehicle by giving their fingerprint or when they disconnect the sensors wires the GSM module sends the alert message with the current location of the vehicle to the authorized person. Another application of this GSM system is that when the vehicle met with an accident, the message must reach to the registered emergency number which will tell extra location and about the accident of the vehicle. Another application is that when the driver was sleepy if he unwantedly removes the hands on the handle bar then it senses and slow down the engine speed to control the speed of the vehicle in order to prevent accident.

Index Terms—Raspberry pi, GSM, GPS, ADXL Sensor, DC motor, VNC Viewer

I. INTRODUCTION

This paper is about building a vehicle many new techniques like fingerprint and so on. This system prevents the car being stolen by the theft. This system consists of fingerprint which is used to control the ignition of the vehicle through the fingerprint scanner. So, this system consists of GSM 900, which is connected to the Raspberry pi which acts as the microprocessor of the project. In order to make sure that the vehicle is secure, only the authorized or owner fingerprint is paired with the microprocessor to start

the ignition. The vehicle will ignite when the fingerprint matches with the database of the microprocessor. While the unauthorized user tries to ignite the vehicle which will not match with the database of the microprocessor then it will prevent from igniting the vehicle, where the alert message will be sent to the authorized person using GSM.

In recent automobile industries more and more number of cars are released according to the need of a customer. So, every year nearly 1.25 million people are dying due to accident in all over the world this is due to unavailability of the medical emergency nearby. In most accident places people will die because of the improper medical facility at that place. So, to overcome this, a preinstalled smart sensing system is installed in the vehicle which will tell about the mechanical conditions services to the customers. So that the customer can drive the vehicle with safety. If any accidents occurs then the extra location and the condition of the vehicle is sent to the emergency numbers via the SMS.

This SMS will send by the GSM modem. This modem will send an SMS to the relatives, nearby police stations and to the medical facility for the proper medical emergency to the passenger. GSM will provide the extra information to the emergency services. Here we use a microprocessor which is serially interfacing the GSM modem and to the GPS receiver. This GSM modem sends the position of the driver that is provided by the GPS and this same data is sanded to the nearest police station, Emergency facilities and pre-resisted contacts.

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II. OBJECTIVES

The objective is to implement the latest fingerprint recognition algorithm to safeguard the vehicle from theft and misuse. Also to locate the accident vehicle at the soonest possible time and rescue the accident victims as well as track the lost vehicle. The system uses biometric technology to make sure that only the authorized vehicle owners with enrolled fingerprints can start the vehicle so that it can avoid theft. The vehicle ignition can be highly protected and could help to decrease theft. Using GPS, the location of the vehicle can be identified where in case of accidents the location address of vehicle is sent to emergency contacts.

III. LITERATURE SURVEY

Dynamic security highlights, similar to electronically monitored slowing mechanisms, footing control and electronic brake dissemination, are intended to keep away from a mishap. Inactive security highlights, as in-assembled disintegrate zones in the monolog body shell which distort in a head-on impact to ingest the vitality of the approaching vehicle, are being to ensure the driver and travellers inside the vehicle when a mishap happens notwithstanding the working of the different dynamic wellbeing frameworks. Airbags, side effect pillars in the entryways and collapsible guiding segments are different cases of inactive security frameworks. [3]

The work done in this paper is an endeavour to outline a propel vehicle security framework that utilizations GPS and GSM framework to anticipate burglary and to decide the correct area of vehicle. Today robbery is going on the stopping or in some uncertain place. The wellbeing of the vehicle is astoundingly fundamental. The propel vehicle security framework is planned utilizing GPS and GSM innovation. The framework contains GPS module, GSM modem, Infrared sensors, 8051 microcontroller, transfer switch, paint shower and high voltage work. GPS framework track the present area of vehicle, there are two kinds of following utilized one is web based following and other is disconnected following. GSM framework is additionally introduced in the vehicle for sending the data to the client since GPS framework can just get the vehicle area data from satellites.[4]

This paper provides the study of Integrated Safety Systems (ISS) like pre-crash frameworks with impact cautioning or independent vehicle activities.

The Survey venture is specifically reacting to this by creating test and appraisal techniques for the assessment of pre-crash frameworks. Techniques are being produced for driver behavioural viewpoints, pre-crash detecting execution and crash execution under conditions impacted by pre-crash driver and vehicle activities. [9]

Smart vehicle associations with enhance Activity security is one of the most encouraging advantages of Vanet. The principal highlight of VANET is Correspondence between two vehicles for message trade by means of Vehicle to Vehicle (V2V) and Vehicle to Foundation (V2I) correspondence convention. VANETs are sorted by high versatility,

quickly evolving convention, transient and one-time cooperation. The Goal of this paper is vehicles can openly collaborate for bringing advantages of more prominent wellbeing and effectiveness. This correspondence can be utilized to evasion of vehicles crash, transmit data about activity. [11]

IV. PROPOSED METHOD

This model consists of a microprocessor, software and hardware components such as:

- A. GPS module the GPS module has receiver with antenna which provide the location of the vehicle. The GPS system is commonly used to get information about coordinates, speed, time and distance. In this module, a GPS system is adopted to implement the in-vehicle device.
- B. GSM Module it is responsible for establishing connection between vehicle device and remote device for transmitting the message which contains the information about the vehicle location.
- C. Fingerprint scanner it is type of technology that identifies and authenticates the fingerprint of an individual to grant or deny access to a computer system or to physical facility.
- D. ADXL sensor it is a small, thin, low power, 3-axis accelerometer with high resolution. It measures the static acceleration of gravity in tilt sensing applications.

V. METHODOLOGY

There are many solutions proposed for the concerned problem and each one have some advantage over others. Presently tracking system is introduced in vehicle to avoid accident and save people's life. They have used microcontroller for this purpose. But the existing systems are available only in high-end vehicles, because the monitoring system is expensive and also the system circuit looks very bulky and not in compact. duty cycles and efficiently managing system resources. This is the system architecture of the proposed system. In this system, PIC microcontroller is used because it is fast, reliable and it takes less power consumption. Ultrasonic sensors are used for obstacle detection whether it is at rear or front end, it will detect and notify the car owner that you have to make a certain distance from the other vehicle. Tyre pressure sensors are used to detect the excess pressure

on the tyre and notifies instantly to the driver. GSM is used for sending the location of the person via SMS. GPS is used here for sending the exact location of the person where the incident happened. [2]

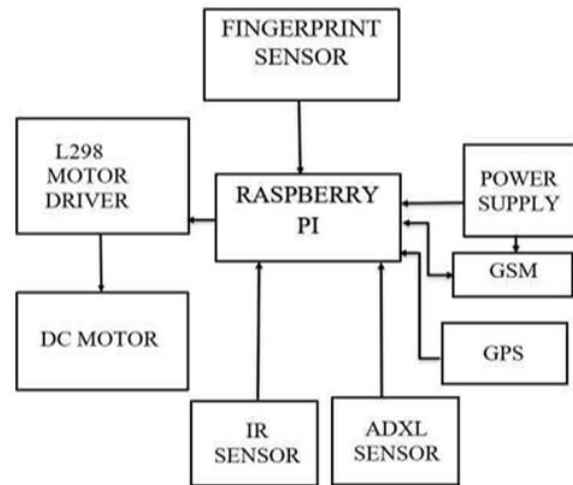


Fig 1: Block Diagram

The methodology for implementing the IoT-based wireless surveillance robot begins with the design and integration of hardware components such as the AI Thinker ESP32CAM module, motor drivers, batteries, and wheels to form a functional surveillance platform. Subsequently, software development entails programming the ESP32CAM module to capture and stream video, implementing motor control algorithms, and creating a user interface for remote control via a web browser. Wi-Fi connectivity is established, and network infrastructure is configured to facilitate communication between the surveillance robot and user devices.

A user-friendly web interface is developed, featuring controls for movement and live video streaming display. Rigorous testing is conducted to validate the system's functionality, including video streaming performance, control mechanisms, and overall stability. Optimization efforts are employed to enhance system performance and efficiency, followed by deployment for practical use in espionage and security applications. Real-world evaluation assesses the system's effectiveness, reliability, and suitability for various surveillance tasks, with feedback informing further refinements and improvements. An Advanced IoT-Based Rescue Surveillance Robotic Car is a smart, unmanned ground vehicle (UGV) designed to access hazardous or inaccessible

environments. It merges IoT for global remote control and live data streaming with a suite of sensors to perform real-time security patrols and search-and-rescue operations

VII. CONCLUSION

In this paper, a new method for developing a low-cost compact anti-theft system for vehicles is developed and demonstrated. This job poses a real threat to car thieves. Vehicles these days are the least protected from being stolen by thieves. With this task presented in this article, it is very easy to track a vehicle with higher accuracy because it is based on the current very advanced GSM technology. So returning the car is very easy. The essence of the work is that the entire process is performed at the lowest possible cost and is suitable for practical use. There is no doubt that in the future every car will be equipped with this unique kit.

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