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IGNITION BASED ON FINGERPRINT RECOGNITION

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ABSTRACT:. Vehicle security is an important issue these days due to the rising number of vehicle thefts. Also one more issue with vehicles is handling its keys. Keys need to be carried and misplacing keys or loosing them will cause a serious issue. Here we propose a solution to this problem by using a fingerprint authenticated vehicle starter system. The system provides a secure and hassle free way to start/stop vehicle engine.

User just needs to scan finger to start the car, no need to carry any key. The system only allows authorized users to start the vehicle. Users can first register into the system by scanning fingerprints. The system allow to use only authorized users

I.BACKGROUND

In modern day, vehicles anti-theft system is our prime important duty to secure our vehicle by the means of fingerprinting. The main focus while developing the vehicle anti-theft system is to protect our system from theft by providing the anti-theft protection. For the protection, first we should restrict the starting of vehicle, only to the authorized persons have this ability to start the car without the use of keys, once it has identified by the Fingerprint sensor. The Fingerprint of the owner and other authorized persons are stored into the database beforehand and at the time of starting engine of the vehicle, scanned fingerprints are being crosschecked with the database . The biometric scheme is used as the primary layer of protection since the chances of it being duplicated is very less Fingerprint images are considered as the most perfect quality pattern for recognition because this image cannot be manipulated by the different variations in skin or by the different expressions. So it is necessary to measure all the locations very carefully which lead to a result of a more reliable data comparison by extracting all the features and the probability of being forgery and duplication is been reduced.

The main advantage of using a fingerprint pattern is that it is very low in cost as compared to other biometric system and the acceptance of using this system by the user is very high. It can be easily adaptable in the environment which can enhanced the security and robustness of the vehicles. Therefore, the usefulness of designing and implementing a biometric unauthorized vehicle starting the engine cannot be overemphasized

II.LITERATURESURVEY

1)Omidiora E. O. etal - in his paper basically focuses on the replacement of keys with the biometric specially fingerprint based lock systems in the vehicles because fingerprints are the oldest and most widely used form of biometric identification and also provide a robust security mechanism for various security domains. Their prototype consists of fingerprint software module used to store the database of the valid users, a hardware unit for interfacing and the ignition system module to ignite the vehicle. Database of the valid users is stored in the module. Now when a person tries to operate the vehicle then the CPU matches the fingerprint of the person with the stored database if the match result is successful then the vehicle is ignited and otherwise not. External devices (hardware) can be controlled through the PC parallel port. The parallel port is a simple and inexpensive tool for building computer controlled devices and projects. It is often used in computer controlled robots, Atmel/PIC programmers.

2)Karthikeyan.A etal -in his paper focuses on the fingerprint security as every person has unique fingerprint. A keypad is also used to add or delete the valid user in the module. FIM3030 fingerprint module by NITGEN is used in this purpose. Microcontroller AT89C52 is used for controlling the whole driving unit. LCD is used as a displaying unit for showing the information about the authorized and unauthorized user. Decoder DM742S138 is used for data routing and for interfacing with fast memory units as the decoder have short propagation delay. Latch 74HC373 is used which are high-speed Si-gate CMOS devices. A relay is used as a interfacing circuitry between the microcontroller output and the ignition system of the car.

3)Prashantkumar R etal - in his paper provides good and effective ways of securing the two wheeler vehicle with a combination of different types of locking options provided in the vehicle. This project does not use the concept of biometric identification but provide other security options that can be used in tracing out the vehicle if theft happens and also provide the owner of

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4)Visa M. Ibrahim etal - in his paper provides a security alarming option to the car's owner when the car is in the danger. In this project GSM technology is used for monitoring and safeguarding the car. There are sensors placed in the doors and the boots of the cars. If any type of tampering in the car happens then an alerting is signal is send to microcontroller.

Intel AT89C51 microcontroller is used as a controlling unit of the device. DTMF (Dual Tone Multi frequency) decoder IC is used to convert the frequency signals from the GSM module to discrete voltage levels which act as input to the microcontroller. When there is any danger of theft of the car through doors and the boots then microcontroller activates the GSM module and sends the message to the mobile phone number attached to the circuit. In this case the microcontroller disconnects the ignition system from the battery and also demobilizes the car. [5] discussed about a system, GSM based AMR has low infrastructure cost and it reduces man power. The system is fully automatic, hence the probability of error is reduced. The data is highly secured and it not only solve the problem of traditional meter reading system but also provides additional features such as power disconnection, reconnection and the concept of power management. The database stores the current month and also all the previous month data for the future use. Hence the system saves a lot amount of time and energy. Due to the power fluctuations, there might be a damage in the home appliances. Hence to avoid such damages and to protect the appliances, the voltage controlling method can be implemented.

III.PROPOSED DESIGN

Finger print based security system can be used at many places like Industries, Offices, and Colleges or even at our home. This project is a fine combination of Biometrics technology and Embedded system technology. Fingerprint sensor is the main part of this system. It makes use of Biometric sensor to detect fingerprint. It is also called as Biometric sensor. Fingerprint sensor uses various types of techniques like ultrasonic method, optical method or thermal technique. In this project we have used optical fingerprint sensor. Main blocks of this project are Microcontroller, Fingerprint module, Buzzer, Relay, Keypad, LCD display and Motor. User has to place his/her finger on the optical sensor part of fingerprint module. We have seen Password based security system RFID based security system. The main feature or speciality of fingerprint is that it is unique. It gives this project the high level security than other security systems. Person recognition using the Fingerprint identification is used since a long time.

IV.METHODOLOGY

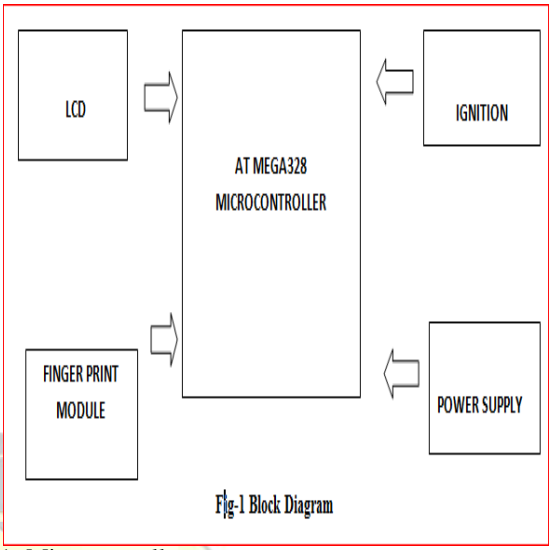

Fig-1 Block Diagram

1 -Microcontroller

The major heart of this project is microcontroller,AT MEGA 328 a microcontroller is a small computer on a single integrated circuit containing a processor core, memory, and programmable input/output peripherals etc. However, compare to others microcontroller is fast and very ease to program in C language because of huge support can gain from the manufacturer for programming the adrino uno is a microcontroller board based on at mega 328 it has 14 digital input output pins and out of this 6 can be used as a pwm output,it simply connect it a computer with a USB cable or power it with battery to get started. In order to maximize performance and parallelism, the AVR usesa Harvard architecture – with separate memories and buses for program and data. Instructions in the program memory are executed with a single level pipelining. While one instruction is being executed, the next instruction is pre-fetched from the program memory. This concept enables instructions to be executed in every clock cycle. The program memory is In-System Reprogrammable Flash memory. The fast-access Register File contains 32 x 8-bit general purpose working registers with a single clock cycle access time. This allows single-cycle Arithmetic Logic Unit (ALU) operation. In a typical ALU operation, two operands are output from the Register File, the operation is executed, and the result is stored back in the Register File – in one clock cycle. Six of the 32 registers can be used as three 16-bit indirect address register pointers for Data Space addressing – enabling efficient address calculations. One of the these address pointers can also be used as an address pointer for look up tables in Flash program memory. These added

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A liquid-crystal display (LCD) is a flat panel display, electronic visual display that uses the light modulating properties of liquid crystals. Liquid crystals do not emit light directly. The most common application of liquid crystal technology is in liquid crystal displays (LCDs). A liquid crystal display consists of an array of tiny segments (called pixels) that can be manipulated to present information. The LCD screen is more energy efficient and can be disposed of more safely than a CRT. Its low electrical power consumption enables it to be used in battery-powered electronic equipment. An LCD is used for displaying the status of the entire project. Since the main idea is to make the project cost-effective . A 16 by 2 LCD is sufficient enough. Although many bit LCD are available.. The display is a dot matrix display used to display characters, alphanumeric characters, symbols etc. The LCD unit receives character codes from the microcontroller, latches the codes to its display data RAM (80-byte DD RAM for storing 80 characters), transforms each character code into a 5 × 7 dot-matrix character pattern, and displays the characters on its LCD screen. It is a 16 pin module. When the fingerprint is to be added, deleted or scanned, it will show the status Fingerprint Verified for Scanning. Fingerprint Added on addition of a fingerprint and Fingerprint Deleted on the deletion of a fingerprint. When a non verified fingerprint is scanned it will display the status as Invalid Access

3. FINGERPRINT MODULE

It is a 4 pin device which is an optical biometric fingerprint reader which can be used for various applications such as access control, safety deposit locks, banks, and car locks etc. The model used in this project is the GT-511C3 fingerprint scanner module. The reason being it is one of the cheapest fingerprint reader available in the market. One of the main features is that it consumes very less power, and it gives the similar performance as to the expensive ones. The fingerprint sensor is used to read the fingerprint of the already registered user/users. It can also be used to add/delete new/existing fingerprints. Its four pins are Tx-In, Rx-Out, GND and +5V . Tx-In and Rx-Out pins are used for Input and Output purpose. The GND and the +5V are used for power supply and grounding purpose. It is very easy to implement, being a simple connecter.

When the user places his finger on the sensor for the first time, a 3-Dimensional image of the fingerprint is captured. It is then stored on the memory of the controller using various algorithms. Internally, it just converts it pieces of code which the microcontroller stores it in its memory and verifies it. Along with the fingerprint sensor three buttons are also used among which one of them is used for sensing the fingerprints. The other two are used whenever a fingerprint is too added or deleted. It scans the edges of the fingers and stores it in the memory of the controller. In case of deleting the fingerprint, we have to first place the fingerprint that needs to be deleted, and on pressing the fingerprint scanner, first is scanning and the second is writing. fingerprint images can be loaded from a file of sample images. The last acquired fingerprint image is then analyzed and its minutiae identified, extracted and stored as a template. The next step involves either enrolling the template or matching the template with other templates. The enrollment process button saves the last extracted template into the database. The identity number of the enrolled template is displayed in the log window. The identification process compares the query template against reference templates in a database. For verification, the identity number of the reference template to be matched with the query template must be supplied.

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FIG-2 Finger print module

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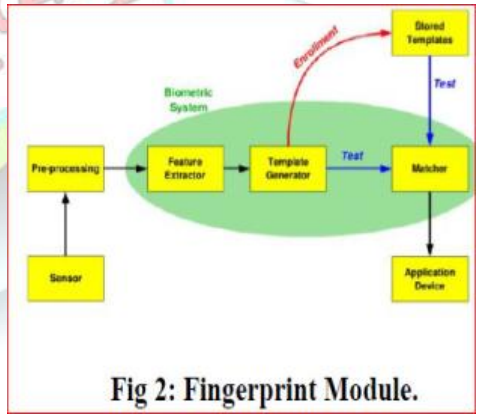

Fig 2: Fingerprint Module.

4 . MOTOR

L293D is a dual H-Bridge motor driver, so with one IC we can interface two DC motors which can be controlled in both clockwise and counter clock wise direction and if you have motor with fix direction of motion. You can make use of all the four I/O to connect up to four DC motors.L293D has output current of600mA and peak output current of1.2A per channel. Moreover for protection of circuit from back EMF output diodes are included within the IC. The

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36V, which has made L293D a best choice for DC motor driver.

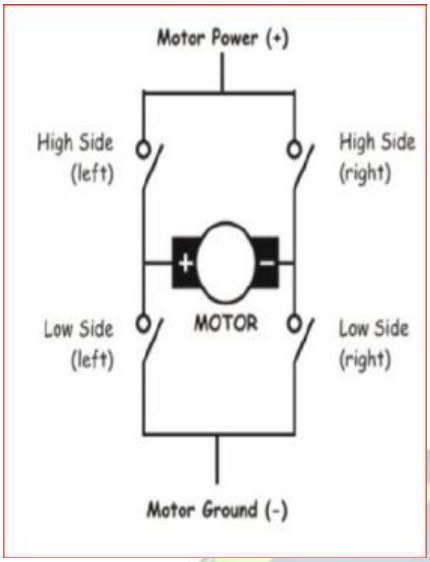


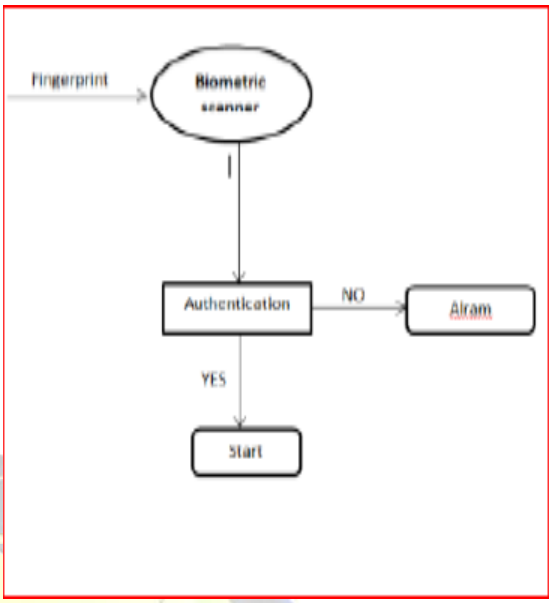
FIG-3 H bridge circuit

The name "H-Bridge" is derived from the actual shape of the switching circuit which controls the motion of the motor. It is also known as "Full Bridge". Basically there are four switching elements in the H-Bridge as shown in the figure As you can see in the figure above there are four switching elements named as "High side left", "High side right", "Low side right", "Low side left". When these switches are turned on in pairs motor changes its direction accordingly. Like, if we switch on High side left and Low side right then motor rotate in forward direction, as current flows from P\power

supply through the motor coil goes to ground via switch low side right.

Whenever a robotics hobbyist talk about making a robot, the first thing comes to his mind is making the robot move on the ground. And there are always two options in front of the designer whether to use a DC motor or a stepper motor. When it comes to speed, weight, size, cost... DC motors are always preferred over stepper motors. There are many things which you can do with your DC motor when interfaced with a microcontroller. For example you can control the speed of motor; you can control the direction of rotation. In this part of tutorial we will learn to interface and control of a DC motor with a microcontroller. Usually H-bridge is preferred way of interfacing a DC motor. These days many IC manufacturers have H-bridge motor driver available in the market like L293D is most used H Bridge driver IC. H-bridge can also be made with the help of transistors and MOSFETs etc. rather of being cheap, they only increase the size of the design board, which is

V. FLOWCHART



First process includes the checking of fingerprint in biometric scanner. Next process includes authentication and it will check the database for the access. If it is authenticated it ill the start the ignition or alarm is triggered which is fixed to biometric device. The main use of use of biomterics are to providing the security for the two wheelers. Fingerprint scanner is connected to the module which is fixed in the biometrics and it is connected to the ignition system. While we touches the biometric scanner it scans with existing one and if it is accessed, the engine will start The Fingerprint of the owner and other authorized persons are stored into the database and at the time of starting engine of the vehicle, scanned fingerprints are being crosschecked with database.

VI.CONCLUSION

Fingerprint identification enhances the security of a vehicle and makes it possible only for some selected people to start the vehicle. The expected result by implementing this model on the motorcycle is that only the authorized person will be able to ignite the motorcycle. Not every person with the key will be able to start the bike. There will be matching of the person's data with the stored one and only in the case of match the bike will start otherwise not. Thus implementing relatively cheap and easily available system on a vehicle one can ensure much greater security and

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unlikely that they have the fingerprint technology needed to fake your fingerprint.

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