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Advanced Security System for Motor Cycle

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ABSTRACT: This project deals with designing of Automatic Shutter Locking System in place of the present manual locking system. The main goal of this project is to design a prototype of the shutter system which responds according to the user fingerprint given. We make use of Arduino Uno which is the core of the system, processes the input commands and controls all the peripheral devices connected to it. The R305 Fingerprint Scanner System, which is an optical scanner and has a very good response time. Users fingerprint gets stored in the memory of the microcontroller. When the input fingerprint matches with that of the stored fingerprint template, the shutter systems opens giving access to the user. Later on whenever an unauthorized user tries to access the vehicle an alert message is through the GSM module along with the GPS location. An app is developed to control the functionality of the lock. The app is also used to add and delete the guest login to access the lock.

KEY WORDS: Arduino Uno, Automatic Shutter Locking System, R305, GSM, GPS, MIT APP.

I. INTRODUCTION

An appalling situation due to increasing number of theft cases of the two wheelers, there is a need to enhance the security level of the bikes. Conventional and commonly used key locks that are positioned on the bikes can be easily unlocked by the professional thieves. With the assistance of master it becomes terribly simple to unlock the lock of the bikes by the thieves. Currently, people are getting technology dependent. As a result, vehicle security systems are becoming essential day by day. Hence more efforts and research have been undertaken to develop such security devices. But most of them are mainly designed for car. There is really scarcity of efficient security system for motorcycle. Thus there's a requirement for a lot of security choices to be out there for the motorbike that is exclusive and should differ from the normal key locks. We need to have a security system which is smart enough to allow only the authorized person to use the vehicle in a more sophisticated manner. This creates the demand of such style of lock that is new and provides a further security level. The new and fashionable lock should be distinctive in itself i.e. it should be solely unlatched by special and specific key. This type of feature is available in the biometrics locks i.e. the lock which may solely be latched and unlatched by the organic structure options. Biometrics will include: face recognition, voice recognition, fingerprint recognition, eye (iris) recognition. Of these style of special biometric recognition techniques the fingerprint recognition is that the most generally used as a result of fingerprint of each person on the planet is exclusive and might provide good reliability. Also the implementation of the fingerprint recognition system is simple and low-cost than the opposite ones. Thus fingerprint recognition lockup system will offer higher dependability than the standard locks and straightforward than the opposite biometric lockup system.

II. LITERATURE SURVEY

S. Vandana et al. proposal uses the RFID Technology to deal with the traffic problems. The major components of this proposal are RFID reader, a camera that is used to track and take picture of the vehicle, RFID tag, a database server which contains the details of the red signal violators and uses GSM technology to send warning message. This proposal minimizes the conflict and confusion between people and the vehicle and which will automatically reduce the number of accidents on roads. As well as this technology is used to reduce the theft and control the speed of the vehicles.

Celia Shahnaz et al. points objective of this paper is to represent a low cost, suitable as well as robust device with anti thievery sensor for securing motorcycle. Multilayers of security are embedded in the proposed device to guard

motorcycle with the sensor and reliable interfacing of GSM-GPRS technology. Some of the functionalities of the device include, control of ignition during armed or disarmed mode, relaying security related status information, like battery level, sensor mode via SMS, also vehicle's location determination based on cellular triangulation and informing the owner and his/her relatives during accidents. They used cellular triangulation method to locate the vehicle instead of GPS. Because GPS signals are not available at everywhere.

Nilesh Gaikwad et al. this paper was to increase safety and security of the automotive systems, in which they have used an R305 fingerprint module for vehicle authentication. It has UART serial communication system having baud rate 9600 to 115200bps. But by default it takes 57600bps. They have also used GSM module, this system uses SIMCOM 300 GSM module which is used for sending a message to vehicle owner. When fingerprint does not match then GSM module send the message to vehicle owner. Finally they have used a relay for switching ignition system. It is having 5v power supply. When fingerprint template matches then relay will activate the vehicle ignition system.

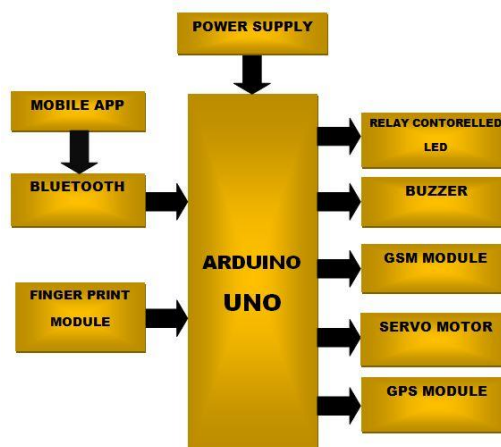
Shamela Rizwana et al. Proposed in this paper they used a fingerprint module to read once identity to start the equipment. ARDUINO microcontroller was used to enable the ignition system if the matching between scanned data and the already existing data is correct. Comparison is done inside the fingerprint module itself and its output is given to microcontroller. Result is displayed in a LCD display whether the user is authorized or not. R305 background highlight optical fingerprint verification module is the latest release of Mi axis Biometrics Co., Ltd. It consists of optical fingerprint sensor, high performance DSP processor and Flash. It includes function such as fingerprint login, fingerprint verification, fingerprint deletion, fingerprint upload, fingerprint download, etc. This can be used as a memory storage element to store the data of the finger print.

III. METHODOLOGY

A basic prototype of a shutter lock system is developed with the help of servo motor. This system responds to the fingerprint module .Whenever a authorised fingerprint is detected, the shutter system unlocks giving access to the user. It even responds to the user mobile application which has been developed. We will be making use of an R305 fingerprint sensor. This is an optical fingerprint module which is quite faster in fetching the details compared to other optical sensors available in the market. We make use of Arduino Uno microcontroller board which is based on ATmega328. We make use of a GSM module for sending information to the owner in case of any thievery. A control switch which controls the power to the fingerprint module. An app to control the functionality of our shutter locking system will be developed. App is also used for adding new users to the fire base. App is connected to the firebase where easy addition and deletion of the users are done by the owner. A GPS module is used to fetch the thief location and sent to the owner in the form of a message.

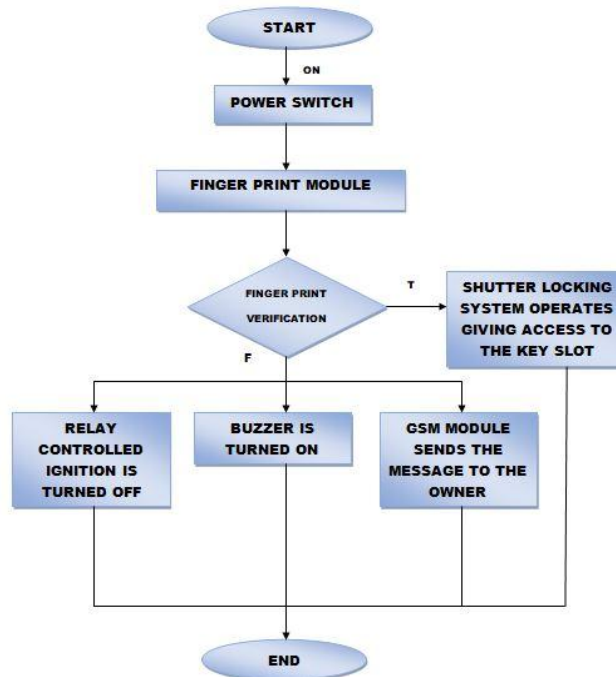
A. Architecture Diagram

The above implementation can be summarized in the following architecture diagram.



B. Flowchart

A flowchart is a formalized graphic representation of a logic sequence, work or manufacturing process, organization chart, or similar formalized structure. The following flow chart shows the subsequent processes involved within the system.

**C. MICRO-CONTROLLER BOARD**

The Arduino UNO is an open-source microcontroller board based on the Microchip ATmega328P microcontroller and developed by Arduino.cc. The board has 14 Digital pins, 6 Analog pins, and programmable with the Arduino IDE via a type B USB cable. It can be powered by a USB cable or by an external 9 volt battery, though it accepts voltages between 7 and 20 volts.

D. GSM MODEM

GSM (Global System for Mobile communications) is an open, digital cellular technology which is used for transmitting mobile voice and data services. In this system we are using it only for transmitting and receiving the data and voice messages. Global system for mobile communications wireless data module which is present is used for remote wireless applications and also machine to machine or user to machine and remote data communications in various applications. Microcontroller will send AT commands to GSM modem and by which accordingly it works. Here we used LORA 1262 long range spread spectrum.

E. GLOBAL POSITIONING SYSTEM (GPS)

A Global Positioning System (GPS), originally Nav-star GPS, it is a satellite-based radio navigation system owned by the United States government and operated by the United States Air Force. This is a global navigation satellite system which will provides geolocation and time information to a GPS receiver anywhere on or near the Earth where ever there is an unobstructed line of sight to four or more GPS satellites. Obstacles like mountains and buildings and walls will block the relatively weak GPS signals. The GPS will not require the user to send any data, and this operates independently of any telephonic or internet reception, though these technologies can enhance and strengthen the usefulness of the GPS positioning information. The GPS will provide critical positioning capacities to military, civil,



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and commercial users around the globe. The United States government created the system, maintains it, and also makes it freely accessible to anyone and everyone with a GPS receiver.

F. R305 FINGERPRINT SCANNER

Finger Print Sensor (R305) -TTL UART is a finger print sensor module with TTL UART interface. The user can store the finger print data in the module and can configure it in 1:1 or 1: N mode for identifying the person. The finger print module can directly interface with 3v3 or 5v Microcontroller. A level converter (like MAX232) is required for interfacing with PC.

G. BLUETOOTH MODULE

HC 05/06 works on serial communication. The Android app is designed to send serial data to the Arduino Bluetooth module when a button is pressed on the app. The Arduino Bluetooth module at the other end receives the data and sends it to the Arduino through the TX pin of the Bluetooth module (connected to RX pin of Arduino).

H. RELAY MODULE

A relay is an electrically operated switch. Many relays use an electromagnet to mechanically operate a switch, but other operating principles are also used, such as solid-state relays. Relays are used where it is necessary to control a circuit by a separate low-power signal, or where several circuits must be controlled by one signal.

I. SERVO MOTOR SG90

Servo motors are high torque motors which are commonly used in robotics and several other applications due to the fact that it's easy to control their rotation. Servo motors have a geared output shaft which can be electrically controlled to turn one (1) degree at a time. The signal pin is used to control the servo motor, turning its shaft to any desired angle.

VI. CONCLUSION

A basic prototype of a shutter lock system is developed with the help of servo motor. This system responds to the fingerprint module. This proposed system is more advance compare to the present locking mechanism which are implemented in the vehicles. Since we have incorporated the fingerprint module, the fingerprint acts as a unique key for locking and unlocking of the vehicle. Added advantage of the proposed system is that the locking mechanism can be controlled with the help of the mobile application which has been developed using MIT App. App is connected to the firebase where new users can be easily added and deleted as and when required by the owner. Vehicle security alert messages are sent to the owner of the vehicle along with the location of the vehicle.

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