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Anti-Theft Security System for Two-Wheelers

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ABSTRACT

In this research work a new system is introduced for the security of a two-wheeler to safeguard from the theft. This system works by using Arduino UNO, Web page/Android app to access the system. There are lots of security systems available in the markets which are easily detectable and hackable by the thieves, but the proposed system is superior as it works on the remote by GPS (Global Positioning System) and GSM (Global System for Mobile). Through this system, we are providing efficient security for two-wheeler in the unknown area or in the dense parking areas. To find the position of the vehicle, a GPS module is used, which shows that the two-wheeler is moved from its standstill position. By using the key relay, the two-wheeler engine can be switched off in case of the theft and accurate location of the vehicle by the GPS module can be traced. All categories of people can be benefited by this innovative product system, as the cost of the product is affordable to all.

I. INTRODUCTION

In current situation the two-wheeler thefts are happening very often and its going on increasing. Our security also always trying to arrest them and to trace the criminal. The criminals who are involved in stealing the two-wheeler have possessed many techniques in themselves to do within a short time. Even the two- wheelers are smuggled to other nations as soon as possible by the criminals. In many ways it is also difficult to trace the criminals and to catch them.

Wireless remote control for motor cycle security system development of device has going to develop in the way of two- way communication between the owner and motor cycle. Through this device we are providing efficient security to two-wheelers in the dense parking area, which can be accessible through the mobile device.

The motor cycle owner needs to have this innovative device, which has the capability to prevent their motorcycle and it certainly alerts violations in case of the theft. As everyone knows, the existence of all the locks cannot prevent their motorcycle from the thieves.

Remote alert will be provided in the case of any violation like bike finding and anti-hijacking. Thus it takes immediate action when the two-wheeler is hijacked and it reduces the man power.

II. LITERATURE SURVEY

Recently many researchers did their work related to anti-theft security system for vehicles. Few of the contributions are referred and it is mentioned below:

"Two Wheeler Security System" Shweta K. et all [1] Proposed a security device for the two-wheeler to prevent against the theft is represented. A Wi-Fi module is introduced and it can be access through an Android app or web page. Recently number of security system is available in the market using Global Positioning System (GSM) or Global System for Mobile (GPS) module which is easily hackable & detectable by thieves. In this project sufficient security system for two-wheelers are provided to overcome the above problem. In the dense parking area also, where the two- wheeler are parked, the protection is provided in this innovative device. Tilt sensor is used for sensing the position of the vehicle, by using that we can find the two-wheeler is moving or in the side lock position.

Prashant kumar, Sagar V.C et all [2] Stated that a number of stolen vehicles are increasing; hence the vehicle tracking system is getting vast popularity. Driving in the places where there are no securities, to park the vehicles, theft is happening often. GPS and GSM are attached and installed with microcontroller and with the single board embedded system, to detect the theft the concept is explained clearly in this paper. By using GPS and GSM modules we can find and the receive the exact location of the system.

S. Amal Dhasan & J. Manikandan[3], explained in their paper about anti-theft wheel locking system to lock the wheel. Here, a solenoid switch is mainly used to lock the front wheel. Plunger is powered by the battery for power supply which is used to control the motion. Drum brake is attached with brake lever to enables the function. The Drum brake will activate when the ignition key is in off stage. The main problem is to control the solenoid to control the wheel when the ignition key is OFF condition. If the theft is happen the microcontroller should do the action sensing the front wheel motion and it should activate the solenoid action.

G.S. Prasanth Ganesh, B. Balaji, T.A. Srinivasa Varadhan[4] represented in their paper about the security of two-wheelrs. The security is different from the other security devices. Without using GPS module and by using the GSM technology here the explanation is given. Hence, it would be the cheapest anti-theft security system for vehicles. By comparing with other Anti-theft system it is a very small kit consists of several components and mainly GSM module. The device can be switched ON and OFF by sending Short message service (SMS) from the owner of the two-wheeler by using microcontroller and also used to receive the exact location of the device and more. At final the microcontroller activates the GSM module and it will send the text message to the owners of the mobile through the nearest base stations. By using time gap between the every successive message by the microcontroller it can find the location of the device.

Mrinmoy Dey, Akteruzzaman Arif and Asif Mahmud,[5] Explained about the tracking of vehicles while driving in an insecure place and on parking areas. This product is worked to safeguard the two-wheelers from the thief and to give more security for the two-wheeler. GPS (Global Positioning System) and GSM (Global System for Mobile) are attached and installed with microcontroller and with the single board embedded system. By using GPS and GSM modules we can find and receive the exact location of the system. To ensure whether the system is driving by the correct person or not the fingerprint verification is used. The system implemented is very cost efficient when compare to the other devices and provides greater security for two-wheelers.

Shruthi.K, Ramaprasad.P, Ruschil Ray, Manjunath A. Naik, Shubham Pansari[6] In this era the vehicle theft is very high all over the world and the situation makes the worse in developing countries like India. So the protection and reliable of the vehicles are more important. Now most of the devices are used with false alarm, easily detectable or deactivated easily and that also having high cost. In this article security for two-wheeler is designed and using sensor network like GSM (Global system for mobile) and GPS(Global positioning system) used to find the location and transfer the data by the GSM module to our Base network and this process and all capable of doing this in a minute.

III. OBJECTIVES

The objective of the proposed work is to detect the theft of the two-wheelers using an Arduino UNO. The two-wheelers are one of the expensive assets that a common low privileged person can own. The innovative product system that we are implementing as a part of this project is beneficial to a significant number of people because it is incredibly safe for vehicle users. It reduces the man power and helps to find the criminal easily who have stolen the two-wheeler. Thus, by installing this relatively inexpensive, readily available innovative product system on a two-wheeler is much greater protection and exclusivity can be accomplished than with a traditional lock and key.

The objectives of the project work performed are as follows:

- To implement the Antitheft Security System for Two Wheelers.
- To Implement the Embedded C Software in Arduino.
- The Hardware demonstration in the real time scenario.

IV. METHODOLOGY

Vehicle theft and traffic injuries are on the rise. Two-wheelers and motor vehicles owners are the most affected victims due to these robberies and injuries. The complete protection for two-wheelers or motor vehicles is a revolutionary idea proposed in this scheme. The vehicle's accelerometer is used to warn the driver when the side lock is broken or when the driver is involved in an accident. A relay is often used to cut off the ignition from the spark plug, and a Global Positioning System (GPS) and Global System for Mobile (GSM) communication is used to warn the user by sending a message to the mobile if theft or accident occurs.

4.1 Materials and Protocols:

Arduino:

It's a type of microcontroller. which we use to dump the program and to control all other units. The 5-12V supply is given to the Arduino and the Arduino ground are connected to GSM, GPS ground. Tx and Rx pins of Arduino is connected to Tx and Rx of GSM module and other pins are connected by the Embedded C program. When the Arduino gets power supply the entire unit gets power supply according to the connections. The Arduino which alerts or calls the others to do the inbuild process of the circuits.

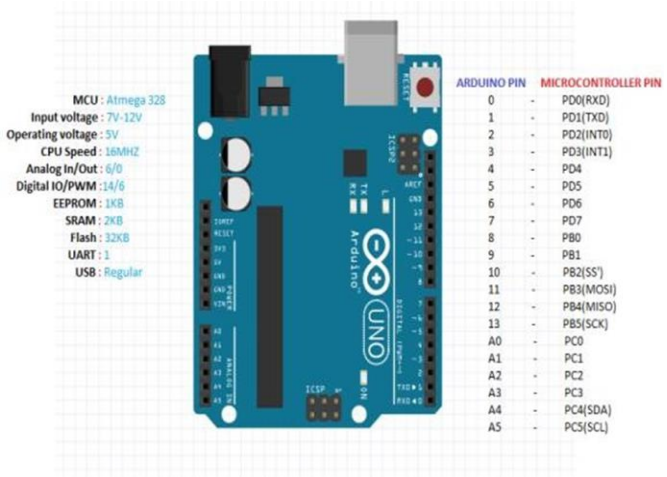


Fig.5.2.1 Arduino

GSM:

It's a device used to send and receive the messages by the IC SIM900A with sim slot. The Arduino calls the IC SIM900A which is in build in the GSM module. Codings are already dumped in the IC SIM 900A. GSM is a two way path which receives and sends the signals from the Arduino.

Fig.5.2.2 GSM module

GPS:

It's a device use to locate the correct latitude and longitude and shares the location via GSM module. The GPS has only four pins ground, Rx, Tx, Vcc. The Tx and Rx pins are connected to 3rd and 4th pin of the Arduino. When GSM receives the signal and it send to the Arduino and the Arduino calls the GPS and the GPS gets the latitude and longitude points. After that it sends the points to the Arduino.

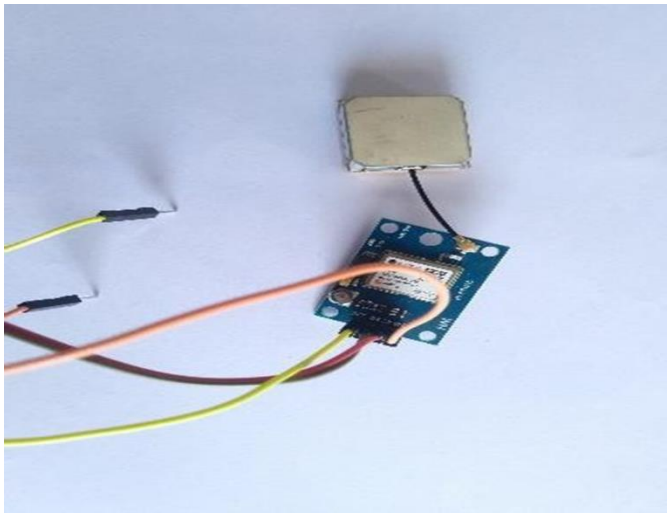


Fig.5.2.3 GPS module

Driver Circuit:

The driver is defined as the electrical circuit which shall be used to control another circuit or component. The driver can be used for a specialized computer chip which will control the high-power transistors in AC to DC voltage converters. Driver circuit is an operated device. It can be used to Off or On the motor.

Fig.5.2.4 Driver circuit

4.2 Hardware implementation:

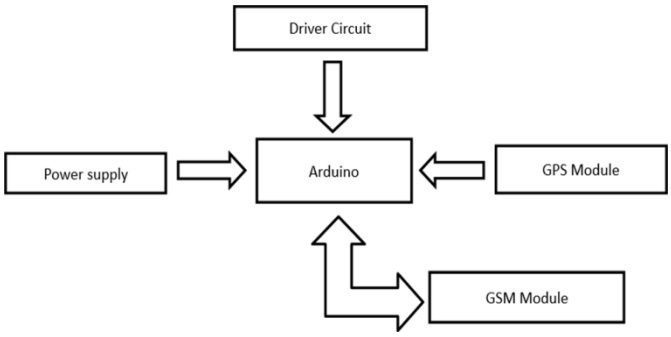
- Connecting hardware modules like GSM GPS to Arduino UNO Board.
- Implantation of this device to the two wheelers.

4.3 Software implementation:

- Create the program
- Compile the program and dump the Program in the Arduino UNO.

NAME OF THECOMPONENTS	SPECIFICATIONS
Arduino UNO	5V,40mA
GSM 900A	12V,1A
GPS	5V
Driver Circuit	4V

Table.1. Component details



Block diagram

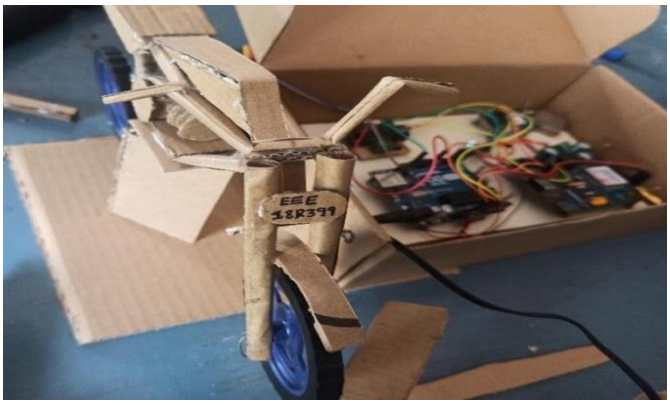
4.4 MAJOIR DESIGN CONSTRAINTS

The following are the constraints to be considered in this work

- GPS delays due to the temperature
- Uninterrupted Power Supply
- Stable Internet Connection
- Controlled Environment
- Periodical Maintenance of device

V. RESEARCH IMPLEMENTATION

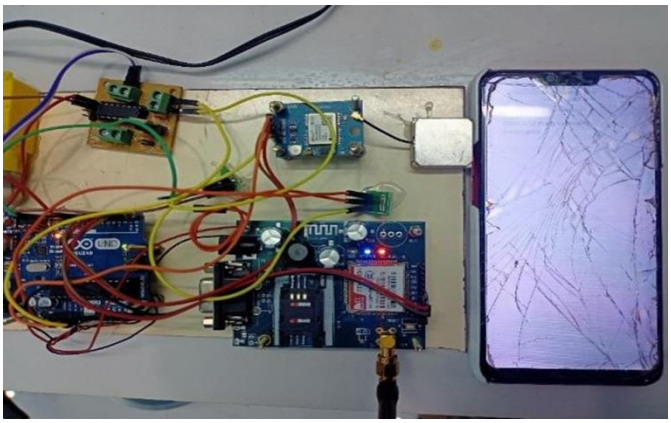
For demonstration of the project in real time, it has planned to setup an innovative product system in the side of the fuel filling tank position of the two wheeler vehicle. When the engine starts then the Arduino will sense and send the signal to the GPS module, it will find the latitude and longitude then the data will transfer to the Arduino then to GSM module by that we will receive the message to our mobile phone. By using Google map we can find the location of the vehicle. Then in order to send the message that OFF or ON by the mobile is given, and it will be received by the GSM module so that the driver circuit activates and off the engine and again he/she who have stolen the two- wheeler can't start the engine.



Hardware Implementation

Process:

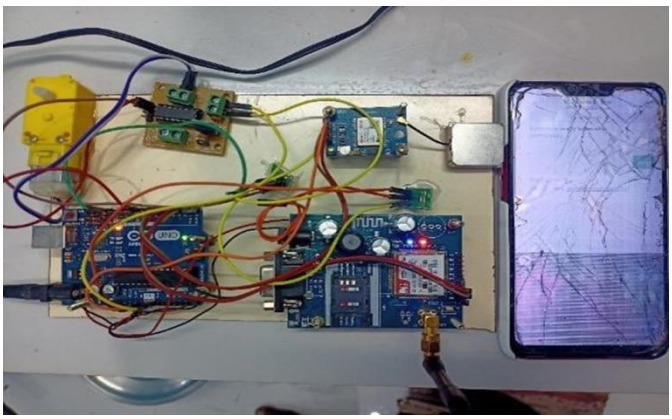
The Arduino gets 12V power supply. System starts to work and receives a message that system is ready to receive the commands.



Power supply

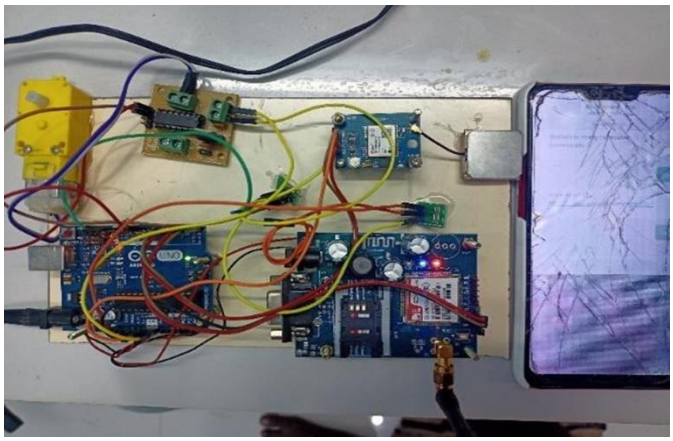
Location transfer process:

Using mobile (/on/) signals can send, then the GSM gets the signal and the Arduino start to fetch the latitude and longitude and it send to the co-ordinates of the mobile using GSM module.



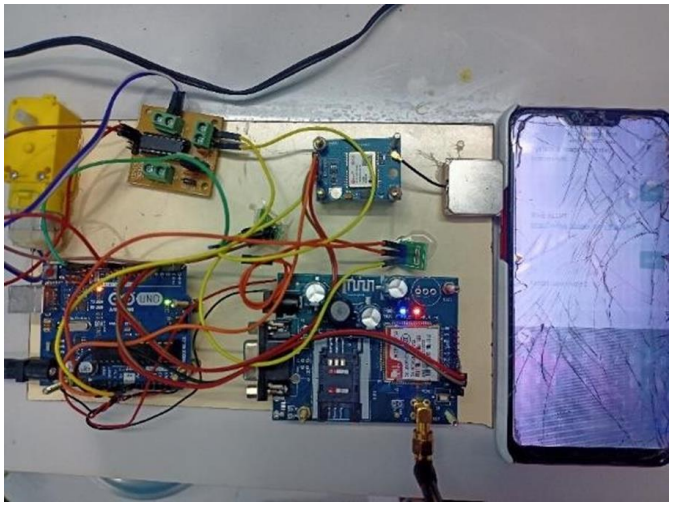
GPS Coordinated values

Sending and receiving message process (/on/) motor starts to run (/off/) motor stops.



Motor switched off circuit

After the motor gets turned off, the Arduino calls the GSM and Message receives that the Motor is deactivated.



Receiving Message

VI. CONCLUSION

This paper gives the solution to prevent their two-wheelers and it certainly alerts in case of the theft. The project mainly focused on persons using the two wheelers for their job and other purposes. Often the available locks in the two-wheeler cannot prevent from criminals but the proposed project work provides safety for the two wheelers. The survey from the people helped a lot to develop the hardware cum software for the implementation of the project in the real time. All categories of people can be benefited and thus it reduces the manpower.

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