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ANTI-THEFT SECURITY SYSTEM FOR VEHICLES

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***Abstract* -The automobile intelligent anti-theft system is an important part of the development of modern automobile industry. In view of the problems existing in the traditional automobile anti-theft system, this paper further adopts the combination of GSM network and GPS positioning system to design a new type of multi-sensor electronic intelligent automobile anti-theft alarm system. The STM32 microcontroller is used to try to construct the GSM module to realize the wireless interaction between the owner and the anti-theft system, and the GPS anti-theft module is constructed to enable the owner to locate the car location information in real time. It is expected that the research of this paper will be helpful to the research and development of anti-theft alarm in automobile industry. In today's world vehicles form an important asset to us, without which our life would be incomplete. But, when it comes to the security of our vehicles, we are very helpless. It is of a great concern, especially in metropolitan cities, where these incidents occur each and every day. So, in this paper, I have focussed on the security of vehicles. The setup consists of a mix of software and hardware. In software, I will be using an android application, and in hardware, a Raspberry pi board B+ model, a jaw or a gripper and other hardware devices. This whole system will allow you to connect with your vehicle from anytime, anywhere and confirm it'ssecurity. A vehicle is usually the most expensive and important asset next to a home, so this system enables you to keep this asset at your fingertips using wireless technology. Think of it as a wireless leash to your car.**

I.INTRODUCTION

Vehicle's security is of utmost importance in today's world. As unemployment is increasing day by day, even the literate people are involved in theft and robbery. So, the security of our vehicles is the foremost requirement. The system which is designed, ensures the security of our vehicle. It mainly uses two resources, firstly, an android app and secondly, a device, which will be installed in our vehicles. We would be able to control our vehicle using the app. The functions made in the app will communicate with the device in the vehicle, to control it . But, in order for this system to work, our android phone and the device, should have an internet connection. Thus, as we are using an internet connection for communication, this system has an unlimited range, means we can control our vehicle from any part of the world, as compared to present days, where we use a key to connect to our vehicle from a distance, but that has a limited range. With the help of this system , we can connect to our

vehicle from anywhere, anytime, with a simple click on a button in the android app. Moreover, we can discover our vehicle's location, start it, stop it, lock/unlock the doors, disable the use of our vehicle, monitor the alarm security system and much more. If a thief will try to steal our vehicle, we will be immediately informed of it, through a text message, that someone is messing with our vehicle. Then we can lock our vehicle with a simple click on our smartphone, that means no one can move your vehicle after that. In fact the accelerator, gear and brake pedals will be locked, so that the vehicle does not move from it's position. Thus with this system, theft of the vehicles can be prevented to a greater extent, which is a very important asset to us and thus leading to a safe society. Vehicles have become important means of communication as it is essential for the transportation of essential commodities from a source location to a destination location [1]. Vehicles in any form need to have a proper identification relating safety as vehicle alert and location identification gain importance [2]. Nowadays, vehicle identification, intrusion and theft control system using well known GSM and GPS technologies are being used and it is considered as a possible viable approach [3]. Automated Vehicle based inspection [4] is also becoming significant where Global system for Mobile communications and Global Positioning Tracking System [5] also helped in preventing vehicle theft and location tracking system are more efficient and utilized for developing safety systems in addition to radio frequency identification (RFID) [6] systems. Microwave systems [7]-[8] are used for further aiding RFID systems where IoT based systems are also nowadays used for vehicle tracking and location identification helping in vehicle identification and preventing vehicle theft. Node MCU based systems have also gained popularity in this related fields of IoT based applications for vehicular safety. Further wireless systems such as sensors in the form of wireless sensor networks [9] have useful in IoT systems.

II. LITERATURE REVIEW

A system is an assemble of related components making a whole system. Security system is a system that gives an alarm when someone tries to break into the vehicle. Earlier people were dependant on simple ways of alert to breach in security. Approximate seventy percent of the vehicles today have a remote keyless entry (RKE) system [12,15].

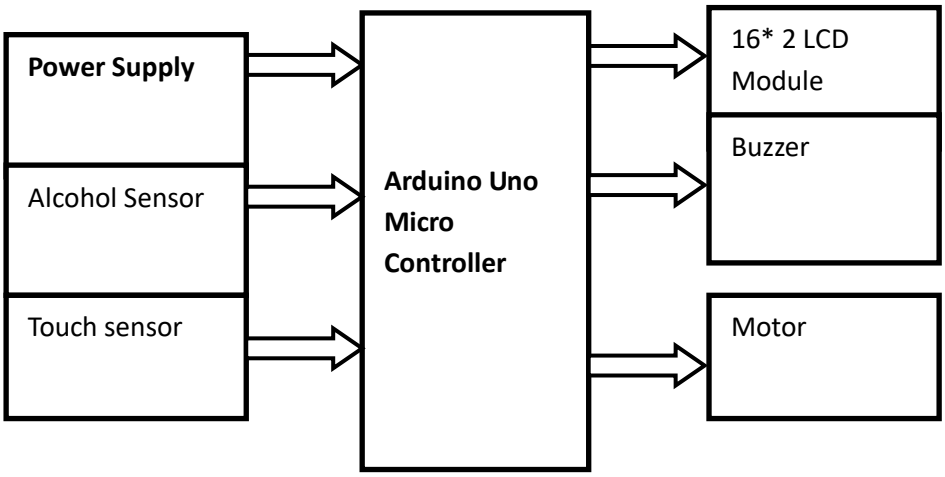
Most remote keyless systems alert the vehicle against theft, lock and unlock the doors. Remote keyless systems are made of a key fob transmitter and a receiver which is installed inside the vehicle. These systems use a frequency of 315 Mega Hz in the U.S. and Japan, and 433.92 Mega Hz in Europe[6]. The challenges for the remote keyless entry designs are achieving low power consumption in both RKE transmitter and receiver, while achieving good range and reliability for the RKE system[6,7,8,9].

Traditionally, the Security Systems were prone to thefts as they were not very secure as in the work of Ji Shin[14] in 2009. Later the enhancements in security of vehicles was introduced by Montaser N. Ramadan, Mohammad A. Al-Khedher, Sharaf A. AlKhedher[2] in 2012. After that, significant improvements has been made towards Security of Vehicles, notably by N. M. Z. Hashim, M. H. A. Halim, H. Bakri, S. H. Husin, M. M. Said[16] in 2013 and Harish Chandra Mohanta, Rajat Kumar Mahapatra, Jyotirmayee Muduli[7] in 2014. Further improvements were noticed in the work of Shubhankar Shome, Rabindranath Bera[5] in 2015 and Michal Czubenko, Zdzislaw, Kowalczuk, Andrew Ordys[9] in 2015.

The most usually used methods are beeps, alarms and biometrics. However, these are costly. It's easy to steal your vehicle by using a car buzzer. But when your car is away from you, you may not benefit from buzzer or alarm recognition. Car alarm systems are used to help with various types of sensors

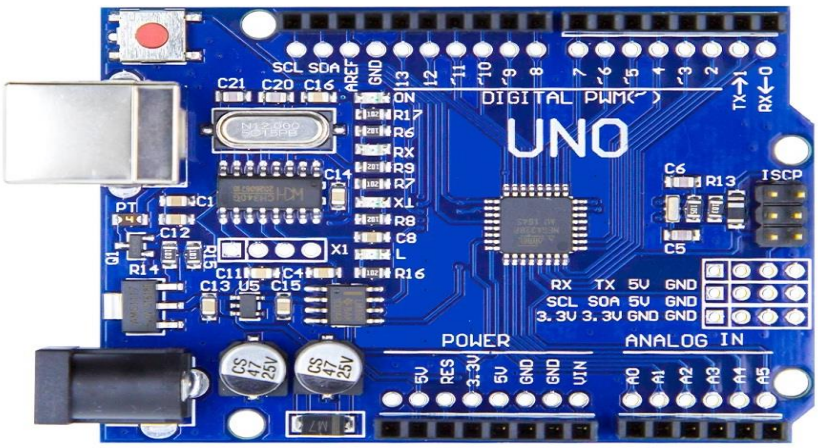
such as pressure, tilt and shock & door sensors to prevent car robbery. However, these systems have some restrictions like peak worth, peak false warning rate and straight forward disposal. Recent developments in the PC software system and hardware for fixing this problem are to develop automobile industry reasonable authentication systems and automated biometrics primarily based identification. Several biometrics are used, like automatic face recognition, facial expression, hand pure mathematics, handwriting and voice for identity and verification of people. But biometrics is not 100% accurate and requires unification and/or additional hardware and cannot be compromised once if somebody learns it, you'll be able to continuously modification your password; however, there's no chance to modify our Iris membrane or fingerprint. If somebody features a copy of their work, you can't do a lot to remain safe.

III. PROPOSED SYSTEM



In the design of this antivehicle theft system, signals are generated by the node MCU to appropriate module circuit. The whole system is aimed to be working efficiency of the system. The microcontroller reads the state of the input buttons which could be either a 1 or a 0. The signal node MCU gets from the IR sensors tells what to work on at that time. This project is aimed to replace the push-button in vehicle ignition and create a more reliable and secured way of starting the ignition. In this system, we are using node MCU as microcontroller and sensor module is interfaced with microcontroller. The status of the vehicle is achieved when it is in theft mode. If the vehicle ignition starts it alerts the vehicle alert system and the notification send to the owner. Here we are placing three IR sensors to detect the vehicle thefting, one sensor is at front side, second sensor is at back side and the third is at bottom side. Whenever the vehicle is stopped then this system gets activated and monitoring the sensors continuously, if the vehicle is moved then automatically front or back side sensors get activated and sends the data to controller, this controller process the data and immediately it sends information to the vehicle owners mobile and also it turn on buzzer with emergency pattern and also we can stop the vehicle from our smart mobile also.

3.1 Arduino uno microcontroller:



The 14 digital input/output pins can be used as input or output pins by using pinMode(), digitalRead() and digitalWrite() functions in arduino programming. Each pin operate at 5V and can provide or receive a maximum of 40mA current, and has an internal pull-up resistor of 20-50 KOhms which are disconnected by default. Out of these 14 pins, some pins have specific functions as listed below:

[1] Serial Pins 0 (Rx) and 1 (Tx): Rx and Tx pins are used to receive and transmit TTL serial data. They are connected with the corresponding ATmega328P USB to TTL serial chip.

[2] External Interrupt Pins 2 and 3: These pins can be configured to trigger an interrupt on a low value, a rising or falling edge, or a change in value.

[3] PWM Pins 3, 5, 6, 9 and 11: These pins provide an 8-bit PWM output by using analogWrite() function.

[4] SPI Pins 10 (SS), 11 (MOSI), 12 (MISO) and 13 (SCK): These pins are used for SPI communication.

[5] In-built LED Pin 13: This pin is connected with an built-in LED, when pin 13 is HIGH – LED is on and when pin 13 is LOW, its off.

Along with 14 Digital pins, there are 6 analog input pins, each of which provide 10 bits of resolution, i.e. 1024 different values. They measure from 0 to 5 volts but this limit can be increased by using AREF pin with analog Reference() function.

Analog pin 4 (SDA) and pin 5 (SCA) also used for TWI communication using Wire library.

Arduino Uno has a couple of other pins as explained below:

[6] AREF: Used to provide reference voltage for analog inputs with analogReference() function.

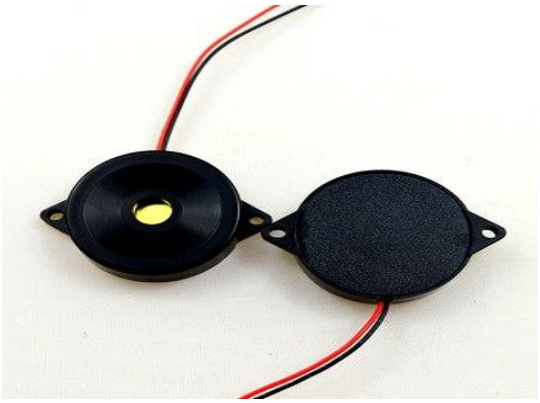
[7] Reset Pin: Making this pin LOW, resets the microcontroller.

3.2 Communication:

Arduino can be used to communicate with a computer, another Arduino board or other microcontrollers. The ATmega328P microcontroller provides UART TTL (5V) serial communication which can be done using digital pin 0 (Rx) and digital pin 1 (Tx). An ATmega16U2 on the board channels this serial communication over USB and appears as a virtual com port to software on the computer. The ATmega16U2 firmware uses the standard USB COM drivers, and no external driver is needed. However, on Windows, a .inf file is required. The Arduino software includes a serial monitor which allows simple textual data to be sent to and from the Arduino board. There are two RX and TX LEDs on the arduino board which will flash when data is being transmitted via the USB-to-serial chip and USB connection to the computer (not for serial communication on pins 0 and 1). A Software Serial library allows for serial communication on any of the Uno's digital pins. The ATmega328P also supports I2C (TWI) and SPI communication. The Arduino software includes a Wire library to simplify use of the I2C bus.

3.3 Buzzer:

A Buzzer is used in the system to alert the people nearby so that they can analyze the situation and take action accordingly. The buzzer is connected to node MCU. It gets activated whenever the motion of the vehicle detected. It's frequency and tone can be changed and used according to the requirements. Hence it is an easy and cheap way to alert people and grab attention to point out the something is wrong. The motor and the buzzer connected to transistor. It controls the working of these components based on the voltage that they receive.



3.4 Touch Sensor:

A touch sensor works by detecting changes in capacitance or resistance when a user makes contact with its surface. The most common type, the capacitive touch sensor, operates based on the principle of human skin's conductivity. When a person touches the sensor, their body alters the local electrostatic field, changing the capacitance at the sensor's surface. This change is detected by the sensor, and the system responds accordingly. In resistive touch sensors, two conductive layers are separated by a small gap. When pressure is applied to the screen, the layers make contact, changing the resistance at the point of touch. The sensor detects this change in resistance and processes the

input. Both types of touch sensors are widely used in devices like smartphones, tablets, and interactive kiosks, where they provide a simple, intuitive method for users to interact with technology.

Alcohol Sensor:

- A sensor is a technological device that detects / senses a signal, physical condition and chemical compounds.
- It is also defined as any device that converts a signal from one form to another.

Sensors are mostly electrical or electronic.

- Alcohol sensor is a subclass of chemical sensors.
- Alcohol sensor measures the concentration of alcohol in its vicinity. Alcohol sensor interacts with a alcohol to measure its concentration. Each alcohol has a unique breakdown voltage i.e. the electric field at which it is ionized. Sensor identifies alcohol by measuring these voltages. The concentration of the alcohol can be determined by measuring the current discharge in the device.

APPLICATIONS:

1. Process control industries
2. Environmental monitoring
3. Boiler control
4. Fire detection
5. Alcohol breath tests
6. Home safety
7. Grading of agro-products like coffee and spices

ADVANTAGES:

1. Preventing the vehicle thefting.
2. High speed operation.
3. It is also operated with smart mobile.
4. It is enabled with IoT.

RESULT:

Whenever someone tries to theft the vehicle when it is in theft mode, it is detected by the IR sensor, it will shutdown the vehicle's engine and sound an alarm thereby alerting the nearby people. Therefore by using this system on a vehicle, any kind of loss and damage can be avoided.

CONCLUSION

In this project, we have developed an efficient system to tackle the menace of vehicle thefting. Our aim is to minimize the loss of property. When the owner kept the vehicle in parking place. Then any one accessed the vehicle it sends signal to the owner that it is being stolen. If he again sends the SMS to the vehicle to stop then the ignition stops and buzzer will give a loud alarm such that he will left the vehicle in the same location, with the help of reset SMS it will come to its original mode. The sensors used in the project is very accurate and can be configured according to the requirements thereby increasing the efficiency.

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