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ADVANCED VEHICLE ANTI-THEFT AND SAFETY SYSTEM USING AI AND LI-FI TECHNOLOGY

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ABSTRACT

There has been steep increase in number of vehicle thefts day by day. There is no fail proof system if the user has duplicate keys or makes some arrangement to fire the ignition of the vehicle. Vehicular theft constitutes a high percentage of reported criminal acts. The number of automobiles involved in travelling each grows drastically high and it becomes impossible to identify the stolen vehicle. Day to Day most of the vehicles undergo accidents due to head on collisions. The head on collision occurs due to a numerous reasons the one being over speeding and loss of control over the car. Further the traffic congestion has lead to numerous deaths of patients who are in emergency vehicles stuck in traffic jams. This project deals with the development of advanced vehicle antitheft and safety system using AI and Li-Fi Technology. The project has of development of the prototype of the vehicle and smart vehicle antitheft system which can perform facial recognition to prevent vehicle theft. The vehicle access will be given to only the authorized owners and if the vehicle theft is attempted the culprits details will be shared with the police station over IOT along with location of the vehicle using GPS location tracking. The proposed project implements AI based driver drowsiness detection for vehicle accident safety due to drowsiness

Keywords: Safty System, LiFi Technology.

I. INTRODUCTION

Security in today's world has also become more advanced because of technology. In preventing thefts for instance, various types of security systems have been developed. There are CCTVs (Closed-circuit Television) which can be found in most commercial establishments because of its high effectivity in preventing and solving crimes, burglar alarms used by commercial establishments which help prevent burglary thefts unauthorized access by setting off a loud alarm, button alarms which automatically alert the nearest police station that crime was attempted or is currently taking place, and many more. There are also different kinds of authentication that are used to increase security features in different kinds of devices such as fingerprint, retinal, iris, and face recognition. Among the types of security features mentioned, face recognition is one of the most sophisticated and secured.

The use of vehicle becomes important everywhere in the world and also preventing it from theft is required. Vehicle manufacturers are attaining the security features of their products by introducing advanced automated technologies to avoid the thefts particularly in case of cars. Biometric and non- biometric methods usually provide such security features. Sometimes these systems fail due to hacked password and encryption of

decrypted data, but it is almost impossible to make replica of distinctive characteristics. Biometric systems are modern and use techniques like fingerprint recognition, iris recognition and face recognition. Of these face recognition and detection systems are more sophisticated, easy to deploy and people can be identified without their knowledge.

Safety is another issue where in there are number of accidents due to driving errors or the road conditions and unexpected situtations. The project deals with the development of smart system to prevent vehicle theft using face recognition and Artificial intelligence. The vehicle safety is also handled using Li-FI based inter vehicle communications to prevent accident between the vehicles.

The vehicle theft is increasing day by day but there is no proper solution to prevent vehicle. Different research scholars are working towards providing an effective solution towards avoiding vehicle theft, however the sensors based solutions and finger print based solutions have some drawbacks. A major problem today for car owners is that they are in constant fear of having their vehicles stolen from a common parking lot or from outside their home. This project proposes the concept of vehicle antitheft using Face recognition. Artificial intelligence is evolving drastically and has wide scope in future. Face recognition as well as identification systems are challenging and number of research scholars are working on efficient techniques for the same. Thus we propose the solution for vehicle security and antitheft using face recognition and detection system. The proposed project uses deep learning to extract the facial features of the person driving the vehicle and if they do not match with the owner, or registered users of the vehicle, the alarm will be triggered and the driver's image will be shared with the registered owner of the vehicle and the police The accident prevention system using driver drowsiness detection and Li-Fi based inter vehicular communication is also proposed in this project where in the vehicle communicates with the surrounding vehicles using Li-Fi trans-receivers to prevent accidents making a framework forvehicle to vehicle communication

II. LITERATURE REVIEW

The existing car antitheft system are Car alarm, flashing light techniques which makes use of different type of sensors which can be pressure, tilt and shock & door sensors, but the drawbacks are cost and it only prevents the vehicles from theft but can't be used to trace the thief. In 1997 B Webb introduce wheel and steering lock system, to prevent car from theft, but they are visible from outside the car and prevent the wheel from being turned more than afew degrees.

The system proposed on Security Module for Car Appliances [1] by Pang-Chieh Wang et.al. This system prevents car appliances from stealing and illegal use on other cars. If illegal moving and use a car appliance with the security module without permission occur that will lead the appliance to useless. But it does not prevent vehicle from theft

In 2008 Lili Wan, et.al. [2] implemented new system based on GSM in which owner can receive the alarm message quickly and if necessary, also it can monitor the car by phone.

The next system was a sensor network based vehicle anti theft System (SVATS) [3]. In this system, first step is to form a sensor network by using the sensors in the vehicles that are parked within the same parking area, then monitor and identify possible vehicle thefts by detecting unauthorized vehicle movement. An alert will be reported to a base station in the parking area if an unauthorized movement is detected. As the sensor cannot

communicate with the base station directly in the extreme case, vehicle cannot receive any protection when no neighbors can be found even if a sensor has tried its maximum power level.

In authors define an automotive security system to disable an automobile and its key auto systems through remote control when it is stolen [4]. But it does not help to recognize the theft.

An efficient automotive security system [5] is implemented for anti-theft using an embedded system occupied with a Global Positioning System GPS and a Global System of mobile GSM by Montaser N. Ramadan et.al. to track and monitor vehicles that are used by certain party for particular purposes, also to stop the vehicle if stolen and to track it online for retrieval.

The next system was proposed in 2013 on real time vehicle theft identity and control system based on ARM 9. [6]. It performs the real time user authentication using face recognition, using the Principle Component Analysis (PCA) algorithm if the result is not authentic then ARM produces the signal to block the car access and the car owner will informed about the unauthorized access with the help Multimedia Message Services (MMS) by using of GSM modem . But in this method the camera captures owner's image only. If the owner's relatives or friends want to start the vehicle it will not start.

Recently new system proposed on vehicle anti-theft system based on an embedded platform consists of multiple layers of protection [7]. The first layer of protection in the system is a fingerprint recognition, based on which the doors are opened. Also to prevent thieves from breaking the glass and getting inside the vehicle, vibration sensors are used in all the windows with a threshold level to prevent false alarms. the vehicle is turned on only with the mechanical keys along with correct key number entry on the combination keypad present, failing to do so for three successive times will result in vehicle getting immobilized by cutting the fuel supply and an alert message is sent to the mobile number of the owner.

Further to prevent the seizure of the vehicle, tire [8] pressure sensor is also being used which also alerts the owner through a mobile message.In case of vehicle accident detection new system proposed by Varsha Goud et.al. on vehicle accident automatic detection and remote alarm device. This system can detect accidents in significantly less time and sends the basic information to first aid center within a few seconds covering geographical coordinates, the time and angle in which a vehicle accident had occurred. This alert message is sent to the rescue team in a short time, which will help in saving the valuable lives.

Detecting an accident before occurring it can save human life [9]. To implement this new system was proposed in which a car will try to avoid obstacle after avoiding human or animal if there is any. Driver will also be notified with red lights indicating that obstacles are in front. However, if the system would not be able to avoid accident then this system will automatically generate a tweet in tweeter. For further safety, this system also contains relay and buzzer where relay helps to protect the car from battery ignition and buzzer will make noise to inform people surrounded.

III. METHODOLGY

The actual fabrication of the proposed work begins the material survey, to be made to select the appropriate materials for the entire project. The second step is to layout a proper plan for the project so that project can be caarried out in stages. Based on the concept of the project the following material was needed to the completion of the project.

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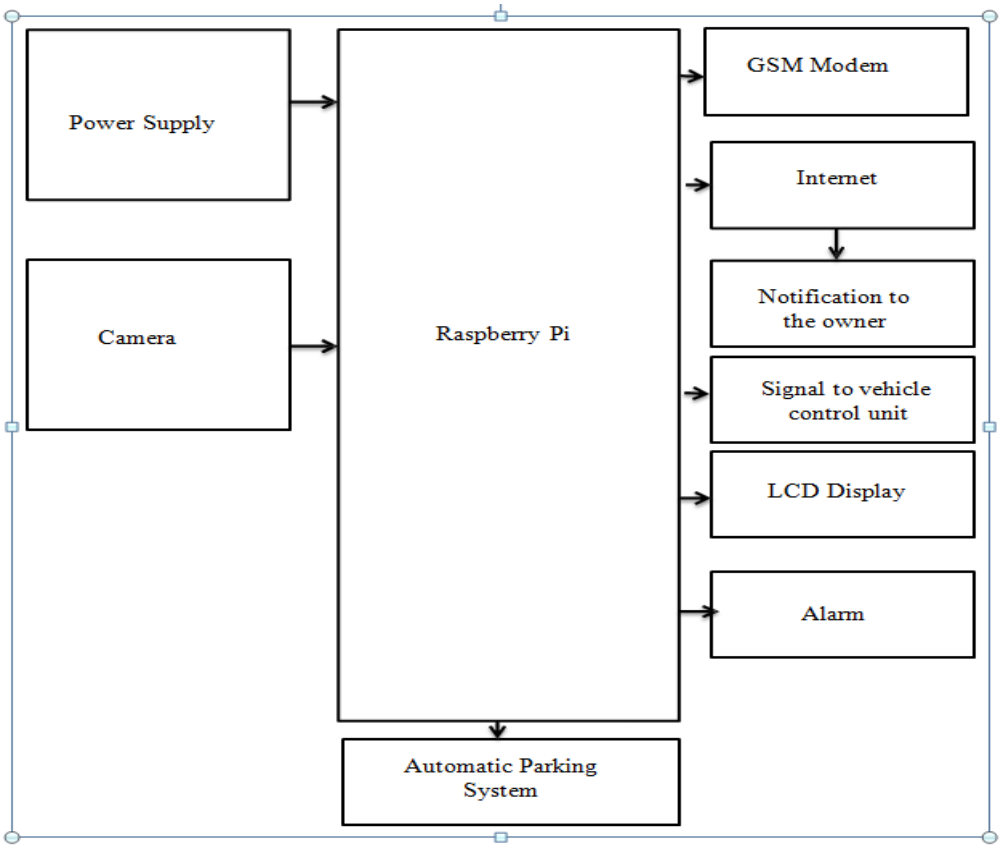

Fig. 3.1: Block Diagram Of Advanced Vehicle Anti-Theft And Safety System Using Ai And Li-Fi Technology

The project consists of development of advanced vehicle antitheft and safety system with drowsiness detection and Li-Fi based inter-vehicular communication. The project is broadly divided into to two parts for understanding the working principle. The AI based antitheft system and drowsy driver detection system and the vehicle to vehicle communication system.

The AI based vehicle antitheft system and drowsy driver detection and safety system consists of a raspberry pi, Ignition switch, relay module and a GSM modem. When the vehicle ignition is started by the driver the system captures the image of the driver starting the vehicle. The image of the driver captured is fed to the facial recognition system which is trained on authenticated owners of the vehicle to check if the person which is driving the vehicle is from authenticated owners of the vehicle. If the person is authenticated no action will be taken. If the person is attempting to steal the vehicle, automatically an alarm will be triggered and the persons image will be mailed to the police station under the attempt of theft of the vehicle. Additionally a SMS notification will also be sent to the registered owner of the vehicle regarding the theft. After the notification is sent the vehicle ignition is cut off to prevent the theft of the vehicle. Thus the proposed system not only prevents the vehicle theft but also help to find the thief trying to steal the vehicle using face recognition and deep learning. Once the authorized owner is detected, the vehicle will continue its operation. When the vehicle is moving the camera interfaced to raspberry pi will run a drowsy driver detection model to capture the video feed and feed it to the drowsiness detection model. If the drowsy driver is found the safety

system of the vehicle is automatically activated which will park the vehicle along the road side automatically to prevent accidents. To demonstrate the concepts the prototype of the vehicle is fabricated and the concepts are demonstrated.

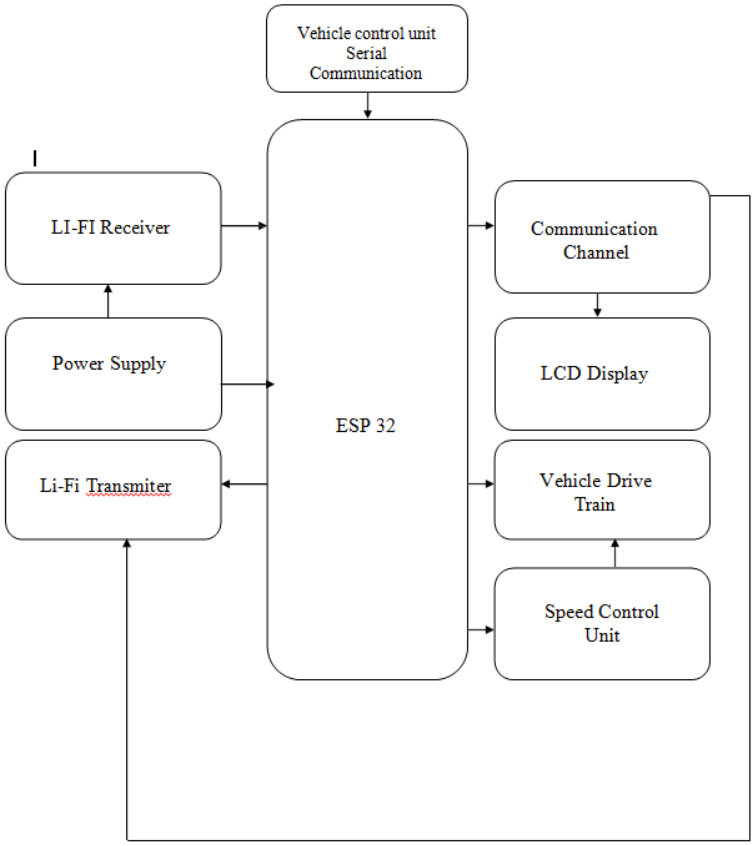

Fig.3.2: Block Diagram for LiFi Technology

IV. METHODOLOGY

The proposed system consists of development of smart system for vehicle safety and prevention of vehicle theft using face recognition. The proposed project consists of a raspberry pi SBC which is interfaced to the camera module. When the vehicle ignition is triggered and vehicle starts moving, the system gets activated. Once activated the system captures the image of the person driving the vehicle and implements face detection and identification techniques to check if the person who is driving the vehicle is the registered owner or the registered person. If the person is not form the registered drivers list the alarm will be immediately triggered and the persons image will be shared with the registered owners of the vehicle as well as the police station. Further the vehicle ignition is turned off to prevent the vehicle theft. Thus this system not only prevents vehicle theft but also helps us keep a track of criminals there by providing full security to our vehicle. Once the vehicle is running the system checks for the drowsy driver using the camera interfaced and the video feed captured. If the driver is found to be drowsy the automatic parking system is activated which will stop the vehicle and park it safely to prevent accidental damage. The LiFi Technology Iis used in this project which will communicate with the surrounding vehicles to prevent any accidents by communicating with each other. The system methodology consists of development of the following important modules

V. RESULT

The proposed project deals with the concept of advanced vehicle anti-theft and safety system using raspberry Pi Face recognition and AI based drowsiness detection. From the implementation of the above project it is expected that the proposed project can help overcome the problems of vehicle theft by providing an intelligent solution to vehicle ignition and cutoff using face recognition system. The system can detect the vehicle theft or unauthorized vehicle access by detecting the face of the driver of the owner and then comparing it with the authorized owners of the vehicle. If the owner is authenticated then the system does not take any action. However if the driver is not authenticated the system will send the notification and cut the ignition. Thus we can conclude that the above system can automatically help to save the vehicle theft efficiently. The system is expected to provide enhanced safety from accidents by implementing vehicle to vehicle communication using Li Fi to prevent accidents and AI based drowsiness detection to detect the drowsy drivers and automatically park the vehicle to prevent accidents due to drowsy driving.

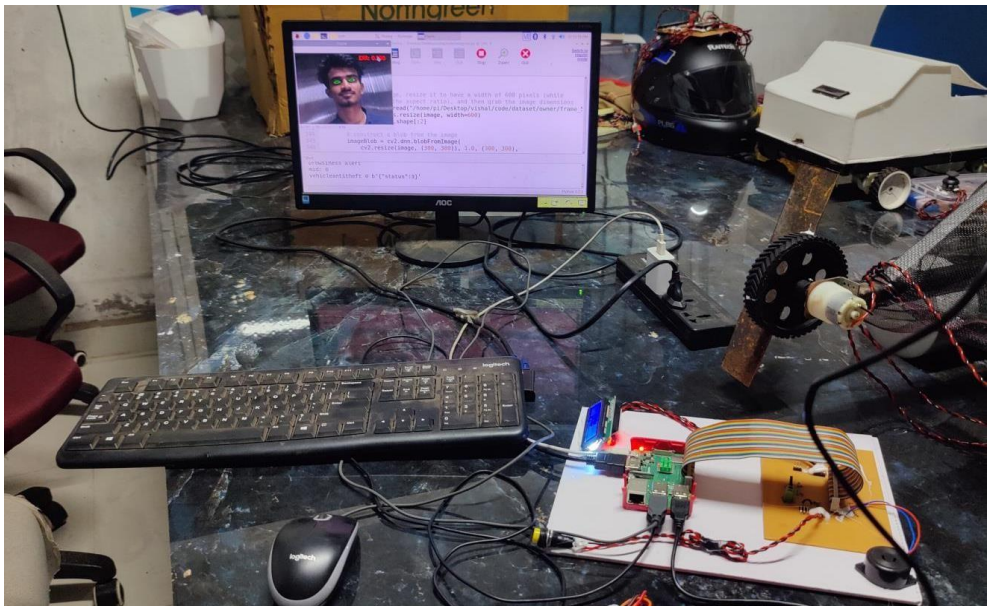

Fig 5.1: Working model

VI. CONCLUSION

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