

“Biometric And Gsm Security With Starting System”

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ABSTRACT

In this modern technology, Fingerprinting is more authentic tool used for security basis. Fingerprint of every person is unique, so the identification or authorization of a person becomes more and more reliable. This lead to an enhancement of the security in starting of the Engine. Biometrics' authentication is used in computer science as a form of identification and access control. Biometrics is the science and technology of measuring and analyzing biological data. In information technology, biometrics refers to technologies that measure and analyzes human body characteristics, such as DNA, fingerprints and other recognition pattern. The special type of a sensor is used to read the fingerprint of a person and matches the data by comparing it with the authorized fingerprint image, which is stored in the database. If the match is found then the vehicles will be started.

In this project, digital image processing algorithms is employed to identify whether the incoming fingerprint image is genuine or forgery. The primary purpose of this study is to explore the development of an electric engine starter into a fingerprint-based engine starter to upgrade and develop higher security in a vehicle especially on motorbikes and scooters that are widely used by students of the Batangas State University ARASOF Nasugbu. The research study focuses in the design and adaptability of the fingerprint engine starter to provide a security for motorbikes and scooters.

The researchers summed up the whole study and concluded that there was a significant difference between the existing Electric Engine Starter System and the Fingerprint Engine Starter for Motorbikes and Scooters. The evaluated Fingerprint Engine Starter for Motorbikes and Scooters offers more security compared to the existing Electric Engine Starting System.

Keyword: -Biometric, fingerprint sensor, security system, Gsm system, Ignition starting system etc....

1. INTRODUCTION

“The Biometric and GSM security with starting system” is among the various automobile & Electronics technologies one of The project is to create an authentication system for two & Four wheelers based on the most popular biometrics that are nothing but Fingerprints. Basically, it is made to prevent the two-wheeler from thefts. The self-start of the two wheeler is replaced with the fingerprint system. The recognition of the fingerprint is based on certain factors such as unique patterns, reference points etc. The project consists of the AVR microcontroller PIC A89S52, fingerprint scanner module R305, Fuel sensor and GSM Module. The fingerprint Module R305 has memory storage capacity of 3 fingerprints. As soon as the fingerprint module acquires the fingerprint, the fingerprint module immediately interacts with the microcontroller and checks if that fingerprint is present in the database of the module. For a valid fingerprint, the ignition system is started provided sufficient fuel must be present. If the fingerprint acquired is invalid then a message will be sent to the owner of the vehicle using GSM Module. LCD Display and DC Motor are interfaced with the microcontroller. LCD Display displays the desired output while the DC Motor starts with valid fingerprint and sufficient fuel.

Biometric & GSM Security with starting system is one of the most successful applications of biometric technology. One of the main advantage of a biometric GSM Security and starting system is it avoids rfid punching". Rfid punching was a major Loop hole which will be exploiting in the traditional time starting systems. Fingerprint recognition is an established field today, but still identifying individual from a set of enrolled rfid starting is a time taking process. Most rfid -based biometric systems store the minutiae template of a user in the database. It has been traditionally assumed that the minutiae template of a user does not reveal any information.

In this project two magnets are placed in a piston. One magnet is fixed with piston. Another one is movable, which is connected with rod. With magnets are replaced by air. Our magnetic shock absorber works on the basic principle of magnet that “opposite poles attract each other and same poles repel each other”. In this both magnets are facing same poles (both magnets are placed facing north and north or south and south). Both magnets are same pole. When rod moves inside the cylinder the movable magnet moves toward the fixed magnet. Since both magnets are of same pole repulsion force is created between the magnets. So the movable magnet opposes the rod action and moves the rod up.

Unlike poles of a magnet attract each other and like poles repel each other. When we place two south poles or north poles facing each other and when they are brought closer they are repelled. This concept is used in magnetic suspension. In this suspension a set of magnets have been selected like poles, then it is placed into in a hollow cylinder. One magnet is fixed at the top of the inner portion of the cylinder and other one is placed at the bottom. When the two magnets are brought closer to each other they are repelled due to similar polarity and the aspect of suspension is achieved.

There is one magnet at the top of the inner portion of the cylindrical shock sleeve with the north polarity facing down towards the ground. The second magnet sits on top of the inner shock that pivots up and down. This magnet has the north polarity upwards so it's parallel with the other magnet. The two magnets fight against each other giving the forks travel. There is also an adjustment at the top of the shock, which allows the magnets to become closer, together for a stiffer travel or further apart for softer travel. Magnets are attracted or repelled by, other materials depending upon the position of poles. A material that is strongly attracted to a magnet is said to have a high permeability. Iron and steel are two examples of materials with very high permeability and they are strongly attracted to magnets. It is based on a simple concept that when two magnets of same polarity are brought together they repel each other due their magnetic field. The SI unit of magnetic field strength is the teslas, and the SI unit of total magnetic flux is the Weber. 1 teslas = 1000gauss = 1weber flowing through 1 square meter, and is a very large amount of magnetic flux.

1.1 Problem Statement

The main aim for developing a secure vehicle system from being accessed .In this project, a sensor is used to read the data and match this from the stored data .Once it has been compared than only the vehicle will be Started. This lead to a more secure and reliable vehicle from being theft and protection will be increased against the crime. Or if the key is remain inside the car than anybody can misuse of that key or start the engine. So security is must by fingerprints and it cannot be similar of any two people. So our vehicle will be secured international Journal of Computer Engineering Applications and Volume.

1.2 Objectives

The Fingerprint Engine Starter for Motorbikes and Scooters is focused in more stylish and more secure engine starting for motorbikes and scooters that have electric engine starter. It limits the number of users that makes the motorbikes and scooters more secure. The motorbike or scooter installed with this device needs to recognize the user before it start its engine. The study was aimed to improve the security of the motorcycles and scooters. It was also aimed to create a newer and better starting system for motorbikes and scooters.

Specifically, this study sought to evaluate the current electric engine starter system and the developed fingerprint engine starter system in terms of accuracy, efficiency, security, reliability, user-friendliness and determine the significant difference of the level of acceptability of the two systems in terms of mentioned criteria. The output of a magneto depends on the speed of the engine, and therefore starting can be problematic. Some engines, such as aircraft but also the Ford Model T, utilized a system which relied on non rechargeable dry cells, (like large flashlight batteries, not what are usually thought of as automobile batteries today) to start the engine or for running at low speed; then the operator would manually switch the ignition over to magneto operation for high speed operation. In order to provide high voltage for the spark from the low voltage batteries, however, a "tickler" was used, which was essentially a larger version of the once ubiquitous electric buzzer. With this apparatus, the direct current passes through an electromagnetic coil which pulls open a pair of contact points, interrupting the current; the magnetic field collapses, the spring-loaded points close again, the circuit is re-established, and the cycle repeats rapidly. The rapidly collapsing magnetic field, however, induces a high voltage across the coil which can only relieve itself by arcing across the contact points; while in the case of the buzzer this is a problem as it causes the points to oxidize and/or weld together, in the case of the ignition system this becomes the source of the high voltage to operate the spark plugs. In this mode of operation, the coil would "buzz" continuously, producing a constant train of sparks. The entire apparatus was known as the Model T spark coil (in contrast to the modern ignition coil which is only the actual coil component of the system), and long after the demise of the Model T as transportation they remained a

popular self-contained source of high voltage for electrical home experimenters, appearing in articles in magazines such as Popular Mechanics.

1.3 Overview

Most four-stroke engines have used a mechanically timed electrical ignition system. The heart of the system is the distributor which contains a rotating cam running off the engine's drive, a set of breaker points, a condenser, a rotor and a distributor cap. External to the distributor is the ignition coil, the spark plugs, and wires linking the spark plugs and ignition coil to the distributor.

The power source is a lead-acid battery, kept charged by the car's electrical system, which generates electricity using a dynamo or alternator. The engine operates contact breaker points, which interrupt the current flow to an induction coil.

The ignition coil consists of two transformer windings sharing a common magnetic core -- the primary and secondary windings. An alternating current in the primary induces alternating magnetic field in the coil's core. Because the ignition coil's secondary has far more windings than the primary, the coil is a step-up transformer which induces a much higher voltage across the secondary windings. For an ignition coil, one end of windings of both the primary and secondary are connected together. This common point is connected to the battery (usually through a current-limiting resistor). The other end of the primary is connected to the points within the distributor. The other end of the secondary is connected, via the distributor cap and rotor, to the spark plugs.

The ignition firing sequence begins with the points (or contact breaker) closed. A steady current flows from the battery, through the current-limiting resistor, through the coil primary, across the closed breaker points and finally back to the battery. This steady current produces a magnetic field within the coil's core. This magnetic field forms the energy reservoir that will be used to drive the ignition spark.

1.4 Features of Fingerprint Gsm System

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

1.5 Working of Fingerprint Gsm System

Battery provides the current to turn the starter motor.

Fuse protects the circuit.

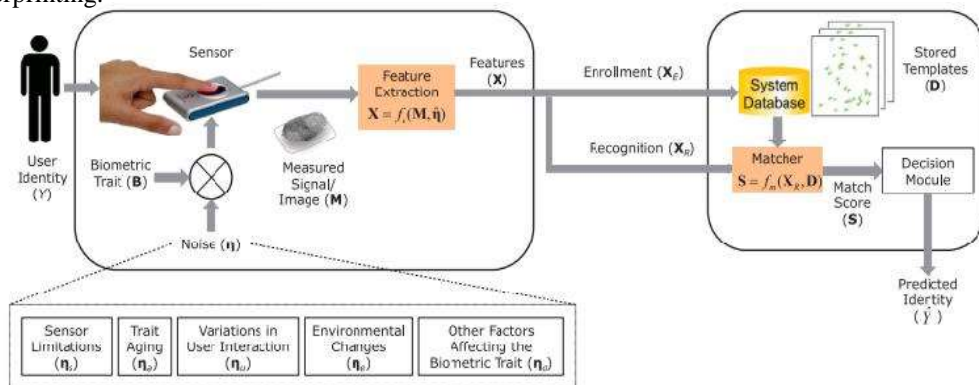
Ignition switch closes the circuit.

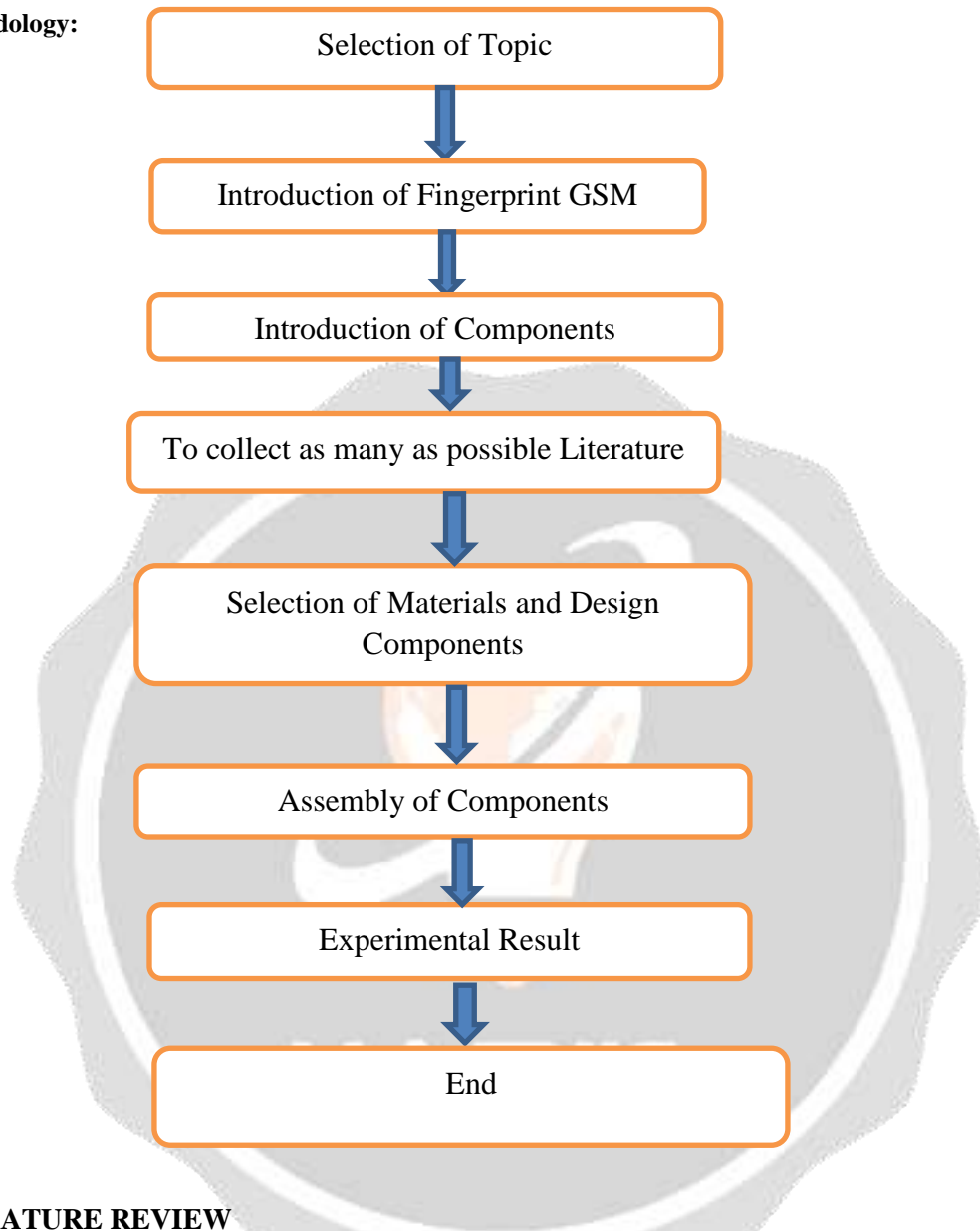
Relay uses small amount of current to control large amount. Neutral safety switch pens the circuit until the vehicle is in neutral (manual transmission), or park (Automatic). (Can be adjusted)

Solenoid does the same thing as relay, but performs mechanical operation. It is an electromagnetic switch.

Starter motor engages pinion gear to ring gear (mounted on flywheel, or torque converter).

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 startup of the engine using fingerprinting.



1.6 Methodology:**2. LITERATURE REVIEW**

A. K. Jain Kenneth et al/Automatic Biometric System Research UK [1] - The main duty of vehicle starting and security system is to improve security of vehicle, Currently almost of the public having an own vehicle, theft is happening on parking and sometimes driving insecurity places. The safe of vehicles is extremely essential for public vehicles. Vehicle tracking and locking system installed in the vehicle, to track the place and locking engine motor. The place of the vehicle identified using Global Positioning system (GPS) and Global system mobile communication (GSM). These systems constantly watch a moving Vehicle and report the status on demand. When the theft identified, the responsible person send SMS to the microcontroller, then microcontroller issue the control signals to stop the engine motor. Authorized person need to send the password to controller to restart the vehicle and open the door. This is more secured, reliable and low cost.

Biometric technology offers advanced verification for employees in every starting. Because biometric systems identify people through physical measurements of unique human characteristics or behaviour, they thwart attempts of time fraud, where one rider punches for another. Biometric systems do not require easily-lost or stolen badges, or other identifying objects. Employee attendance verification is a major use of biometric. Fingerprints have been scientifically studied for many years in our society. The characteristics of fingerprints were studied as early as 1600s. Meanwhile, using fingerprints as a means of identification first occurred in the mid-1800s.

Inside the Mobile Revolution –A Political history of GSM 2nd edition over the period 1984-87 of GSM was being shaped by France, Germany and UK [2]

With a growing database of fingerprint images, it soon became desirable to have an efficient manner of classifying the various images. Between 1896 and 1897, Sir Edward Henry developed the Henry Classification System, which quickly found worldwide acceptance within a few years. This system allows for logical categorization of a complete set of the ten fingerprint images for a person. Until the mid-1990s, many organizations continued to use the Henry Classification System to store their physical files of fingerprint images (Diefenderfer, 2006).

Kenneth J. Ayala-The 8051 Microcontroller [3] - As fingerprints began to be utilized in more fields, the number of requests for fingerprint matching began to increase on a daily basis. At the same time, the size of the databases continued to expand with each passing day. In the early 1960s, the FBI, Home Office in the United Kingdom, and Paris Police Department began to devote a large amount of resources in developing automatic fingerprint identification systems. Today, automatic fingerprint recognition technology can be found in a wide range of civilian applications (Government, 2011)

It's becoming common place to see fingerprint scanners included in various devices and the recent addition of them in automobiles comes as no surprise. These scanners in cars are added as safety features, where the car owner does not need the car keys to open the doors or start the engine. This is made to be an auto theft deterrent as the thief would not be able to start the vehicle without taking the time to hotwire the car and that would be time consuming. Car fingerprint scanners are used in two different ways, one in which the scanner is embedded inside the dashboard and the other is done remotely, where the owner will have a wireless scanning device that they can use to remotely start the engine before they get inside the car (James, 2011).

By combining the unique identifying process of fingerprint ID with an onboard computer, Siemens believe it would be easy to activate personal settings for the vehicle. The system would simply determine who you were and adjust seating, mirror positions, climate, stereo and other devices to the user's personal preferences. Fingertip sensors – produced from the same Complementary Metal Oxide Computer Engineering and Intelligent Systems www.iiste.org ISSN 2222-1719 (Paper) ISSN 2222-2863 (Online) Vol.5, No.1, 2014.

R. Ramani and S. Valarmathy is publish in I. J. Intelligent system and application 2013[4] - Semiconductor (CMOS) technology used for conventional memory chips – is just one of many technologies Siemens are currently developing. They stress that their high level of investment in research and development is key to their ability to bring such technologies to production (Global News).

In large government organizations and corporations, biometrics plays a huge role in employee identification and security. Additionally some data centers have jumped on the bandwagon and have implemented biometric scanners to enhance remote access and management by adding another layer of network security for system administrators. Unfortunately the cost of implementing fingerprint and other biometric security scanning in data centers is still quite expensive, and many centers still rely on ID badges while waiting until biometric technology becomes a little more pocket-book friendly (Zerowire.in).

3. Working of Starting System

The function of the starter motor is to start up the combustion engine. An electric motor forms the basis of the starter motor. When the starter switch is turned-on, the starter relay turns on the electric motor. This motor drives the starter gear ring via the pinion gear.

The rotating movement of the starter motor is created through the interaction of two magnetic fields. Starter motors come with permanent magnets or with electromagnets. Each of these configurations has its own specific characteristics.

The energy required by the starter motor is provided by the battery. The starter motor requires a lot of start-up power. The battery must therefore have sufficient capacity and any losses must be kept to a minimum. As the starter motor begins to turn faster, start-up power is reduced. This is caused by the inverse voltage generated. Depending on temperature, diesel engines require starting assist systems. In case of passenger cars, these facilities consist of a preheating system that preheats the combustion chamber and the air it contains. Glow plugs serve as heating elements. The glow period is regulated using a glow timer.

On the contrary, electromagnetic regenerative suspension transforms the shock energy into electric energy that is more convenient to store and reuse, and has high performance, increased efficiency, less space requirements, and so on. In recent years, electromagnetic suspension (EMS) system has drawn worldwide attention. Permanent magnets motor is favoured in EMS to provide active force in actuator mode or damping force in generator mode. The damping force can be simply changed by tuning the shunt resistances

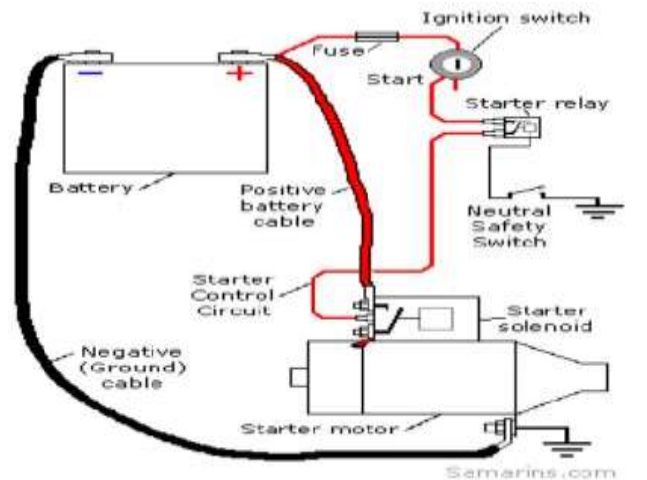


Fig - Working of Vehicle Starting System

3.1 MATERIAL

(a) Base Materials used for PCB

The base materials used for PCB's are glass epoxy, epoxy paper, polyester etc. Copper foil used for copper clad is manufactured by the process of electronic deposition.

(b) Finger Print Sensor:

(c) LCD

(d) Relay:

Relay acts as a switch which is used to control the 230 volt AC supply. This relay will be turned on whenever vehicle crossed speed limit. This relay can be used to turn on a high volume alarm or siren etc.

(e) Microcontroller:

(f) GSM Modem:

(g) Buzzer: -

Used to give indication of over speed condition.

(h) Resistors:

The pull-up resistors are required to source the required current to the 7-segment display, which the microcontroller alone is not capable.

4. DESIGN

4.1 diode design:-

$$PIV = V_m$$

$$V_m = E_0 \max + 2 V_f$$

$$= 10.7 + 1.4 \text{ V}$$

$$= 12.1 \text{ V}$$

$$= I_0 = \frac{I}{2} = 116.2 \text{ mA} / 2$$

$$= 58.1 \text{ mA}$$

$$= 5 \text{ ms} - 3.4 \text{ ms} = 1.2 \text{ ms}$$

$$I_{fm} = 116.2 \text{ mA} (8.6 \text{ ms} + 1.2 \text{ ms}) / 1.2 \text{ ms}$$

$$= 833 \text{ mA}$$

From above specification diode 1N4007 is selected

4.2 Filter Capacitor:

As mentioned above we have to use filter capacitor to remove the AC signal from the output of rectifier. Filter capacitor is used in order to remove ripples from the pulsating DC and convert it to unregulated DC.

A capacitor is an electrical device that can store energy in the electric field between a pair of closely spaced conductors (called 'plates'). When voltage is applied to the capacitor, electric charges of equal magnitude, but opposite polarity, build up on the plate.

Capacitors are used in electrical circuits as energy storage devices. They can also be used to differentiate between high frequency and low frequency signals and this makes them useful in electronic filters. These small deviations from the ideal behaviour of the device can become significant when it is operating under certain conditions, i.e. high frequency, high current, or temperature extremes.

$$PIV = 100V$$

$$I = 1A$$

For filter capacitor design:

$$C = (I_l * t_1) / V_r$$

V_r = ripple voltage

I_l = load current

T_1 = time during which the capacitor being discharge by load current

V_r = ripple voltage 10% of output voltage

$$V_r = 1.0 V \text{ Frequency } 50 \text{ HZ}$$

$$T_1 = 1/50 = 20 \text{ ms}$$

$$T \text{ for } 360^\circ = 20\text{ms}$$

$$\text{For } 180^\circ = 10\text{ms}$$

$$\text{For } 60^\circ = 20\text{ms} * (60^\circ/360)$$

$$= 3.4\text{ms}$$

For bridge:

$$T_1 = [\text{time for } 90^\circ + \text{time for } \leq 1]$$

$$= 5\text{ms} + 3.4\text{ms} = 8.4\text{ms}$$

I_l = load current supplied to various IC

I_l = current required for LCD + o/p current of 89S51 + o/p current of max232 + current required for LM35 +

+ Current required for heart beat sensor + current required

For GPS SR-87

$$= 3\text{mA} + 40\text{mA} + 8\text{mA} + 0.060\text{mA} + 22\text{mA} + 40\text{mA}$$

$$= 113.06\text{mA}$$

$$= 113.06 * 8.4 * 10^{-6} / 1$$

$$= 949.704 \mu\text{F}$$

Thus this 949.704 μF value can be approximated to 1000 μF . Thus we will use 1000 μF capacitor before IC 7805, which is used for improving Frequency Response.

(i) Voltage Regulator:

Two separate voltage regulators are used after the filter capacitor so as to generate constant DC voltage supply of 5 volts and 12 volts. We have used 7805 and 7812 as a voltage regulator. Both of them are three pin IC which are namely input, ground and output. We have to give output of filter capacitor to the input of regulator, and we get 5 volts and 12 volts supply at the output pin of the respective regulator.

Transformer selection we require 12V for min input for IC 7805

$$= \text{Drop across IC 7805} + \text{Required Output voltage}$$

$$= 3 \text{ V} + 5 \text{ V}$$

$$= 8 \text{ V}$$

So at Input of 7805 we required 8 V with margin

Consider drop across diode 0.7V so 2 diode conducts drop is 1.4 V

$$= 1.4 \text{ V} + 8 \text{ V}$$

$$= 9.4 \text{ V}$$

So at secondary we required 10 V

FUTURE SCOPE

Among the various Automobile and electronic technologies one of biggest has been in the Biometric and GSM Security with Starting System.

- Strong security provides in provide the vehicle.
- GSM Through easy location stress in vehicle.
- Future finger print problem in condition owner send GSM through in circuit ON send Message and start the vehicle.
- Cell phone through ignition start.
- Easy apply in four wheeler.
- Driver information send in owner cell phone.

CONCLUSION

With the knowledge of new techniques in 'Electronics' we are able to make our life more comfortable. One such application of Automobile & Electronics is used in "Biometric and GSM security with starting system" The approach we followed and which is explained in this project report is novel and has achieved the target of "Biometric and GSM security with starting system" satisfying user needs and requirements. The development of this project has shown how much hard work goes into the creation of a system. "Biometric and GSM security with starting system" was a project based on microcontroller, due to which hardware requirement.

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