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ANTI THEFT SYSTEM FOR MOTORCYCLE USING BLUETOOTH

[1]Asif Shahkutty, [2]Aswanth B Sujan, [3]Abhay R, [4]Asif Suhail M N, [5]Afran N

[1]Assistant Professor, [2]Student, [3]Student, [4]Student, [5]Student

[1]Dept. of Electronics and Communication,

[1]ACE College of Engineering(Affiliated to APJAKTU), Thiruvananthapuram, India

Abstract: This project is an idea to prevent bike theft and lost keys by using Bluetooth technology to integrate bikes with Arduino modules and mobile phones. When the user removes the key from the bike and the distance between the phone and the key exceeds a certain limit, the buzzer in the system will sound, thus we will receive a warning and the ignition system will turn off.

Index Terms **- Arduino, Mobile Phone, Bluetooth, Buzzer, Ignition System**

I. INTRODUCTION

The anti-theft device or system we show is based on Bluetooth technology and is used by the Arduino Uno module. Although anti-theft devices such as touch locks [3] are already on the bike, we see the potential for bike theft.

That's why we put a simple Bluetooth system that will prevent bike theft. It uses Bluetooth technology to integrate bike keys with Arduino modules and mobile phones to prevent bike theft and key loss.

Through this project we propose motorcycle anti-theft system; This way, if the owner leaves the key [9] on the bike and the distance between the phone and the key exceeds a certain limit, the system gives an audible warning... a buzzer so that the vehicle owner can be notified. It is done by integrating the Arduino module with the Bluetooth of the owner's phone.

We focus on motorcycle theft using the master key. Thieves use "master keys" to carry out theft operations. These keys are made at home using sharp and molten metal as per their needs. The defendant reached the bike and used his hand to insert the key into the navigation lock, thereby disabling the system.

II. HARDWARE REQUIREMENTS

2.1 Arduino Uno

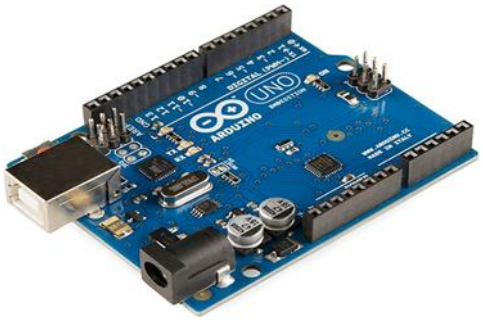

Figure 1: Arduino Uno board

Arduino Uno is an open microcontroller board based on the Microchip ATmega328P microcontroller developed by Arduino.cc and first released in 2010. The board is equipped with digital and analog input/output (I/O) pins for connecting to various expansion cards (shields).) and other circuits.[1,4] The board has 14 digital I/O pins (6 of which can output PWM), 6 analog I/O pins and can be powered using the Arduino IDE (Integrated Development Environment) via a type B USB cable. It can be powered by a USB cable or another 9-volt battery, but it accepts voltage from 7 to 20 volts. Similar to Arduino Nano and Leonardo.

Any of the 14 digital pins and 6 analog pins on the Uno can be used as input or output under software control (using the Pin Mode(), Digital Write() and Digital Read( ) function).[8,12] They operate at 5 volts.

2.2 Bluetooth Module

Figure 2: HC-05 Bluetooth module

HC-05 is a Bluetooth module [6,11] that can be used to provide wireless communication between devices or microcontrollers. It can operate in master mode or slave mode and can be configured using AT commands.[10]

2.3 Buzzer

Figure 3: Buzzer

A buzzer is a simple but effective electroacoustic device designed to produce a distinctive buzzing or beeping sound. Buzzers are often used as audible indicators or sirens to detect special events or conditions in various electronic and electrical systems. [2,5] They have vibrating diaphragms, or piezoelectric elements, that produce a loud, visible sound when activated by electric current. [7,13] Buzzers are used in many applications including household appliances, industrial machines, alarm systems and electronic games. The simple design and reliable operation of buzzers have made them an essential part of daily life, providing a simple alarm to convey messages or warn of certain situations

2.4 Relay Module

Figure 4: Relay Module

Power relay module is an electrical switch made by an electromagnet. The electromagnet is activated by low voltage from the microcontroller. When activated, the generator kicks in to turn the circuit on or off. [14,15]

A simple relay has a soft metal core or coil wound around the solenoid; The metal yoke gives a negative path to the magnetic relay module. load. They are often used to control lights, motors, and other high-energy devices and can be controlled by a variety of signals such as switches, sensors, or microcontrollers.

III. SOFTWARE REQUIREMENTS

3.1Arduino IDE 2.0

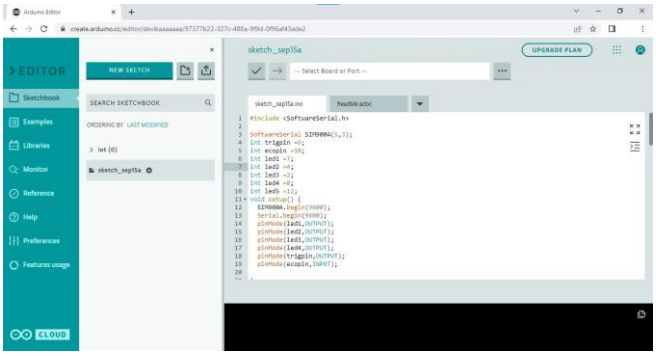

Figure 5: Arduino IDE user interface

On October 18, 2019, Arduino Pro IDE (alpha preview version) was released. A beta preview was subsequently released on March 1, 2021, and was renamed IDE 2.0. The system still uses the Arduino CLI (command line interface), but improvements include further job enhancements, autocomplete support, and Git integration. The front end of the application is based on the Eclipse Theia open source IDE. Acronyms and Acronyms

Behind the scenes, Arduino IDE 2.0 improves the runtime and in-app updates for our boards and software libraries. Speaking of updates, Arduino IDE 2.0 can also be updated from the app, saving us the trouble of downloading the latest version from the Arduino website.

3.2 Application developed for the system

Figure 6: Developed application user

We created an app for the working of our anti-theft system using MIT App Inventor. We named the app PROJECT EDEN.

It is used to know whether our phone is connected to the Bluetooth module of anti-theft system or not.

We gave an option to change the background of the user interface.

The reason we created this app is that the apps available in online platforms like Play Store do not have auto re-connect feature.

3.3 MIT app inventor

Figure 7: MIT app inventor logo

MIT App Inventor is a web application that allows you to create applications for Android and iOS devices using a visual programming environment. You can drag and drop blocks of code to create the functionality and appearance of your application. It is managed by the Massachusetts Institute of Technology (MIT).

IV. FLOWCHART

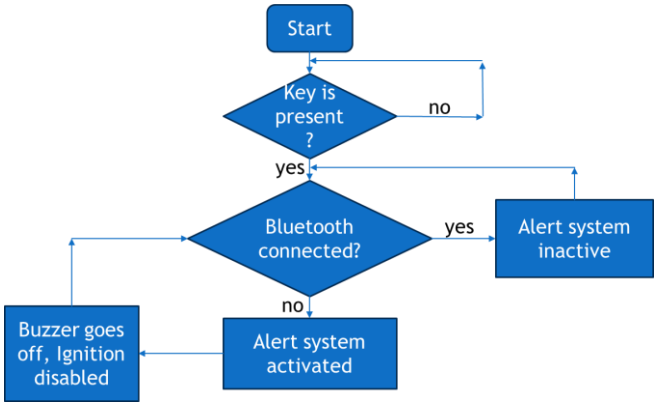

Figure 8: Flowchart of the system

V. WORKING

The system is activated only when the key is inserted.

Case-1: If the mobile phone of user is within the range of the Bluetooth module of anti-theft system, then the app will show 'connected' and buzzer is not activated and ignition system of the user's vehicle will function.

Case-2: If the mobile phone of user is out of the range of the Bluetooth module, then the app will show 'disconnected' and the buzzer goes off, alarming or alerting the user. The ignition system is also disabled by relay module.

When the mobile phone enters the range of the Bluetooth module again, the app reconnects the phone with the Bluetooth module, deactivating the buzzer and reactivating ignition system.

VI. RESULTS

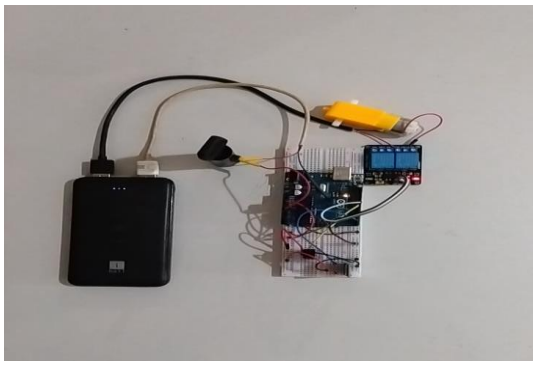

Figure 9: Anti-theft system construction

Figure 10: Anti-theft system on, buzzer activated

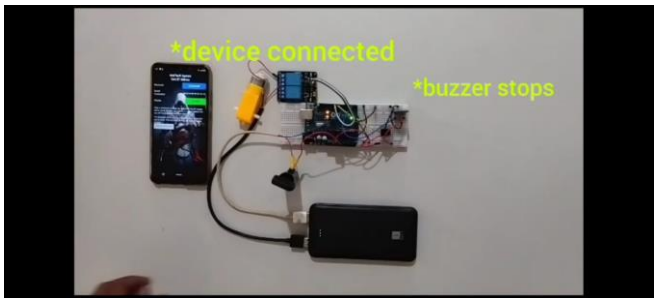

Figure 11: Device connected, buzzer stops

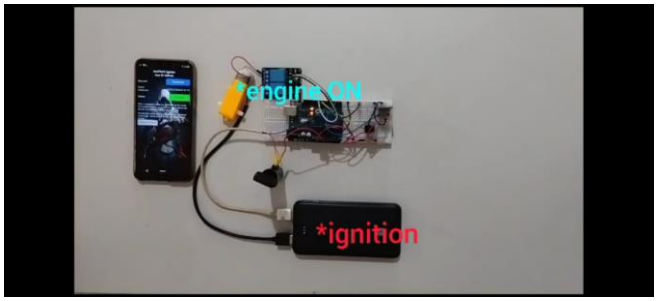

Figure 12: Engine(motor)on, ignition is given

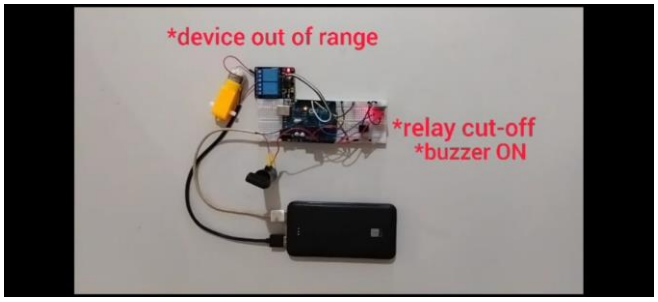

Figure 13: Device out of range, relay cut off, buzzer on

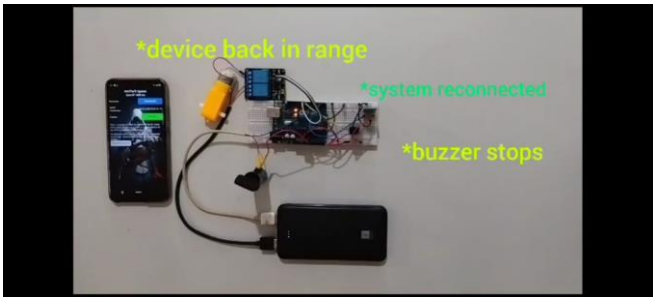

Figure 14: Device back in range, buzzer off

The results show that the anti-theft system is successfully implemented. Whenever the user's phone is within the range of the Bluetooth module, the app shows 'connected' and the buzzer is inactive and when the phone is out of range the app shows 'connected' and the buzzer goes off, alarming/alerting the user.

VII. Future Scope

We can incorporate a GPS system into the anti-theft system such that the user gets the location of the motorbike when the buzzer goes off.

We can add an automatic handle lock mechanism to prevent theft.

Addition of a sim module to the system so that the sim module sends a message to the user during theft, in case the internet is unavailable.

Activation of arm button so that the user can arm (turn on) or unarm (turn off) the system.

Password protection for the system.

VIII. Conclusion

The anti-theft system is an effective way to prevent motorcycle thefts and it also prevents losing the key in the bike key-hole. It is low cost. Its mechanism is simple compared to the existing anti-theft systems, so the owner can troubleshoot. It provides fast response.

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