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Smart Automobile Security System

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***Abstract* – The proposed system is smart automobile security system that makes automobile theft almost impossible and avoid accidents. This smart automobile project is a system is connected to the ignition system and breaks. In order to start the ignition system, user has to enter his strong password. Only when the right password is entered does the ignition system start and breaks are will wore off. It will give buzzer when wrong password is entered. The buzzer stops as soon as user enters the right password. If automobile crosses its speed limit user automatically receives a message mentioning that vehicle is moving so fast. And user can warn the person about speed. He can apply breaks by using servo. If any accident occurs by using vibration sensor notification is sent to hospitals and family people with the help of cloud connecting to Node Micro Controller Unit (MCU). Using ultra-sonic sensor we can always monitor our petrol level of the automobile and if any one tries to steal petrol from vehicle you can get a quick notification and buzzer will be on.**

Keywords – Keypad, Node Micro Controller Unit (MCU), vibration sensor, servo, cloud .

I. INTRODUCTION

The proposed system in this paper is able to control the automobile, fuel theft cases almost impossible. The proposed system consists of keypad to turn on the vehicle. And provides real time monitoring system to the user. By using this one can be able to control and react with in short time to accidents. It consists of two microcontrollers and different set of sensors and actuators to complete the project.

II.PROBLEM DEFINITION

Vehicle and Fuel theft cases are increasing day by day all over the world. So, Vehicle Security system plays an important role nowadays. Most of the advanced vehicle security systems best suit the four wheelers and motor bikes. As of the security system for two wheelers is concerned, the systems available in market are of no match to the well-equipped thieves. When anyone tries to steal the automobile and fuel then this circuit will start conducting and the buzzer starts sounding. This sound indicates that somebody is trying to steal the automobile and fuel, so this circuit is used to protect the vehicles from thieves.

III. METHODOLOGY

The methodology purpose of project is to allow for controlling the entire management process through effective block diagrams making and problem solving, while ensuring the success of specific processes, approaches, techniques, methods and technologies. In this project we use two microcontroller bores to perform the operation. One is ARDUINO and the other is NodeMCU which is connected to cloud for real time monitoring.

1. ArduinoUNIO

Fig-1 Block Diagram of Arduino UNIO

2. Node Micro Controller Unit (MCU)

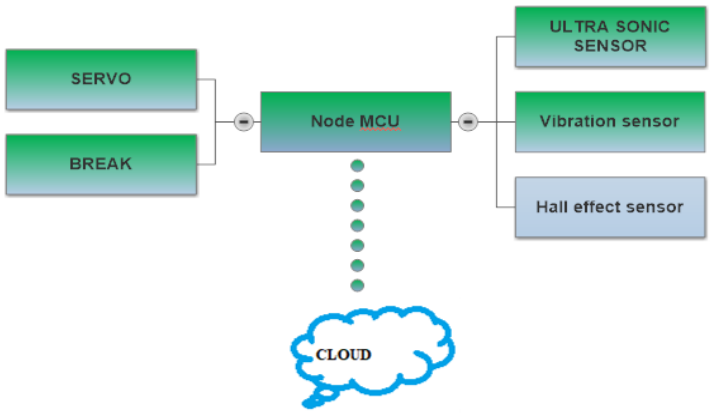

Fig-2 Block Diagram of Node MCU

IV. PROCESSES STUDY

IoT devices are becoming a part of the mainstream of proposed system is smart automobile system smart devices into their lives of people faster than ever. Growing need for real-time monitoring, tracking and automation coupled with favorable government initiatives has driven Internet of Things (IoT) market in India. Growth in the market is anticipated on account of ongoing technological developments in Internet of Things technology for providing better connectivity and coverage as well as real-time monitoring & tracking of services and systems across diverse industry verticals to reduce operational and manpower costs. Equipment used in the project are easily available in market with in a common man budget.

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The "Internet of Things" (IoT) has been around for a decade, but its adoption and implementation has accelerated just within the last several years. Ironically, its scope and definition are still not clear. Some describe IoT as the machine-to-machine (M2M) connection of things with embedded sensors or small computers over a wireless or wired network. The small computers can be programmable logic controllers (PLC) that control the opening and closing of valves, or intelligent electronic devices (IED) that enable or trip electrical circuit breakers. The project proposed here will involve some intermediate level coding techniques to run the system. Performance monitoring of cloud-native applications that consist of several micro-services involves the analysis of time series data collected from the infrastructure, platform, and application layers of the cloud software stack. The analysis of the runtime dependencies amongst the component micro services is an essential step towards performing cloud resource management, detecting anomalous behavior of cloud applications, and meeting customer Service Level Agreements (SLAs). And it includes some clouds to get notification and which also involve real time monitoring.

In this paper I have made use of different articles, journals that are previously published to get some data and information. That is able to help to complete the project successfully. It comes as an integrated ready platform which includes a Wi-Fi chip which you can connect your sensors/electronics to make them identifiable on the Internet. You can then collect and visualize the data from these sensors OR even remotely control if you have something like an appliance or any other actuator that you wish to connect. You don't need to feed in complex code for data visualization, the platforms of different cloud let you run visualizations with just a two-line script. The setup process is extremely straightforward, and just has 4 steps to combine your hardware to the cloud. The cloud comes with a developer console to configure your hardware and build a code to be deployed on your systems. If you are planning a mass deployment, a single click can remotely deploy this code onto all the hardware systems you have linked with your account.

V . INPUT PARAMETERS

Transportation system has been a part of evolving of humans. One cannot image the life without vehicles. To accommodate the vast number of population, the number of vehicles also has been increased rapidly. This also led to increased number of accidents, robberies. The accident avoidance measures used now a day are all static and old. Also, there is no proper accident detection mechanism. This study proposes Smart Automobile Monitoring System for early detection of accidents and also to prevent thefts. It uses IoT technology to monitor the vehicle continuously and also to access and control remotely. The IoT devices placed in vehicles is designed using ArduinoUNIO, Node Micro Controller Unit (MCU) that is acquainted with sensors to detect accidents and thefts immediately. The vehicle is also acquainted with a camera to find the severity of accident. To detect the severity, system uses machine learning based image classification model. When the accidents happen the system detects it immediately system will immediately inform that to the authorities. The system also acquainted with GPS system. This will allow the system to continuously keep track of vehicles location. This data will be used to find the vehicles location during an accident or theft. The results of system were promising in terms of efficiently detecting the accidents, finding the accident and also detecting the location of vehicle.

Using any existing system, one cannot control automobile accidents, automobile and fuel theft issues. Hence at least we must be able to detect accidents as early as possible. Any person or animal that is injured in an accident must be provided with medical treatment right away. Oftentimes, the people that are injured in accidents may not go for immediate medical treatment, either because of misjudging the injuries or due to the legal procedures involved in accidents. Even a person feels okay; there is no harm in being evaluated for any injuries. The main goal of this proposed in this paper is immediately detecting accident, reducing the bike and fuel theft cases with help of GPS live tracking system installed in our system. The system was not a simple system but a framework to immediately detect accidents with severity. It also helps the user to remotely check the vehicle during theft as well as real time monitoring of fuel level and speed of the vehicle. It also allows the user to locate the vehicle position from anywhere in the world. To accommodate all these, the system includes Node MCU accompanied by different sensors, Arduino UNIO module and GPS module. The overall architecture of the system framework was shown in Figure 1, Figure 2. The internal design of IoT system was shown below.

As discussed in previous section, the project uses to detect accidents immediately and smart lock system to protect your vehicle from theft conditions. As shown in Figure 2, the system has Node MCU equipped with vibration sensor, hall sensor and a camera is fixed to vehicle to collect data from vehicle. As shown in Figure 2 to on/off vehicle, the ArduinoUNIO connected to keypad connected to the ignition motor and breaks when user gives right key then vehicle will be on and breaks will wore off. If password is wrong the vehicle will be off and breaks will be on. The Node MCU module also connected with a GPS module that is used for connect with internet and send the location of the vehicle. And it helps with live tracking the vehicle which is also known as real time monitoring.
When the vehicle was stolen, the users can shut down the vehicle by locking the ignition system and by turning on the breaks to wear on by simply clicking a button in cloud user interface. Break relay switch in vehicle is connected to raspberry pi to allow the user to remotely shutdown the vehicle. And can check the fuel level and speed of the bike from anywhere at any time using real time monitoring of the system provided by cloud. As mentioned above by using mass vibration sensor we can detect the

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accident and immediate message is sent to hospital and family with the help of cloud.

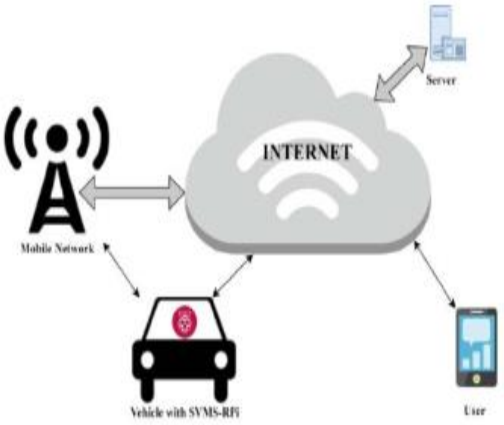

Fig.3

VI. DATA COLLECTION

1. Ultrasonic sensor: The function of ultrasonic sensor is to detect the variation in fuel level and it gives variable output voltage as per the variations in level. This ultrasonic sensor can be used for any type of liquid. So it can be used for petrol as well as diesel or in some cases it can be used for water level detection as well.

2. **Accelerometer**: An accelerometer is electromechanical device used to measure acceleration forces. Such forces may be static, like the continuous force of gravity or, as is the case with many mobile devices, dynamic to sense movement or vibrations.

3. Keypad: - User will enter the password using the keypad. Various keys of keypad are as following:
1. 0 to 9, 2. Enter 3. Escape.

4. **Buzzer or siren**: A buzzer is turned on whenever petrol theft is going on or petrol is stolen. Buzzer will be turned on as soon as there is decrease in petrol level without ignition key. Loud noise of buzzer will draw attention of persons in the surrounding so they can come to know that something wrong is happening with the bike. This can save further fuel theft.

5. **GPS**: - The GPS (Global Positioning System) is a "constellation" of approximately 30 well-spaced satellites that orbit the Earth and make it possible for people with ground receivers to pinpoint their geographic location. The location accuracy is anywhere from 100 to 10 meters for most equipment. GPS systems are extremely versatile and can be found in almost any industry sector. They can be used to map forests, help farmers harvest their fields, and navigate airplanes on the ground or in the air. GPS systems are used in military applications and by emergency crews to locate people in need of assistance.

6. **Microcontroller**: - Various functions of microcontroller are: i)To read the data from Ultrasonic sensor ,Hall effect sensor and Mass vibration sensor are collected to Node MCU micro controller which receives data from sensors and sends all the data to cloud as shown in Figure 3. ii) To check the pass key the keypad is connected to the Arduino. iii) To alert the user buzzer is also connected to Arduino if any wrong key is given.
iv)To turn on buzzer if the liquid level crosses threshold value. v) To send notification when there is change in liquid level, change in speed of vehicle notification is sent through cloud connected to the sensor by using Node MCU microcontroller

7. Vibration Sensors:- Vibration Sensor are sensors for measuring, displaying, and analyzing linear velocity, displacement and proximity, or acceleration. Vibration however subtle and unnoticed by human senses is a telltale sign of machine condition. Before taking a vibration measurement, you need to attach a **sensor** that can detect vibration behavior to the machine that is being measured. ... An accelerometer is a **sensor** that produces an electrical signal that is proportional to the acceleration of the vibrating component to which the accelerometer is attached.

8 Hall Effect:-The Hall effect sensor works on the principle of the Hall effect, which states that whenever a magnetic field is applied in a direction perpendicular to the flow of electric current in a conductor, a potential difference is induced. This voltage can be used to detect whether the sensor is in the proximity of a magnet or not. The Arduino can detect this voltage change through its interrupt pin and determine whether the magnet is near the sensor or not. The basic working of the Arduino Hall effect sensor is shown in the picture below. Using this sensor we can calculate the speed of the vehicle. And data is shown in cloud we can check and send notification to the person driving the vehicle.

9. Servo:- Servos are controlled by sending an electrical pulse of variable width, or pulse width modulation (PWM), through the control wire. There is a minimum pulse, a maximum pulse, and a repetition rate. A **servo** motor can usually only turn 90° in either direction for a total of 180° movement. With the help of servo we are able to control breaks of vehicle .When the user give write password breaks will wore off. And when vehicle cross its speed limit with the help of cloud we can apply breaks.

10. Breadboard:- A breadboard is a solder less device for temporary prototype with electronics and test circuit designs. Most electronic components in electronic circuits can be interconnected by inserting their leads or terminals into the holes and then making connections through wires where appropriate.

As mentioned above with the help of sensors , microcontrollers the proposed system smart automobile system can be constructed .For Arduino we add Accelerometer , Keypad is given as input and out-puts

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actuators are buzzer , Ignition coil and servo to control breaks to give all the connections we are using breadboard for connections as shown in FIGURE-3. Keypad is connected to port pins directly.Our second microcontroller is Node Micro Controller Unit we add ultrasonic sensor, Mass vibration sensor and Hall Effect sensor as inputs for the controller for output we add servo to control breaks and cloud is added to send notification and store data to analyze and send notification to send notification. The cloud is connected to Node Micro Controller Unit with the help of Wi-Fi connections are shown in FIGURE-4. With the help of cloud app in user mobile user can get notification and send message to hospital and family working process of the cloud is shown in FIGURE -3.

VII .DATA COLLECTION:-

1. ARDUINO CIRCUIT DIAGRAM:-

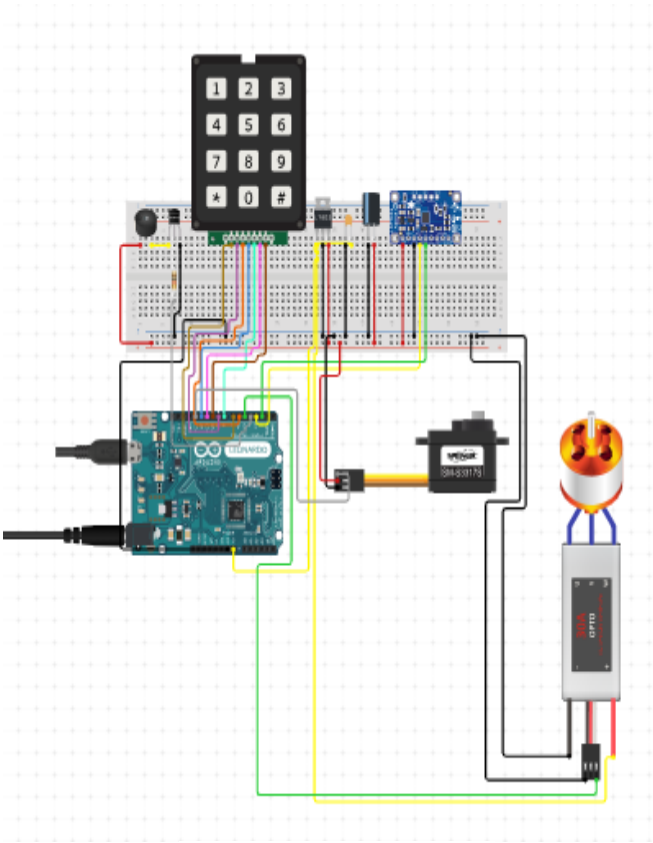

Fig.4 Arduino UNIO circuit diagram

Connections are given as per the circuit diagram. Keypad consist of eight digital pins and they are connected to ArduinoUNIO pins 3, ArduinoUNIO pins 4 ArduinoUNIO pins 9, ArduinoUNIO pins 6, ArduinoUNIO pins 7, ArduinoUNIO pins 8.Buzzer negative is connected to TSBC337C and buzzer positive to Bus POS . Transistor is connected across in order to switch the electrical supply. One pin of transistor is connected across the buss ground and one pin is connected to buzzer. Circuit diagram also consists of 1Ω resistor connected across ArduinoUNIO pins 2 and ground. We used brush less DC motor for ignition coil and its pin is connected to ArduinoUNIO pins 5 and it's ground, pin GND is connected to the Bus GND. Servo vin is connected to Bus POS and its data pin is connected to ArduinoUNIO pins 11, its ground is given to GND pin, out pin of servo is connected to ArduinoUNIO 11 pin. In addition we are adding the voltage regulator Vin to ArduinoUNIO Vin, with the help of bread board we are connecting voltage regulator Vin to ignition coil and capacitor, its ground is connected to the ground and Vout to Bus POS. In between we add capacitor to the bread board and for balancing voltage we need to add 12V voltage supply to the ArduinoUNIO.

2. NodeMCU CIRCUIT DIAGRAM:-

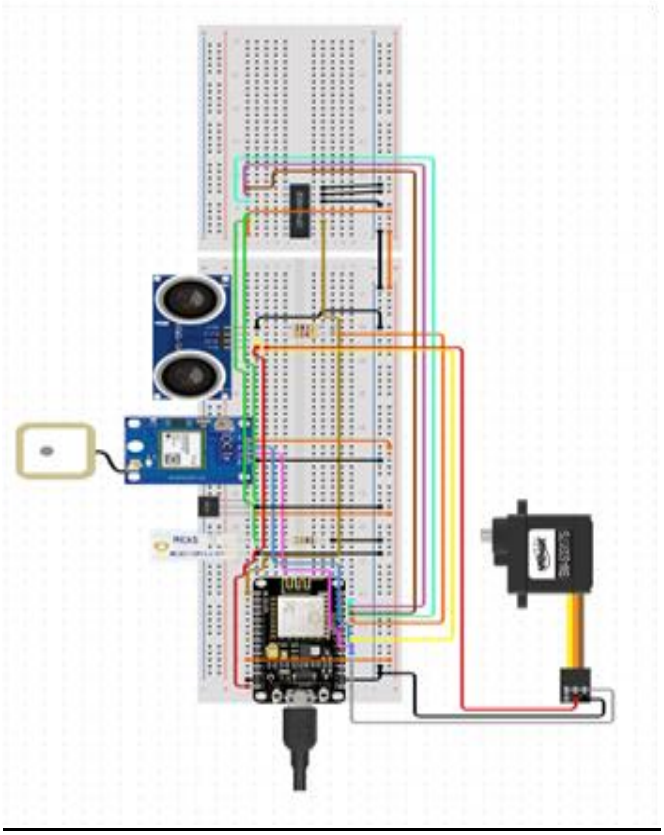

Fig.5 Node MCU circuit diagram

First place NodeMCU on bread board flowingly add vibration sensor to support it add 1Ω resistor. NodeMCU GND is connected to Bus GND, Bus POS is connected to NodeMCU 3V pin. Servo GND is connected to Bus GND, it's out-put to NodeMCU pin D8. Connect vibration sensor ground to its ground , its out pin to connected to 1Ω resistor which is inter connected with DATA sheet , the other end of the resistor is connected to the ground . Add Hall Effect sensor to the bread board and its Vcc to Bus POS, GND to BusGND, it's Vout to DATA sheet. Connect GPS to the circuit by connecting its GPS GND to Bus GND, GPS RX to NodeMCU D7, and GPS TX to NodeMCU D6. Connect ultrasonic sensor GND to Bus GND, sensor TRIG pin to NodeMCU D5 and its VCC to NodeMCU Vin, finally connect its Vcc to servo Vin. Add two resistors parallel to each other and they are connected to NodeMCU D4 pin. And other both ends of the resistors are connected to ultrasonic sensor. The data sheet analog pin is

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connected to the analog pin of the NodeMCU A0 , it's E0 to Bus GND , it's GND to Bus GND , it's Vcc to Bus POS , Vee to Bus GND , similarly it's S0 to D1, S1 to D2 and S2 to D3 . Finally using USB port to give supply connect your PC to NodeMCU and upload your program through cable.

IX. IMPLEMENTATION:-

The system can be implemented in in all automobile transportation systems. the system software components are designed using open source software. The image classification model was implemented in a Arduino , NodeMCU server with help of cloud . The notification application was sent by the same cloud. The IoT device is built with NodeMCU, Arduino UNIO with Accelerometer and Impact Sensor as shown in Figure 2 , Figure 1. The NodeMCU also connected with GPS modules. The NodeMCU, Arduino UNIO was loaded with programs that comes with cloud interpreter. All the components, that are connected to NodeMCU were accessed and controlled by Arduino programming language. The system was installed in a small automobile and tested. The results of the system show promising results. When a vehicle equipped with this system, the user need to support the system with internet connection and user should have a cloud application to get data. When an accident happens, the system will detect the accident and will send a message to the registered mobile numbers like police, hospital, family members etc. as shown in Figure 3. When the vehicle was stolen, the user can track the vehicle location, and can control i.e. switch off the vehicle's break by clicking the button in user interface.

XI. FUTURE DEVELOPMENT AND APPLICATONS

Future Development:

1. We can provide voice feedback system.
2. We can add some advanced sensor to the car or bike. In case when the bike or car locked and somebody is try to open the door or open the bike lock then vibration will be produced and vibration sensor can sense this vibrations and turn on the buzzer send alternate messages to owner and police station.
3. In future it includes auto-driving system where we can reduce the accident rate.

Applications:

1. It can be used in all kind of automobile.
2. Smart lock system can also be used to secure house

XII CONCLUSION :-

The Project has multiple scope in future which is yet to be found. The project aims to serve the society in as many ways as possible. Thus the project is a combined effort of various departments of engineering to solve a particular problem. Further the product can be combined to a single integrated system and be used in many aspects and departments to solve major problems of the society.

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