Plug & Play Based Smart Switch

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Abstract— Our project depend upon the smart connectivity using mobile.Currently manual process is used to operate a bike .By using this project we are creating smart connectivity between smart phone and bike and also fingerprint starter. Hence we call it as a smart connected bike. The fundamental components of this project are ArduinoUNO, Four Channel Relay, Bluetooth module HC-05,fingerprint scanner module,12v Power Supply .In this project we are going to operate ignition, starter, horn and headlight in smarter way by connecting Smartphone and also by fingerprint scanner. We do not need key to start the bike we just need to have our smart phone or by our finger. Bikes battery is used as power supply for the whole circuit. Where switch is used to manually turn on and off the supply to circuit diagram. Currently manual process is used to start a bike by using bike key. But in our project we can start it by either smart phone or by fingerprint scanning. The aim of the project is to develop the smart connectivity between bike and smartphone also by fingerprint. Now a days many cars having smart connectivity features. We want to make a circuit for bike which will be easily operated by smart phones. Till today not a single company has launched such bike with smartphone connectivity, so we can start our bike with smart phone or by fingerprint without using key.

Keywords: Arduino, fingerprint sensor, Bluetooth Module, Relay Switch etc.

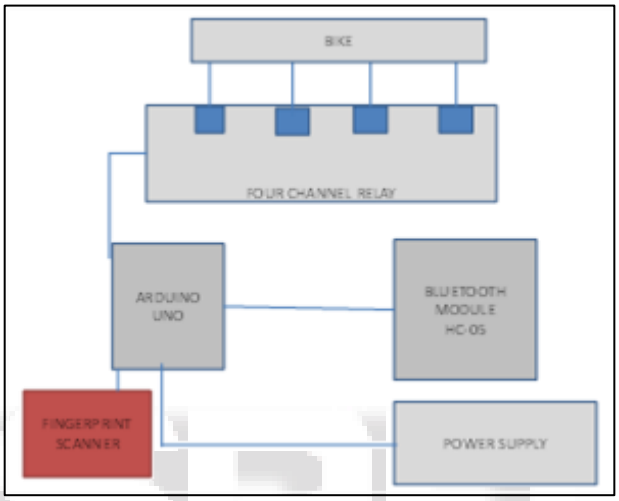
I. INTRODUCTION

- In today's world in the field of automobile, it has been leading towards the connected technology.
- Now a days many cars having connected features as well as keyless entry.
- The company such as MG Motors, Hyundai, Kia motors has taken initiative to add some revolutionary features in cars.
- But there is not that much revolution in the bike .The world is changing and embracing new technologies, so there is necessity to come forward to add some new feature in the bike.
- So that it can be connected and operated over the smart phone platform.

A. Proposed Work:

The battery of bike used as power source to arduino. Bluetooth module is connected to arduinouno board to which we can connect our smart phone. The fingerprint scanner module is also connected to arduinouno board. 4 channel relay module is connected to the arduino board. We put single switch to ON the whole circuit connected on bike, when we on that switch that time we can connect our smart phone to the circuit with help of app in mobile, that time as per our instructions arduino gives command to relay board and realys output is connected to bikes various component like ignition, starter, horn and headlight etc. Fingerprint scanner module having saved fingerprints of owner of bike so when we put fingers on it that time it will give signal to ignition switch and we can start the bike.

II. PROPOSED SYSTEM



A. Fingerprint Scanner:-

Human fingerprints are practically unique that's why it is successfully used to identify individual .It gives high level of security which is nearly impossible to breach .There are different type of fingerprint sensors and lots of componias offering different types of modules which is revolutionizing age of security .

1) Sparkfun Fingerprint scanner –TTL:

This module is the economical version of the GT-521F52 and can store up to 200 different fingerprints. It is capable of 360° fingerprint recognition and download/upload templates using serial interface. Additionally, the GT-521Fxx series features a resolution of 450dpi, with a false acceptance rate of <0.001% and a false rejection rate of <0.1% while only needing <1.5 seconds to identify a unique fingerprint!

B. Bluetooth Module:

Bluetooth is a technology for a wireless communication it is designed and developed to replace wired connections. It uses serial communication to transfer a data.

1) HC-05 Bluetooth module:

IT provides switching modes between master and slave mode which means it able to use neither receiving nor transmitting data .HC-05 Bluetooth module is simple to use Bluetooth SPP (Serial Port Protocol) module, designed for transparent wireless serial connection setup. This serial port Bluetooth module is fully qualified Bluetooth V2.0+EDR (Enhanced Data Rate) 3Mbps Modulation with complete 2.4GHz radio transceiver and baseband. It uses CSR Bluecore 04-External single chip Bluetooth

system with CMOS technology and with AFH (Adaptive Frequency Hopping Feature). The product can be easily integrated with Arduino and other micro-controllers.

C. Relay Module:

Relay is basically a switch which is operated by an electromagnet .the electromagnet require a small voltage to get activated which we will give from the arduino and once it is activated, it will pull the contact to make the high voltage circuit. It can be controlled with low voltage, like the five volt provided by the arduinopins.

1) Four Channel Relay Module

12V Relay module with 4 onboard relays. Each relay can switch devices with current up to 10A. Optical isolators are included in the circuit to protect your driver device from a reverse voltage surge.

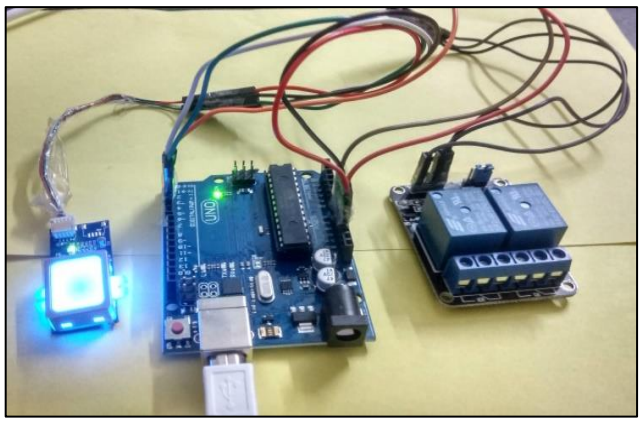
2) Single Channel Relay Module - 5V

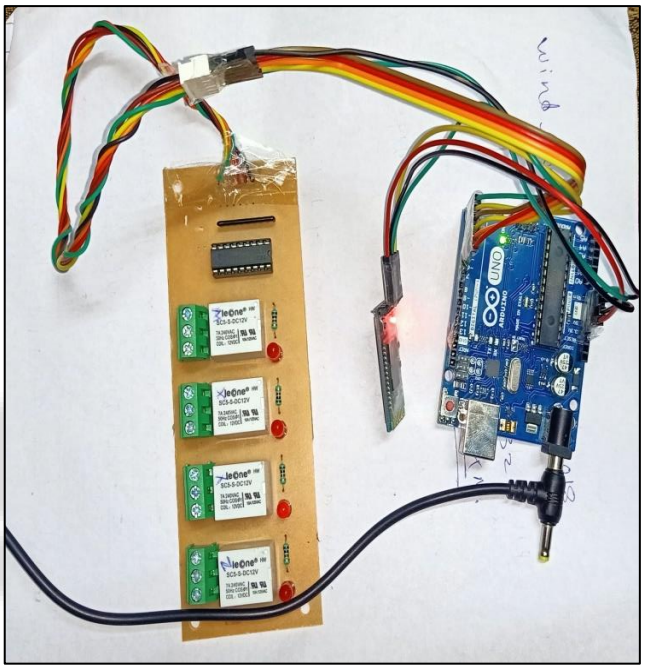
Single channel 5V relay module can be used in interactive combination of AC-DC projects, such as smart home and etc. This module uses a SINGLE 5v high-quality relay. It can also be used to control lighting, electrical and other equipment. The modular design makes it easy to expand with the Arduino board (not included). It can be controlled through digital IO port, such as solenoid valves, lamps, motors, and other high current or high voltage devices.

D. Arduino:

Arduino is an open-source platform used for building electronics projects. Arduino consists of both a physical programmable circuit board (often referred to as a microcontroller) and a piece of software, or IDE (Integrated Development Environment) that runs on your computer, used to write and upload computer code to the physical board.The Arduino platform has become quite popular with people just starting out with electronics, and for good reason. Unlike most previous programmable circuit boards, Finally, Arduino provides a standard form factor that breaks out the functions of the micro-controller into a more The Arduino Integrated Development Environment it a cross-platform application (for Windows, macOS, Linux) that is written in functions from C and C++ It is used to write and upload programs to Arduino compatible boards, but also, with the help of 3rd party cores, other vendor development boards.The source code for the IDE is released under the GNU General Public License, version 2. The Arduino IDE supports the languages C and C++ using special rules of code structuring. The Arduino IDE supplies a software library from the Wiring project, which provides many common input and output procedures. User-written code only requires two basic functions, for starting the sketch and the main program loop, that are compiled and linked with a program stub main() into an executable cyclic executive program with the GNU toolchain.

III. TESTING RESULTS





A. Challenges while implementation:

- The major problem was to establish waterproof system, to enhance durability and ensure that there should not be any problem of short-circuit.
- It was very hard the placement of components below bikes sit due to the air filter which is situated exact below the seat
- when we have used this system for the first time there was a problem of battery drainage due to continuous use of battery for arduino and fingerprint scanner ,then we have used switch to turn it on manually whenever it was required
- there was difficulty in setting up synchronization between bikes main ignition connections and our project system connections

IV. CONCLUSION

There is a possibility of forgetting bikes key but we never forget our smartphone so we made a system or let say a project which can utilize smartphone as a key to start a bike and further more to access some important features by a smartphone itself that's why we call it as a keyless entry

Human fingerprints are practically unique that's why it is successfully used to identify individual so there is no need to carry any of the object to turn on the ignition of the bike which is really keyless entry.

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