

## TWO WHEELER SECURITY SYSTEM

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**Abstract** - In this paper, a new device is proposed for a security of a two-wheeler from theft. This device works on the Wi-Fi module, which can be accessible through a web page or Android app. There are lots of security systems available in the market which are easily detectable & hack able by the thieves, these systems work on the remote control or GPS or GSM. Through this device, we are providing efficient security to two-wheeler; this device also has a feature of finding the two-wheeler in the dense parking area. For sensing the position of the vehicle, we are using tilt sensor, which shows that two-wheeler has been moving from their still or bending position.

**Key Words:** Two-wheeler, Security, ESP12E, Relay, System

### 1. INTRODUCTION

In the modern era, the security of each & everything is the vital role and the security of two-wheeler or bike is one of the important parts. Typically the bikes are stolen from streets or parking lots. By the time people, understand the situation the vehicles are made underground leaving almost no traces. To come out of the problem, there is only of implementation of a security system in bikes. Currently, the security systems available for two-wheeler are very costly. So the bike companies are not able to implement the security system as it increases the total cost of a two-wheeler. So it is necessary to design the security system for a bike which is less costly & easily usable for every person. The device, we have designed for the security of the two-wheeler has ESP8266 microcontroller, which has prefabricated Arduino board with inbuilt Wi-Fi module, this Wi-Fi module can be accessed through the HTML web page or Android app from the mobile phone. This web page or Android app controls the ignition of the two-wheeler, head light & side indicators of two-wheeler.

### 2. LITERATURE REVIEW

In [1] this paper, GSM and GPS technology are used. Two-wheeler position is obtained by GPS module this data is

given to microcontroller hardware which sends message to user mobile phone through GSM module.

In [2] this paper, system alerting owner by SMS to user whenever theft attempt, allowing user to control vehicle remotely by SMS also provide engine immobility and alarm.

In [3] this paper, hardware is implemented to prevent theft from stealing vehicles and fuel of vehicle. About an theft attempt owner is alerted by SMS allowing user to control system remotely.

In [4] this paper, proposed design uses Global Positioning system (GPS) and Global system mobile communication (GSM). System constantly watches a moving Vehicle through GPS and sends data when demanded. About a theft attempt, we have to send SMS to the microcontroller, then microcontroller issue the control signals to stop the engine motor. Then we have to reset the password and restart the vehicle.

### 3. DESIGN OF THE SYSTEM

#### A. Block Diagram

The block Diagram of two-wheeler security system is shown in figure (1). It consists of an ESP8266 12E module, DC to DC Buck converter, battery, Tilt sensor, Relay Driver (ULN 2003 IC), Five Relay Unit and web page of Wi-Fi module. As per the requirement of the user, the action commands are given by a user to the ESP8266 12E module by the medium of the web page. ESP8266 is often integrated with some other devices through its GPIO pins and appropriate codes should be provided for such external application. Here its GPIO pins 16,13,14,12 are utilized for the output to operate the relays. Relays are used as a remote-control switch. This all relays are switched by Relay Driver (ULN 2003 IC). As the ESP8266 12E required 3.3 V to operate but supply is of 12 V coming from bike's battery. so we used DC to DC Buck Converter, it will step down the voltage 12V to 3.3 V as per requirement.

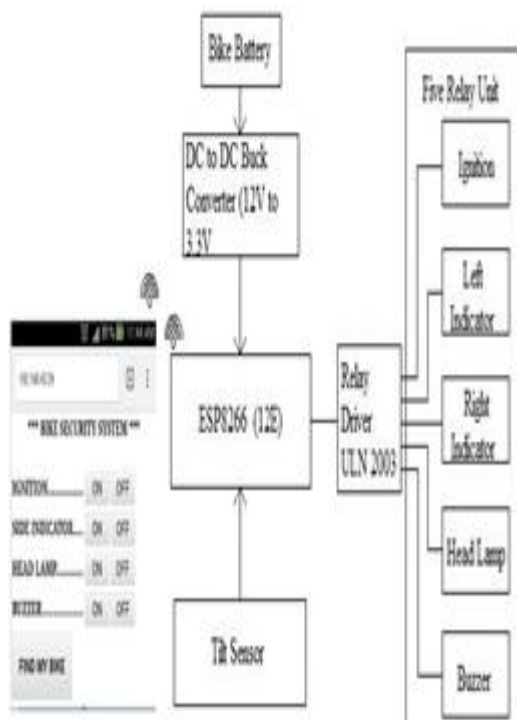


Figure1. Block diagram of two wheeler security system

## B. Hardware Implementation

The Hardware operates such as if the implemented circuitry is ON, then user required two conditions to be satisfied to start the bike as firstly it will check ignition switch is open of the bike then it will check user are also turning ON bike through the medium of our mobile application. if these conditions are satisfied then we can operate the bike otherwise it will not start the bike but it will start to a buzzer. In hardware implementation mainly we have concentrated on following components-

1. Relay: -The relay is a device which functions as an electrically operated switch. It operates in response to an electrical signal, the relay open or closes its switch contacts. When a voltage is applied to the coil of relay then it will magnetize the yoke. Due to this, armature move towards the yoke. This result in the armature opens the NC contact and closes the NO contact. We are using five relays of Single pole double throw as one NC type and others NO type. Available D.C relays have standard operating voltages of 6V to 110V and A.C relay have 6V to 240V. The D.C electromagnetic relays are faster than A.C relays.

2. ULN2003 RELAY DRIVER IC: -ULN2003 IC is used to drive the relays.ULN2003 contain NPN transistors as seven Darlington pair of transistors which have high voltage and high current-carrying capacity. This means ULN2003 IC can drive seven relays at once and in response to its output microcontroller provide high or low

signals to relays. A diode is used in each Darlington pair of transistors which makes is easily used with an inductive load. We can also use ULN2003 IC as a motor driver circuit, relay driver circuit, lamp driver, line driver and many others.

3. DC to DC Buck Converter: -Buck converter is a step-down converter it will step down the voltage when it will stepping up the current. It is a switching mode converter not of linear type. As per requirement, it will step down voltage 12V to 3.3V.we are using monolithic control circuit provide features such as 3V to 40V input, low standby current, frequency operation up to 100KHZ, output voltage adjustable.

4. Tilt Sensor: -Tilt sensor measure tilting of an object in which it is placed with axes of the reference plane. ESP 12 E is pull up the tilt sensor pin whenever tilt sensor operate it will ground the corresponding pin and which is recognized by ESP 12 E. It also used for indicating pitch and roll of boats and aircraft.

5. ESP 12E Wi-Fi Module: -The heart component of our hardware is ESP 12E Wi-Fi Module which is developed by Ai-thinker Team. It has low power consumption which is applicable for IOT's and mobile devices. It provides the features such as Wi-Fi 2.4 GHZ band and supports Wi-Fi protection access with pre-shared key and smart link functions, integrated with 10-bit ADC, TCP/IP Protocol stack, TR switch, balun, LNA, power amplifier, PLL, regulators, power management unit.

## C. Software Implementation

ESP 8266 is the Wi-Fi module & micro controller unit which will be programmed through Arduino software. The Arduino board is designed in such a way that it uses microprocessors & controllers of different types, these boards have digital & analog I/O pins which are used to interface with other circuits. The Arduino board has Universal Serial Bus & serial communication interface; these are used for loading programs from other computers. The microcontrollers are typically programmed using a lingo of features from the programming languages C and C++. Arduino project provides an integrated development environment (IDE) based on the Processing language project which uses the traditional compiler tool chain.

## 4. FLOW CHART

Flow chart of two wheeler security system has shown in the figure 3. This flow chart explains the process of the security system. To start the two-wheeler check whether the Wi-Fi is connected or not, if connected than start all the functions available on the webpage or android app, if

Wi-Fi is not connected & somehow the ignition switch is on than the indicators start blinking & buzzer will start. Again if Wi-Fi is not connected & someone tries to tilt the two-wheeler than side indicators & buzzers will start blinking.

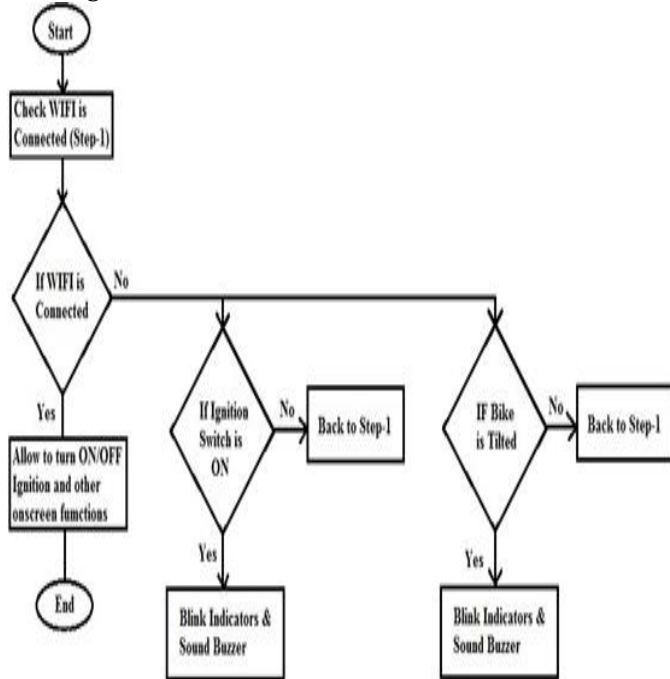


Figure 2.Flow chart of two wheeler security system

### 5. EXPERIMENTAL PROCESS

To start the two-wheeler, we have to open the web-page or the android app. Now, owner has to check the Wi-Fi connection, if it is on than press ON switch on the web page for ignition & than



Figure 3.Two wheeler security system device

Switch on the two-wheeler with the key. Now, start other options available on the web page or android app if required. Now, if the owner is not in the range of the Wi-Fi & someone tries theft the two-wheeler, than tilt sensor will be activated & buzzer will start. If owner has parked the bike/two wheeler in the dense parking & wants to search it, than owner just have to be in the range of WI-FI & press search my bike button on the webpage or android

app, which will start the indicators of the bike/ two wheeler & owner will easily get position of the vehicle.

### 6. APPLICATIONS

- Lock and unlock the bike via Wi-Fi.
- Search the bike in a huge parking lot.
- Alert the surrounding people that somebody is try to theft the bike. For this function it uses:
  - a) If somebody try to move/lift the bike.
  - b) If somebody try to ON ignition using duplicate/fake key.
- The most useful application of this system is nobody will use the bike other than the authentic user.

### 7. CONCLUSION

This project covers all security functions like tilt sensor, when somebody tries to move the vehicle or if WIFI is not connected to the authentic device and somebody tries to ON the ignition the system will sound a buzzer. It is designed and implemented with ESP-12E MCU with embedded Wi-Fi. And it is programmed with Arduino IDE. The programming as somewhat complicated because of HTML web page contains required to include. The main motto of bike security system is to prevent the bike from the unauthenticated handling and prevent stolen off the bike. This bike security feature plays the much more important role in day to day life in future. This project is more user-friendly and reliable.

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