ARDUINO BASED SMART CAR SECURITY FOR THEFT CONTROL USING IOT

Submitted in partial fulfillment of the requirements for the award of
Bachelor of Engineering in Electronics and Communication Engineering

By

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

SCHOOL OF ELECTRICAL AND ELECTRONICS

SATHYABAMA

INSTITUTE OF SCIENCE AND TECHNOLOGY

(DEEMED TO BE UNIVERSITY)

Accredited with Grade "A" by NAAC|12B Status by UGC I Approved by AICTE

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BONAFIDE CERTIFICATE

This is to certify that this Project Report is the bonafide work of **P. NAGA PRUDHVI (37130312)** who carried out the project entitled **ARDUINO BASED SMART CAR SECURITY FOR THEFT CONTROL USING IOT** under my supervision from NOVEMBER 2020 to APRIL 2021.

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DECLARATION

I **P.NAGA PRUDHVI,** hereby declare that the Project Report entitled**"ARDUINO BASED SMART CAR SECURITY FOR THEFT CONTROL USING IOT"** done by us under the guidance of **Ms.V. AMALA RANI, M.E, (Ph.D)** is submitted in partial fulfilment of the requirements for the award of Bachelor of Engineering in Electronics and Communication Engineering.

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ABSTRACT

As part of the intelligent city's development, an Arduino-based intelligent car control and accident notification system was created. The finger print module is installed in the vehicle's door. When the finger is matched to the finger print module, the door automatically opens; otherwise, the buzzer will sound. The GPS module is used to track vehicles. This unit, wherever the vehicle robs, conveniently tracks the location over the cloud with time and date. It also has an alcohol sensor that detects if the individual has consumed alcohol. If alcohol is consumed, the engine is turned off automatically. This computer has a rain sensor that activates automatically when it rains. In this unit, we use the mems sensor, which helps us to quickly determine whether or not an accident occurred. We have access to all information in IOT cloud data.

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CHAPTER 1

1. INTRODUCTION

Around 14,500 of the 36,000 cars stolen in India each year are worth nearly Rs.115 crore, mostly in non-road terms, and many components are missing. Since there are so many options, many cars are actually stolen. Cars are also left unattended and unexpectedly parked. Robbery attempts can only be thwarted through a mixture of anti-theft techniques. Nearly 16 crore cars were registered in 2012, with 1,7 lakh being stolen. Despite all law enforcement agencies' claims that car robbers are effectively tracked, the Lok Sabha estimates that 1.65 lakh vehicles were stolen in just one year, in 2013. It was also robbed of key entry. TWOC is a well-known term. " Taken Without Owner's Consent " (TWOC). Via unauthorised use of a car, the owner provided the driver with easy access to the keys. This includes the vehicle owner's employee, the young or adult child, and anyone else who would otherwise be permitted to use the truck. Depending on the rule, the vehicle's owners can choose not to charge. This can be done in a variety of ways. This description, however, can also apply to criminals who break into a vehicle and discover the owner's keys inside, then drive the vehicle with the keys. First, the owner or operator must remove a vehicle that is unreachable and mostly idle.

The second section deals with opportunistic fraud (i.e.). Alternatively, some cars for sale are stolen during a "test drive." A "test drive" may also give a potential robber details about the location of the vehicle's key, allowing the robber to return home and steal later. Tracking equipment, which was first created for the shipping industry, is designed to immediately identify the location of each car. GPS technology determines the spot, which is then transmitted in real time through a GSM modem. The paper is divided into two parts. The paperwork must be completed. 1) Determine the vehicle's position. 2) Automobile ownership. It is simple to locate the vehicle without difficulty. The following services are available: Remote locking and door lock features, as well

as monitoring and retrieval of robbed cars. It can be used to monitor the status and location of valuable goods being transported by lorries. It can be used to keep track of the driver's status in the system. It reduces vehicle misuse, resulting in significant cost savings for individuals.A grouping of capable or programmable hardware and software that is considered in a broad framework for particular features or functions is referred to as an embedded computer. Industrial equipment, agricultural machines, cars, medical devices, cameras, household appliances, sellers' appliances, toys, and mobile devices are all possible candidates for an embedded system.

1.1 ADVANTAGES OF OUR SYSTEM:

Robbery prevention and injury avoidance are two major benefits of our scheme. High-tech safety features, especially in low-cost vehicles, are not available. As a result, only the access individual has access to the access sensor. With the aid of a rain sensor, we will reduce the number of people on the job. With the help of an alcohol sensor, we'll be able to keep accidents to a minimum. Mems is an accident warning sensor.

1.2 OBJECTIVE

1. To propose a system using finger based security system to prevent theft control.
2. Also included many features like gas sensors to detect air and automatic wiper.
3. We can easily locate the car with time and date via cloud if car is stolen by someone
4. The system will update the data to cloud for instant of time.

1.3 EMBEDDED SYSTEM

Embedded systems are computer systems, but they face a particular challenge in distinguishing between various devices — from no UI to sophisticated user interfaces, as seen on mobile devices. Keys, LEDs, sensor tactiles, and other user interfaces are used. Remote user interfaces are also used by some applications.

1.4 The internet of things builds on an embedded systems base

While some embedded systems are simple, a growing number of them either eliminate the need for human decision-making or have functionality beyond that of humans. Some aircraft, such as drones, can, for example, combine sensor data and operate faster than humans, allowing for new forms of functionality.

CHAPTER-2

2. LITERATURE SURVEY

2.1 RFID BASED THEFT DETECTION SYSTEM FOR AUTOMOBILE PARTS

In Sri Lanka, vehicle theft is a low-profile crime with inadequate penalties. An inquiry has been conducted in Colombo, Sri Lanka, to determine which car parts are sometimes stolen. This is critical if a better safety system capable of detecting robbery and ensuring vehicle authenticity is to be established. According to the survey results, this vehicle safety device was clearly needed. The study explains how a model prototype for preventing vehicle theft was developed, introduced, and tested using RFID technology, demonstrating that vehicle theft is a real problem. The vehicle safety system is transformed into a low-cost solution based on TDM and signal relays using a single low-cost RFID reader.

2.2 ANTI-THEFT DEVICE FOR CAR: ALERT SYSTEM USING RADIO WAVE

Car theft is currently an issue in Thailand, which, despite the presence of many anti-theft devices, has an effect on both the economy and cross-border criminals. Equipment locking, remote control, and GPS vehicle tracking are examples of these mechanisms. GPS tracking systems are of particular interest because, if the car is stolen, the GPS location is sent to the owner's phone on demand through the mobile system's connection principle. However, these devices do not have a broad range of services. If someone tries

to steal a car, the system senses motion in the vehicle and automatically sends the GPS location to the driver.

2.3 ANDROID BASED VEHICLE ANTI-THEFT ALARM AND TRACKING SYSTEM IN HAND-HELD COMMUNICATION TERMINAL

The number of vehicles in China is increasing as the automobile industry expands. Cars have long been a popular form of public transportation. Although the convenience and speed of travel are appreciated, vehicle theft is becoming a growing concern. An anti-theft alert and an Android-based tracking system are used in this article to design and create a manually controlled touch terminal. Vehicle abnormal information is sent to the owner's mobile phone, such as a smart phone, through an integrated sensor device on terminals running the Android operating system (OS). This makes it possible to use the remote alarm over long distances. Furthermore, vehicle location tracking is possible thanks to the use of GPS or contact base station positioning.

2.4 POSITION DETECTION AND TRACKING SYSTEM

Via GPS and standard Web technologies, the autonomous location tracking and monitoring system improves accurate positioning for friends and family. A smartphone customer, a registry, a web customer, and a map service are all part of this network. When friends or family members join the management room, the mobile client locates the business and sends pop-up SMS. This location can be sent to the server, where it can be monitored and displayed using the web client by other users.

CHAPTER-3

3. AIM AND SCOPE OF THE PRESENT INVESTIGATION

3.1 AIM

- • To have a robbery deterrent system that focuses on a finger. Many features were also included, such as an air sensor and automatic wipers..

3.2 EXISTING SYSTEM

- Assume that this system has several flaws, such as the possibility of fraudulent acts if the documents are insufficient.
- The new system does not have any modules for vehicle tracking.

3.3 PROPOSED SYSTEM

- Arduino smart car safety as part of smart city development to prevent theft and provide accident warning.
- A finger print module is installed in the car door. When the finger is paired with a fingerprint module, the door will automatically open; otherwise, the buzzer will sound.
- GPS makes use of the vehicle tracking module. In any case, this computer with time and data can easily track theft through the cloud.
- This device's alcohol sensor also senses whether or not anyone has consumed alcohol. If alcohol is consumed, the engine is turned off automatically.
- This unit has a rain sensor that activates automatically when it rains.

3.4 PROPOSED BLOCK DIAGRAM

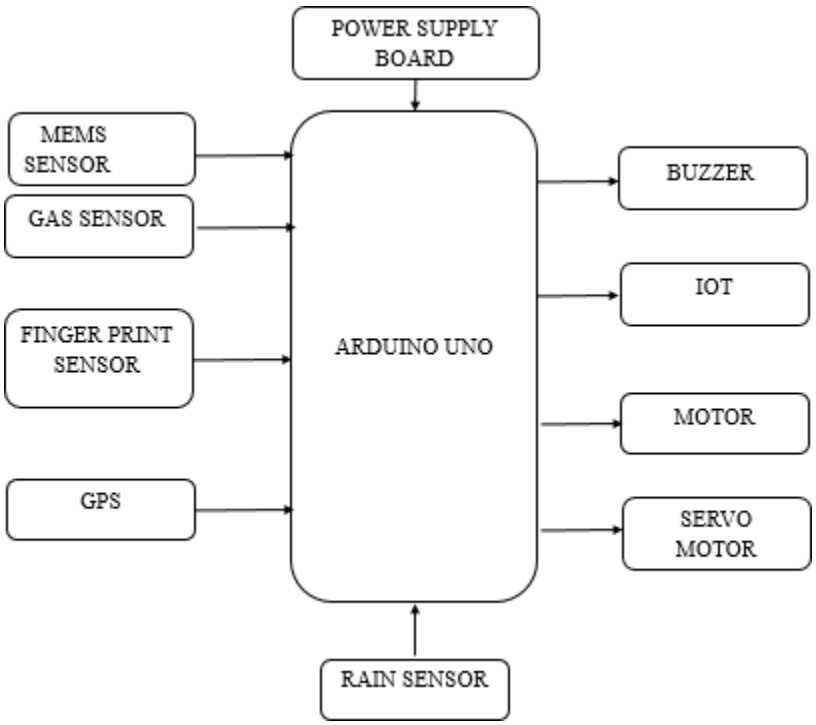


Fig 3. 1: Block Diagram

3.5 WORKING OF BLOCK DIAGRAM

• A finger print module is installed in the car door. When the finger is matched to the finger print module, the door automatically opens; otherwise, the buzzer will sound. The GPS module is used to track vehicles.

• When a car is stolen, this computer quickly tracks the site using time and date from the cloud.

• This device's alcohol sensor also senses whether or not anyone has consumed alcohol. If alcohol is consumed, the engine is turned off automatically.

• This unit has a rain sensor that activates automatically when it rains.

CHAPTER- 4

4. EXPERIMENTAL OR MATERIALS AND METHODS;ALGORITHMS USED

4.1 HARDWARE REQUIREMENTS:

- ARDUINO UNO
- ESP8266
- GPS
- FINGER PRINT SENSOR
- GAS SENSOR
- MEMS SENSOR
- MOTOR
- BUZZER
- SERVO MOTOR
- RAIN SENSOR
- POWER SUPPLY

4.1.1 SOFTWARE REQUIREMENTS:

- ARDUINO IDE
- EMBEDDED C
- PHP

4.2 ARDUINO UNO :

The Arduino Uno is a microcontroller board based on the ATmega328 (datasheet). A ceramic 16-MHz resonator, a USB link, an ICSP header, and a board reset button are among the 14 pins (including 6 pwm output). It includes all of the microcontrollers needed for USB port connectivity as well as AC-to-DC operation from a battery or adapter. The Uno differs from all previous boards in that it lacks an FTDI USB serial driver chip. Instead, it comes with an Atmega16U2 configured as a USB-to-serial converter (Atmega8U2 up to version R2). The 8U2 HWB line on the Uno Board

Revision 2 is pulled to ground by a resistor, making it easier to position in DFU mode. Board Revision 3 introduces the following new features:

• The pinout is 1.0. The SDA and SCL pins are added near the AREF pin, and the IOREF pins, which are near the RESET pin, allow the shields to adjust to the voltage supplied by the board. In the future, shields will be compatible with both the 5V-operating AVR board and the 3.3V-operating Arduino Due board. The second is an unattached pin that will be used in the future.

• The RESET track has been improved.

• Replace the 8U2 atmosphere with something else. "Uno" is an Italian name for the upcoming Arduino 1.0 release. Arduino's reference versions, the Uno and version 1.0, are evolving. The Arduino boards reference model is the Uno, the modern order of USB Arduino boards; the Arduino boards index for examples of previous versions.

4.3 POWER

VIN. The Arduino Board can reduce the input voltage where an external source of energy is used (“as opposed to 5 volts from the USB connection or other regulated power source”). This pin may be used to provide or access the voltage by supplying power through the power jack.

5V, This pin disconnects a 5V power from the panel's controller. The board comes with a DC power jack (7–12 V), a USB connector (5V), or a VIN pin on the board (7-12V). The controller is bypassed by the 5V or 3,3V supply voltage, which may damage your device. It is not something we suggest. We do not recommend it.

3. 3 volts A 3,3-volt supply is produced by the on-board regulator. The current draw is set to the maximum of 50 mA.

• Pins on the surface of GND.

Fig 4. 1 : Arduino UNO

The ATmega 328 is a 32-kilobyte microcontroller (with 0.5 KB used for the bootloader). Enter and leave the building. The entrance and exit. Pin mode (), digital type (), and digital reading can all be used as input or output on any of the 14 digital Uno pins (). It runs on 5 volts. You have a job. You have a job. Each pin's internal pull resistance ranges from 20 to 50 kg Ohms and can handle up to 40 mA.

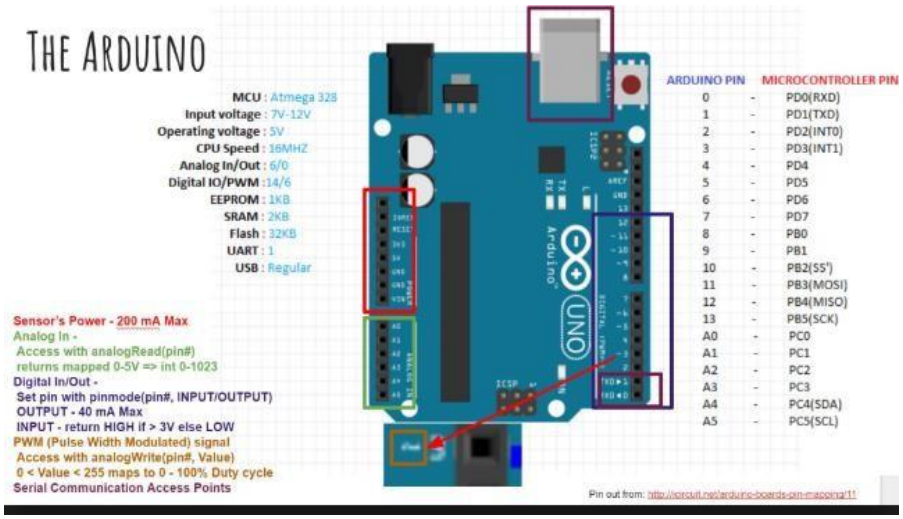


Fig 4.2: PIN CONFIGURATION

4.3.1 USB OVERCURRENT PROTECTION

The reset polyfuse on the Arduino Uno protects the USB ports on your device from

shorts and overcurrent security. When most machines are sealed internally, the fuse provides an external protective surface. The fuselage automatically breaks the connection if the USB port exceeds more than 500 mA before a short load is removed.

4.4 ESP8266

The ESP8266 provides a full and independent wireless Internet solution for hosting or discharging all Wi-Fi networking purposes from other application processor. If the ESP8266 programme is the only programme on the computer, it can boot from an external flash drive. The cache has been used to increase device capacity and reduce memory requirements in these applications.

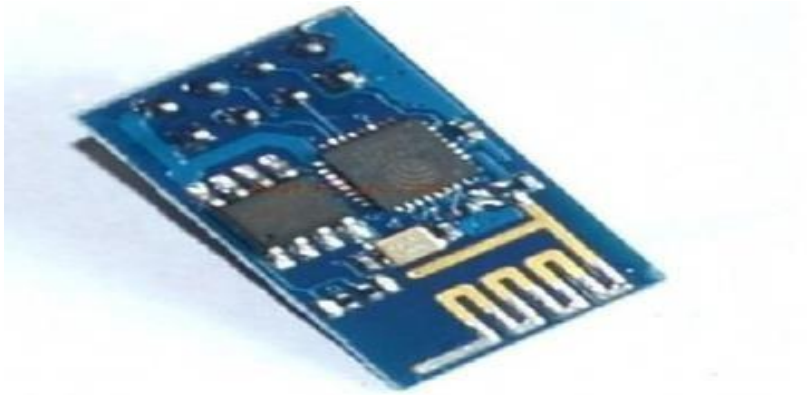


Fig 4.3 : WIFI Module

Any design based on a microcontroller will benefit from the use of the UART or CPU AHB bridge interface as a Wi-Fi adapter. ESP8266 can be integrated into sensors and other applications through its GPIOs, with minimal upfront formation and low load during operation, thanks to its on-board processing and storage ability. It only requires a few external connections and is designed to cover a small PCB region, including an antenna switch baluna, a power management converter, and a complete solution, including the front-end module, with a high degree of on-chip integration.

4.4.1 FEATURES :

- SDIO 2.0, SPI, UART
- 32-pin QFN package
- Integrated RF switch, balun, 24dBm PA, DCXO, and PMU
- Integrated RISC processor, on-chip memory and external memory interfaces
- Integrated MAC/baseband processors
- Quality of Service management
- I2S interface for high fidelity audio applications
- On-chip low-dropout linear regulators for all internal supplies
- Proprietary spurious-free clock generation architecture
- Integrated WEP, TKIP, AES, and WAPI engines

4.4.2 SPECIFICATIONS :

- 802.11 b/g/n
- Wi-Fi Direct (P2P), soft-AP
- Integrated TCP/IP protocol stack
- Integrated TR switch, balun, LNA, power amplifier and matching network
- Integrated PLLs, regulators, DCXO and power management units
- +19.5dBm output power in 802.11b mode
- Power down leakage current of <10uA
- Integrated low power 32-bit CPU could be used as application processor

4.5 GPS

The "Global Positioning System" is abbreviated as "GPS." The Global Positioning System (GPS) is a satellite map reading system that is used to locate an object. The United States armed forces first used GPS knowledge in the 1960s, and civilians began to use it in the following decades. Many consumer goods, such as automobiles, smartphones, fitness watches, and GIS, are now equipped with GPS receivers.

The GPS system is made up of 24 satellites that are spaced about 12,000 millimetres apart across the globe (19,300 kilometres). They fly about 7,000 kilometres per hour every 12 hours (11,200 kilometres per hour). The satellites are evenly spaced so that four satellites can be seen clearly from every location on the planet.

Each satellite transmits a message with its current location, orbit, and time. The GPS receiver uses a technique called triangulation to determine its exact location by combining signals from multiple satellites. Three satellites are needed to determine the position of the receiver, but four satellites are more accurate.

In order to speed up GPS detection, most GPS devices employ a caching feature. A GPS system can easily identify which satellites are accessible when searching for a GPS signal by saving its previous position.

4.5.1 WORKING

4.5.2 GPS satellites orbit Earth twice a day, in exact orbit. To decode GPS devices and decide the correct position of the satellite, each satellite has its own signal and orbital parameters. These data and trilateralization are used by GPS receivers to determine a consumer's exact position. At the time a transmitted signal is received, Each satellite is measured by a GPS receptor. The receiver will quantify and display your location electronically using distance measures from a handful of more satellites for the calculation of your race, for a golf course to be mapped, or for a trip anywhere.

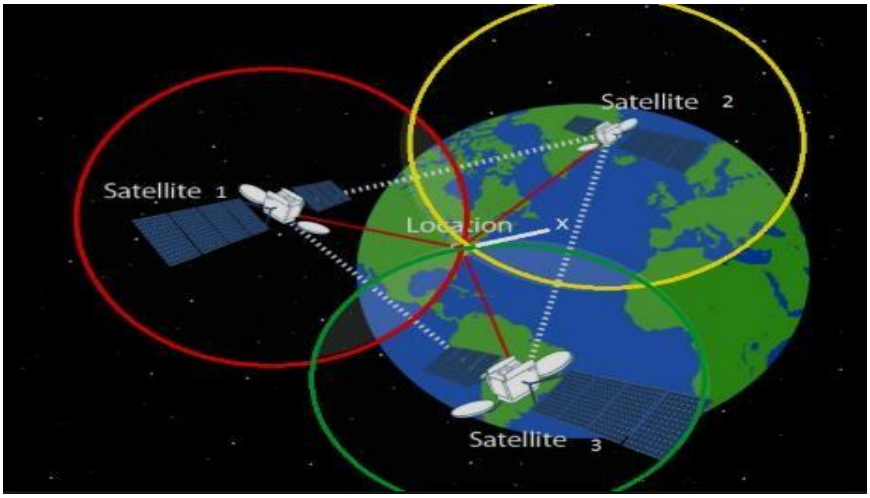


Fig 4. 4: GPS WORKING ON MOBILE

A GPS receptor has to be locked into the signal of at least three satellites to monitor the 2-D location (latitude and longitude) and track rotation. By viewing four or more satellites, the receptor will decide your 3-D location (latitude, longitude and altitude). A GPS receiver normally monitors eight or more satellites, depending on the time of day and location. Certain devices would enable you to do something with your wrist.

The GPS will measure additional statistics, for example, until your location is calculated.

4.5.3 ACCURACY

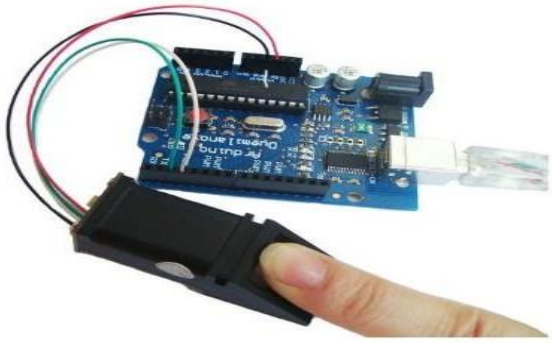
GPS receivers are extremely reliable today thanks to their parallel multi-channel design. If you activate our receivers first, they will easily lock on to satellites. In dense areas or urban environments with large buildings, they form a tracking lock. The accuracy of GPS receivers can be affected by atmospheric or other error causes. Garmin GPS recipients generally are about 10 meters precise. The accuracy at sea is even better.

WAAS improves the reliability of the Garmin GPS receiver (Wide Area Augmentation System). This capability will increase accuracy to more than 3 metres by correcting the atmosphere. There are no additional costs or fees associated with using WAAS satellites. Differential GPS (DGPS) will aid users in improving their precision and correcting GPS distances to within 1 to 3 metres on

average. The most commonly used DGPS correction service is the US Coast Guard, which uses a network of towers to transmit GPS signals through beacon transmitters. In addition to their GPS, users would need an antenna and a differential beacon receiver to receive the correct signal.

4.6 FINGER PRINT SENSOR

Fingerprint scanners are biometric protection instruments. For opening, doors and other security applications are used. Fingerprint scanners became available on mobile phones in 2010.



4.5 FINGER PRINT SENSOR

4.6.1 TYPES :

Optical reflexive

The elded technique uses a finger or prism lightened by a led diode. When the fingerprints make contact with the surface, the light is immersed, and the crests are fully reflected. The light and dark areas that result are recorded by a pictorial sensor.

In practise, this approach has some drawbacks: photographs taken with wet and dry fingers vary significantly, and the system is sensitive to dust and dirt on the surface. The device is enormous, inefficient, and expensive. This device is simple to use, and when

the skin is damaged, the fingerprint cannot be properly identified. Elderly fingerprints can be difficult to recognise due to a lack of elasticity in the skin. In certain cases, this can lead to incorrect identification. If the stored fingerprint is taken with a lower pressure, false acceptances may occur.

Capacitive

The sensor is a silicone-integrated circuit that includes a regular 500 pixel transducer as well as a large number of transducer components. Each element has two metal electrodes that are next to each other. It saves power and provides a feedback path for an inverting amplifier when the finger is used to feel ridges instead of distance from the electrodes.

Electrostatic discharge is the focus of the sensor. These sensors only work on healthy skin; they don't work in rough conditions, calluses, or scars. They are ineffective. They are ineffective. Moisture, fat, and dust may all have an impact on their behaviour.

Mechanical

On the sensor surface, there are tens of thousands of tiny pressure transducers. An alternative design uses switches under a valley that stay open if they are replaced by a slope. Rather than dealing with a grey scale, it just gives one pixel with some detail.

Dynamic output

In the past, most sensors have been upgraded. A new operating mode has been developed to prevent this. Instead of being still, the finger runs around the sensor in a steady motion. Since the sensor has a tiny sensitive area, a processor can stitch a series of images together in a full frame.. The benefits have been greatly enhanced, and the residual fats have been removed.

4.7 GAS SENSOR

A gas detector is a device that detects gas in the atmosphere and serves as a safety device. These instruments detect gas leaks or other contaminants and send a signal to a control device, which automatically shuts down a method. A gas detector in the field where the leak occurs will alert the operators to travel. This type of apparatus is necessary since certain gases, including those emitted by humans and animals, can harm organic life.

The gasoline, inflammable, poisonous gases and oxygen loss can be detected by gas detectors. This device can be used for process tracking and new technologies, such as photovoltaic systems, in plants such as petroleum plants.. It has the capability of putting out fires.

The mechanism by which sensors identify potentially dangerous gas leaks is known as gaseous leak detection. The identification of hazardous gas is usually indicated by a hearing warning from these sensors. Toxic gases such as paint, spray, fuel, construction, drilling, depositing, and entering closed areas, among other items, may be released during operations. Carbon gases, photoionic sensors, infrared point sensors, ultrasound sensors, gas sensors, and semiconductor sensors are all commonly used sensors. Gas sensors are a common form of sensor. Infrared image sensors have only recently become usable. Industrial plants, refineries, drug factories, fumigation facilities, pulp mills, aircraft and shipyards, hazmats, wastewater treatment systems, cars, indoor air quality inspections, and indoor homes are all places where they can be used. Tests for indoor air quality are available. Both sensors can be used in a variety of ways.

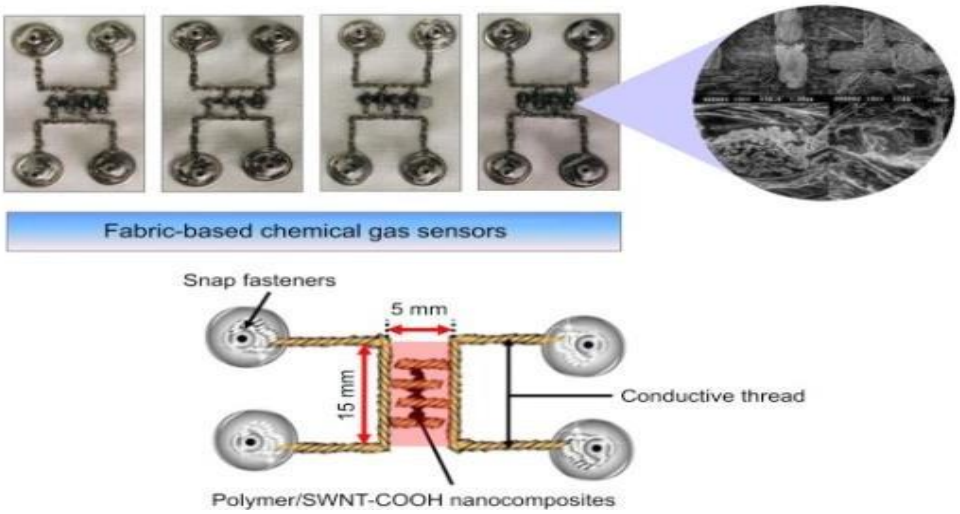
4.6 GAS SENSOR

4.7.1 ELECTRO CHEMICAL:

Gases can be spread to an electrode through Porosity membranes and oxidised by chemistry in electrochemical gas detectors. As the gas oxidises, the amount of the current released will determine whether an electrode showing the concentration of gas is measured. By changing the porous barrier, manufacturers may customise electrochemical gas detectors to a particular range. The diffusing barrier has proved to be more durable and efficient as a physical/mechanical barrier than other early detection technologies that need less maintenance.

4.7.2 CATALYTIC BEAD(pellistor)

Catalytic bead sensors are used on flammable fuel gases that are between the low and upper explosion limits (UEL). The active and reference beads on the opposite arm of the Wheatstone Bridge circuit are platinum platinum wire coils with temperatures of up to a couple of hundred C. The catalyst in the active bead heats the bead and changes its electrical resistance, allowing the fuel compound to be oxidised. The difference in voltage between active and passive performances is the same as with gasoline gasses and vapour. When the system is transported to a fuel gas environment, the sampled gas passes through snuffed fried metal in the sensor, preventing an explosion.



4.7

All fuel gasses are detected by pellistors but especially sensitive to smaller molecules which spread through the sinter more rapidly. The observable volume is normally between a few hundred and a few thousand parts per million. Compounds like silicones and mineral acids can poison or inhibit these low-cost and long-lasting sensors, which need at least a few percent oxygen to operate from the air.

Jodides; alcohols, aldehies, alcanes, and alkanes; iodides, olephines, sulphur compounds, and organic est Standard air constituents or mineral acids do not elicit a response.

Electronic vehicle systems for driver notification and auto exhaust system.

4.7.3 SEMI CONDUCTOR:

The sensor senses the gas in direct contact with a semiconductive sensor via a chemical reaction. Tin dioxide in half-conductive sensors is the most common substance which reduces electrical resistance when it comes in contact with the monitoring steam. However, in the case of 1% methane, tin dioxide tolerance is normally about 50 km per day, but it can drop to around 3,5 km per day. Hydrogen, oxygen and poisonous compounds, such as c monoxide, are commonly used in semiconductor sensors. One and only of the popular types of semiconductor sensors is carbon monoxide sensors. They're even used in some breathing treatments. Gas sensors are used over a shorter

distance from infrared or ultrasound detectors because they cannot come into contact with them.

4.7.4 ULTRA SONIC:

Ultrasound detectors are not gas detectors in and of themselves. A pressure gas spreads in a small hole in the low pressure area and detects acoustic emissions (the leak). They use sound sensors to identify variations in the atmosphere's background noise. As most high-pressure gasses produce ultrasound between 25 kHz and 10 MHz, the sensors can easily discern between 20 and 20 kHz between this frequency and the background.

If there is an ultrasound anomaly from the usual background noise frequency, the ultrasound gas leak detector will sound an alarm.

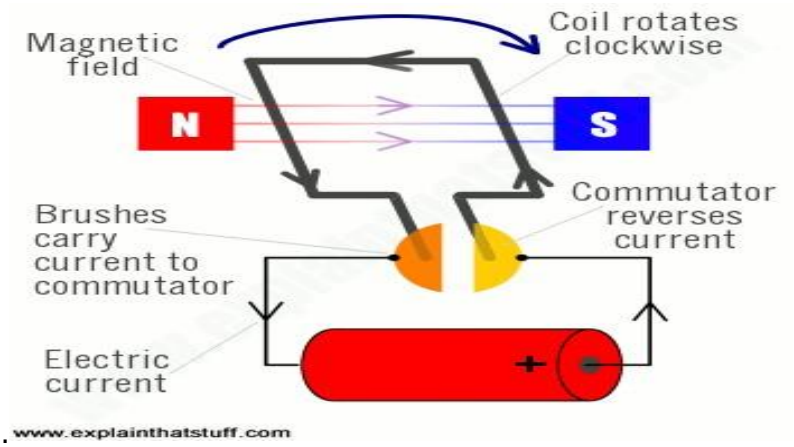
4.7.5 HOLOGRAPHIC:

Holographic gas sensors detect changes in the polymer film hologram matrix by reflecting light. As holograms mirror light at certain wavelengths, a change in structure may lead to a bright reflection of the presence of a gas molecule. In light sources, such as white or lasers, and observers and CCD detectors, holographic sensors are used.

4.8 MOTOR:

A motor is a mechanical device that produces an output. The engine works in the following manner: It is possible to use an alternate current that alternates its direction on a regular basis (AC). Tiny battery motors, such as those found around the house, are the safest way to connect a switch to the coil's ends. It's not like commuting; this out-of-date word is unprepared for the technique's meaningless name. It actually means to travel back and forth, in the same way that it means to go back and forth. When the belt rotates around its axis, the switch is a two-half metal ring with the job of adjusting the electric current in the belt. Half of the switch will be attached to one end of the spindle. The motor's electric terminals are attached to the power supply.

The switch is regulated by a few loose connectors called graphite brushes, which are springy, thin metal lengths that are "brewn" on the switch, as the name implies. When the switch is pressed, the spindle rotates continuously along the path of the circuit's electricity flow.



4.8

Rotor

An electric motor's turning part is the rotor, which turns the shaft to generate mechanical power. The rotor usually has conductors that hold currents that interfere with the attractive field of the stator to generate torque that turns the shaft. Permanent magnets are used in some rotors, while stator conductors are used.

Bearings

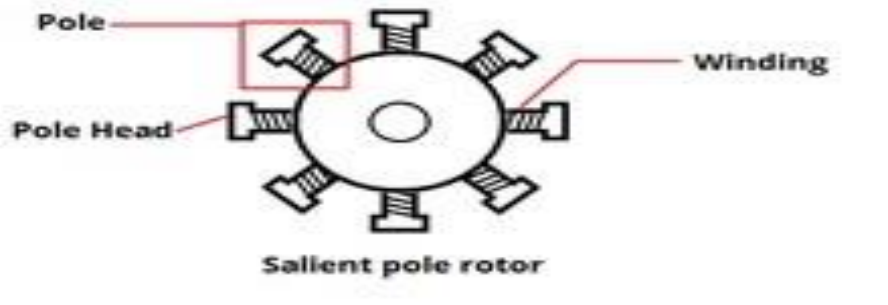
It can rotate around its axis thanks to rotor spindles. The spindles are put to good use. The cupboards are supported by the motor box. From the inside of the engine, the engine shaft is applied to the external load.

Stator

The stator, which is usually made up of permanent magnets or curves, is a permanent part of the motor's electromagnetic circuit. The stator's core is made up of thin lamination sheets. If a solid core is used, laminations are used to reduce energy losses.

Air gap

The disparity between the rotor and the stator is referred to as the air distance. Since a large gap has a big impact on growth, the air gap has a big impact, though it's typically minor. That is the primary cause of engine engines' low power factor. The magnetisation current is increased by the air gap. As a result, the air size should be less. Small gaps can cause automated problems in adding to noise and losses.



4.9 Salient-pole rotor

Windings

When wire coils are bound about a soft magnetic core of iron, magnetic poles are formed.

In electric machines, there are two types of magnetic field poles: salient and non-salent poles. A winding coiled about the pole below the polar face generates the pole's magnet zone in the salient polar assembly. In a non-alien-polar or dispersed area or round-rotor rig, winding is distributed in polar facial slots.

Drivers made of thicker metal, such as copper or aluminium rods or metal sheets, are commonly used in some engines. Electromagnetic induction is commonly used to operate these devices.

4.10 COMMUTATOR

4.8.1 BUZZER:

An electronic, electromechanical, or piezoelectrical audio signaler is known as a buzzer or beeper (piezo for short). In buzzers and bookbinders, user-based confirmations, pacing, and warnings such as a click or a keystroke are popular.

4.11 BUZZER

4.8.2 APPLICATIONS:

While technological advancements have rendered buzzers obsolete and undesirable, buzzers and similar circuits may still be used.

• The use of engineering

• Judging tables are just a few of the current demands.

• Educational goal

• Marketers' tables

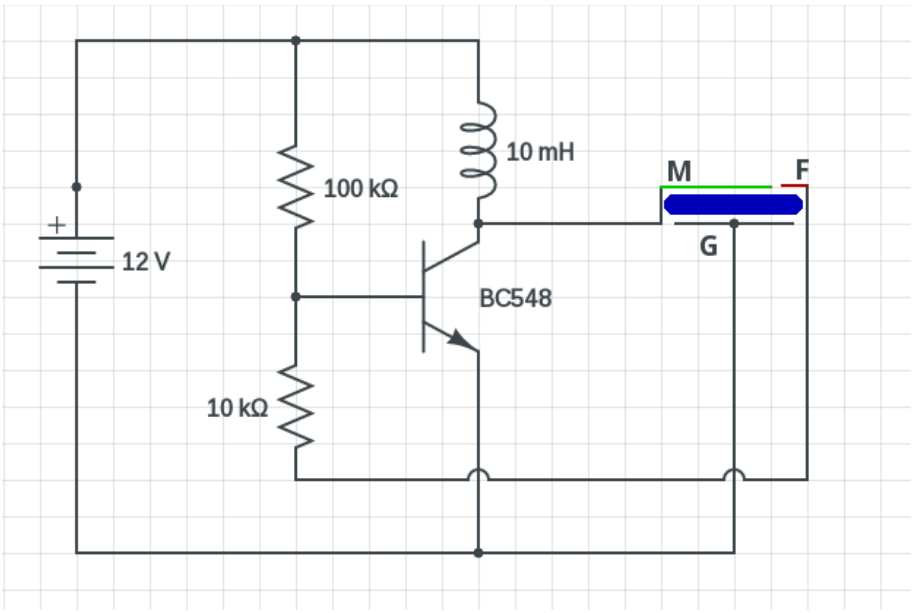
• Electronic metronomes

• Game view lockout device

4.8.3 CIRCUIT DIAGRAM AND CONSTRUCTION:

Take note of the pinout of the piezoelectric portion in the circuit diagram: M is the principal terminal, F is the feedback end, and G is the ground plate.

The circuit is simple to build and can be done on a small bandboard. Since there are few components in this piezo buzzer circuit, it can also be built by soldering them together.



4.12 CIRCUIT DIAGRAM

If the piezo part electrodes receive voltage, they will become more flexible. This adaptable strength allows the base plate to bend up and down.

When a piezoelectric element is subjected to a different stress and creates voltage, the opposite occurs.

As you've seen before, auto drive piezo buzzers are made of a supplementary electrode. In the feedback terminal, the voltage supplied by the flex force is visible.

Piezo buzzers are inserted into a resonant cavity, which has an opening on the opposite side.

The driving mechanism and the piezo buzzer will soon be working together, swinging at the piezo buzzer's resonating frequency.

4.8.4 PIEZO BUZZER CHARACTERSTICS:

- Wide effective voltage: 3~250 V
- t consumption: less than 30 mA greater rated occurrence
- Higher footprint

4.8.5 SERVO MOTOR:

A servo-motor is a rotating or linear actuator that precisely regulates the angular or linear position, speed, and acceleration of a rotating or linear actuator. It is made up of a sensor and an engine for input location. Servo motors also necessitate a sophisticated control unit, which is often a custom-built module.

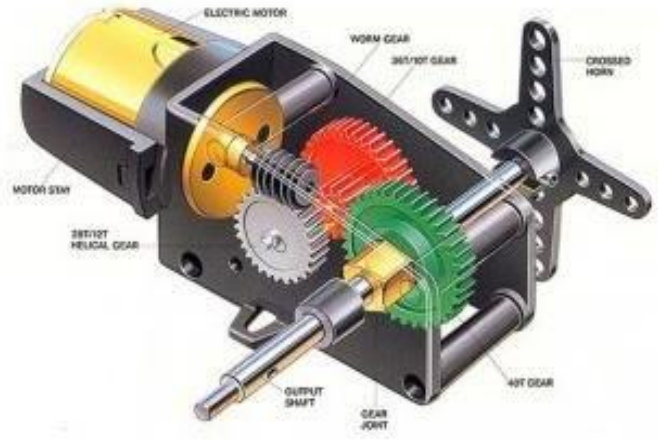
While servomotors are not a particular engine type, they are often used to describe a motor that can be used in a control system.

Servo engines are used in robotics, CNC, and automated manufacturing applications.

MECHANISM

A service engine is a closed-loop servomechanism that controls motion and end position using position feedback. A signal is used as the input (analogue or digital) indicating the output shaft's controlled position.

A location and rpm input encoder are connected to the engine. In the simplest case, only the position is known. The results are compared to the control position and input from the external controller. If the resultant position changes, an error signal is produced, allowing the motor to rotate in the correct position, if possible. When the locations approach and the motor stops, the error signal decreases to zero.



Servo Motor

4.13 SERVO MOTOR

For position sensing, the most simple servo motors only use a motor potenciometer and a bang control; the motor rotates at full speed (or is stopped). This type of servo motor is not the same as the basic low-cost servos used in radio-controlled industrial motion control systems.

In fact, the servo motor is made up of four parts: a standard DC generator, a gear reduction unit, a sensor, and a control system. The DC motor is connected to an overall position sensor with feedback through a gear system. The engine output feeds the servo arm from the transmission box to the servo spline. For normal servo engines, For low-power servo motors, the unit is usually made of plastic, although for high-power servo motors, it is typically made of metal.

One black wire, one white/yellow wire, and one red wire, which is connected to the power supply, make up the three wires.

4.8.6 ADVANTAGES:

- When a full load is applied to the engine, the driver will increase the current to the motor coil as he goes to rotate the motor.
- It is possible to work at a high speed without experiencing any out-of-stage condition.

4.8.7 TYPES OF SERVO MOTORS:

AC servo, DC servo, brushless DC servomotor, continuous rotation, and linear servo-engine are some of the different types of servo-engines. The engine is the servo. Three wires, power control, and dirt make up a typical servo motor. The form and size of these engines are important. The RC servo motor is the most common motor servo in hobby applications due to its simplicity, affordability, and reliability.

4.8.8 DC SERVO MOTOR:

A motor used as a DC servo motor has a distinct DC supply in the winding and frame winding industry. With the control frame current or ground current control, the controller can be used to store power. Compared to armature control, field management has a number of advantages. Similarly, armature management has a number of benefits over field control. On the basis of the applications, the control should be applied to the DC servo motor. The DC servomotor provides a very stable and fast response to start and stop control signals due to its low induction reaction. DC servo motors are used in similar equipment and digitally controlled systems.

4.14 DC SERVO MOTOR

4.8.9 AC SERVO MOTOR:

4.15 AC Servo Motor

AC servo engines are used to track encoders and provide feedback on shut-out loops. This engine can be precisely positioned and operated for applications. These engines often have better rolling stocks or more tolerant designs, as well as higher torque voltages in some simple designs. Engines are used in automation, robotics, CNC machinery, and other applications with a high degree of precision and variety.

4.9 RAIN SENSOR:

Raindrop Sensor is a system that detects rain. It is made up of two modules: a rainboard that detects rain and a module for analogue value control that transforms the analogue value to a digital value. Raindrop sensors can be used in the automotive industry for control and rain sensing in automatic windshield washing machines, as well as in farming.

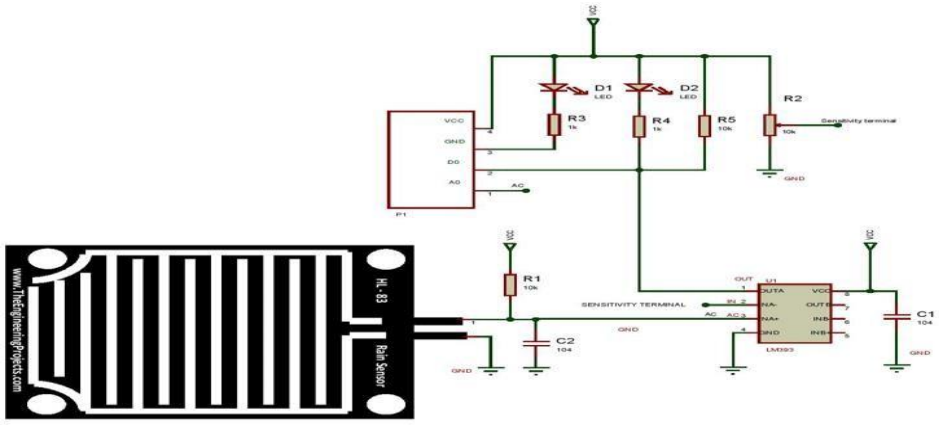
4.9.1 PIN CONFIGURATION OF RAIN SENSOR:

S No:	Name	Function
1	VCC	Connects supply voltage- 5V
2	GND	Connected to ground
3	D0	Digital pin to get digital output
4	A0	Analog pin to get analog output

4.9.2 RAIN SENSOR FEATURES:

- Working voltage 5V
- Potentiometer adjust the sensitivity
- Anti-oxidation, anti-conductivity, with long use time
- Small board PCB size: 3.2cm x 1.4cm

4.16 Rain Board Module



4.17 Raindrop Sensor Module Circuit Diagram

The R1 resistor and platform module serve as a voltage divider, as shown in the diagram above. As a biassing tool, condensers C1 and C2 are used. The non-inverse

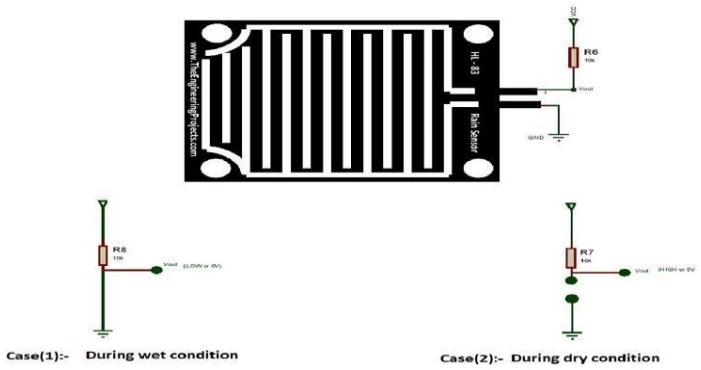
terminal will receive input from a rail board module connection point R1. From this connection, a second point is connected to the control module's terminal A0.

The output of the potentiometer is connected to the LM393 inverter terminal (R2). The R2 resistor can be used as a voltage separator, with the voltage transferred to another R2 in the input terminal, altering the control module's sensitivity. The relationships are depicted in the diagram above. R3 and R4 resistors are used to maintain a high level of bus conditions, while R5 serves as a pull-up resistor when not in use.

4.9.3 WORKING OF RAIN SENSOR:

Case1: When the inverting terminal's input is greater than the non-inverting terminal's input.

Case2: If the input of the inverter is less than the data of the terminal,.



4.18 Raindrop Sensor Working

The input to the inverting terminal is fixed to a specific value by adjusting the capacitor and sensitivity. As rainwater is exposed to the rainboard module's exterior, it becomes humid, resulting in the lowest supply resistance. This will give the LM393 Op-non-inverting Amp terminal the lowest voltage. This comparator contrasts inverting and non-inverting terminal voltages. If the condition exists, the op-output amp should be digital LOW (1). If the condition is present, the Op-Amp

output is HAGH digital (2). The corresponding circuit for both conditions is shown in the diagram below.

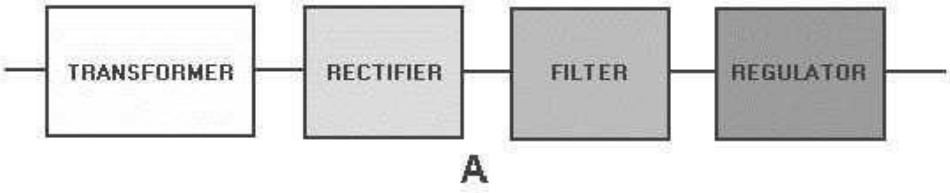
When the A0 pin is attached to the microcontroller, an external analogue digital converter ("ADC") is used. In the terms of Arduino, there are six ADC pins that can be used directly for calculations.

4.9.4 APPLICATIONS OF RAIN SENSOR:

- Automatic windshield wipers
- Smart Agriculture

4.9.5 POWER SUPPLY:

A power supply is an electrical device or system that delivers energy in the form of power or other forms to an output or load group (also known as a power unit or PSU). The concept is most often used to describe electricity supplies, with mechanical energy and other supplies being used less frequently.



4.19 Block diagram of a basic power supply

The transformer isolates the electricity from the energy source by stepping up or down the input line voltage. The alternating current input signal is corrected by applying direct pulsating current. When you get to the end of this section, you'll see why pulsating dc isn't

a good idea. The pulsating fuel is converted into a lighter and more suitable form of dc voltage by a filter component.

The regulator, the final component, does just what its name implies. It maintains constant power supply output despite major changes in current or input voltage. You can now follow an AC signal through the power supply because you know what each segment is doing. You must examine how this signal is altered in the power supply. You'll see how these changes happen later in the chapter. In Figure B, the primary transformer receiver receives a 115 volt AC input signal. The transformer is a step-up transformer with a 1:3 turn-on ratio. The output voltage is determined by doubling the incoming voltage by the ratio of fits in the primary to secondary volume ratio, which is why the output voltage is 115 volts AC' 3 = 345 volts ac. The rectifier's output would be about half or 173 Volts of pulse DC since each diode in the correctifier section is performed by 180° of a 360° supply. The time of increase and decrease of the various indicators is monitored by the filter segment, which includes a resistor network, condensers, and inducers. As a result, the signal maintains a more consistent DC frequency. We can see the filter operation more clearly in the discussion of the real filter circuits. The filter output is a 110-volt dc signal that drives the dc's ac-ripple. The reason for the lower tension is revealed (average tension). Using electronic equipment, the controller maintains a constant 110-volt ft output (more commonly called the load).

Digital circuit Simple 5v supply:

• Short operational description: Provides well-controlled +5V output, 100 mA output current capacity.

• Defense of the circuit: Incorporated overheating cuts off operation when the control system IC becomes too heavy.

• Complexity Circuit: Very easy to build.

• Efficiency Circuit: Highly stable +5V output voltage.

• Component Availability: Easy to obtain, only common fundamental components are used.

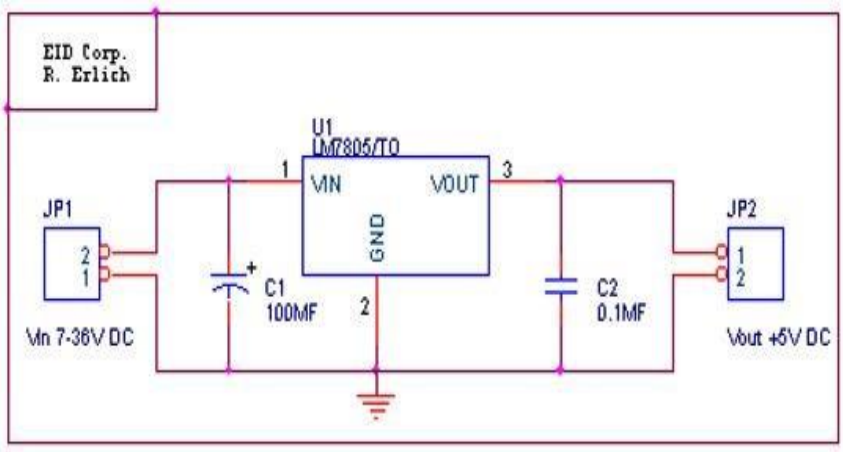
• Applications: electronic equipment component, small power supply laboratory.

• Net control voltage: Network power source unregulated DC 8-18V.

• Current power supply: output current required + 5 mA.

4.9.6 CIRCUIT DESCRIPTION:

This circuit is a minor +5 V power resource useful for digital electronics experiments. Such transformers are easy to obtain, but their tension control is typically very low, so that they are not very usable by digital circuit testing unless there is a better regulation.



4.20 Circuit diagram

This circuit gives +5V output at 150 mA, but if the regulator chip is well cooled, can be increased by 1 A. The device is overloaded and secured by terminals.

To safeguard the input voltage feed, the condensers have to be big enough. The circuit is conveniently mounted as a piece of Vero board.

IC regulator pinout 7805.

1. Voltage not controlled

2. Soil.

3. Out of controlled tension

4.9.7 ARDUINO IDE:

Arduino is a free and open-source electronic platform for people who want to build things. Arduino is made up of an integrated programming environment (IDE) and a physical programmable circuit board that connects to your system and allows you to write and upload computer code to it (often referred to as a microcontroller).

Among people who just started using electronics, and for good reason, the Arduino Platform is extremely popular. Unlike some earlier programmable circuit boards, Arduino does not need extra hardware to load new code into the boards (called a programmer). The Arduino IDE usages a simpler version of the C++ system to make programming simple. Finally, Arduino has a standard form factor, which distinguishes it from a more open microcontroller feature package.

Performers, creators, hackers, newbies, and anyone involved in digital artefacts or environments have used Arduino's hardware and software. The Arduino can communicate with keys, LEDs, motors, GPS, cameras, phones, and even televisions! A broad community of users has contributed code to a variety of arduino projects with instructions, in addition to the point that the Arduino software is free, hardware boards are quite inexpensive, and software and hardware are quite easy to learn.

Arduino panels come in a variety of shapes and sizes, and they can be used for a variety of purposes (explained on the next page). While some Arduino boards tend to be very different from the one shown above, the majority of them share the following components:

4.21 ARDUINO IDE

Sketches are the name for the Arduino software programmes (IDE). In a text editor, the images are generated and saved as files. Cut/paste, as well as search/replace, are available in the text editor. When saving and exporting, feedback is provided in the message field, and errors are also displayed. The console shows the text performance of the Arduino Software (IDE), as well as full error messages and additional information. The board and serial port are configured at the bottom right of the window. Serial screens can be searched, imported, generated, opened, and saved using toolbar buttons.

Arduino is incredibly simple to use, but it provides almost complete control over the majority of Arduino-based projects. "Save File," "Edit," "Font, copy and paste" options (new, load saved, etc.), "Sketch," "Tools," and "Help" are all normally found at the top of the menu bar. Options for "sketch" can also be downloaded. The software code is entered using a simple text editor in the IDE's central field. The compiler status, storage quantity, programme errors, and other useful details are displayed in an output window at the bottom of the IDE.

Sketches are Arduino projects that are written in a stripped-down version of C++ with only a few C++ functions. Microcontroller programming differs slightly from computer programming, so there are several device-specific libraries available (e.g., “changing pin modes, output data on pins, reading analogue values, and timers”). Users who assume Arduino is coded in "arduino" are also perplexed by this. The Arduino, on the other hand, is written in C++. It just makes use of the computer's special libraries.

4.9.8 EMBEDDED C:

Embedded C programmers are the spirit and heart of every embedded PC we use in our daily lives, including mobile phones, washers, and digital cameras.

Any processor contains an embedded software. The integrated programme is the first factor that determines how well an embedded system works. The embedded C language is primarily used to programme the microcontroller.

Several embedded applications have been developed in the past using assembly level programming. They were, however, immobile. This consideration has been addressed in the implementation of various languages such as C, Pascal, and COBOL. It was, however, the programming language C, which was commonly used in embedded systems. C code is much easier to understand than Java code, and it is also more robust, scalable, and portable.

Dennis Ritchie developed the C programming language in 1969. It's a list of one or more tasks, each of which is made up of a set of statements that perform a specific task.

C is referred to as a mid-level language because it can be used to create both high-level and low-level applications. Before diving into the details of embedded C programming, it's important to understand how RAM works.

Salient features of the language

• C language is a programme which contains a variety of keywords, data types, variables, constants, etc.
• Embedded C is a generic word in C, associated with a specific hardware architecture, for a programming langue.

• Embedded C is a C language extension with some extra header data. These files will move from controller to controller.

• The 8051 #include<reg51.h> microcontroller has been used.

Embedded machine designers must know the architecture of the hardware for programme writing. These systems play a leading role in external system monitoring and control. The interrupt processing, timers, serial communication and other features are also controlled and used directly by the internal architecture of the microcontroller.

4.9.9 THE STRUCTURE OF AN EMBEDDED C PROGRAM:

- comments
- pre processor directives
- global variables
- main() function

{

- local variables
- statements
- ……..
- ……..

}

- fun(1)

{

- local variables
- statements
- ……..
- ……..

}

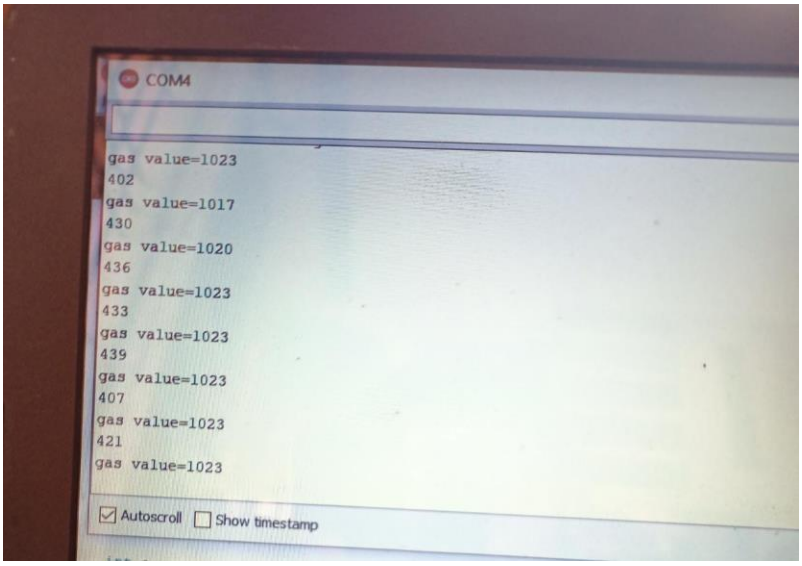
CHAPTER – 5

5. RESULT AND DISCUSSION

• The standard value for alcohol is 1023. If any gas sensor or alcohol sensing value is less than 50, the engine will shut down, and we will see on the screen after some time if there is no gas, the engine will start, and the value will be 1023.

5. GAS NOT DETECTED:

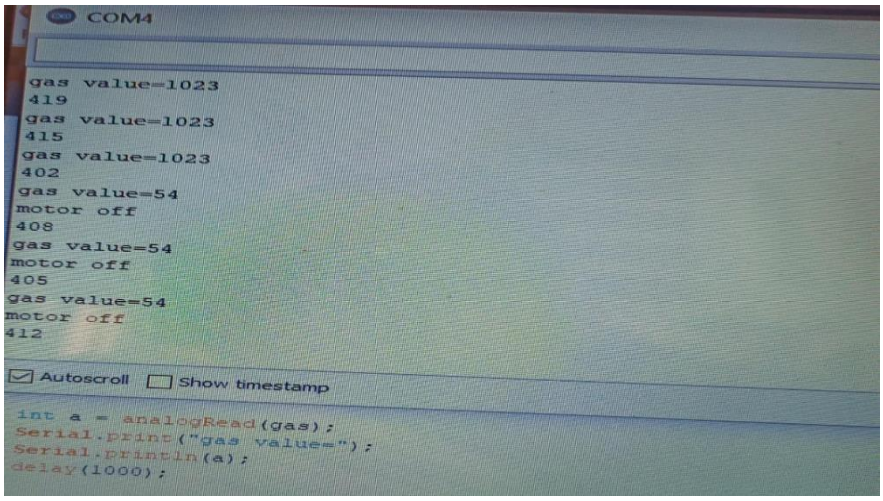
Gas value showing constant in the below image



5.1 GAS CONSTANT VALUE

5.1 GAS DETECTED

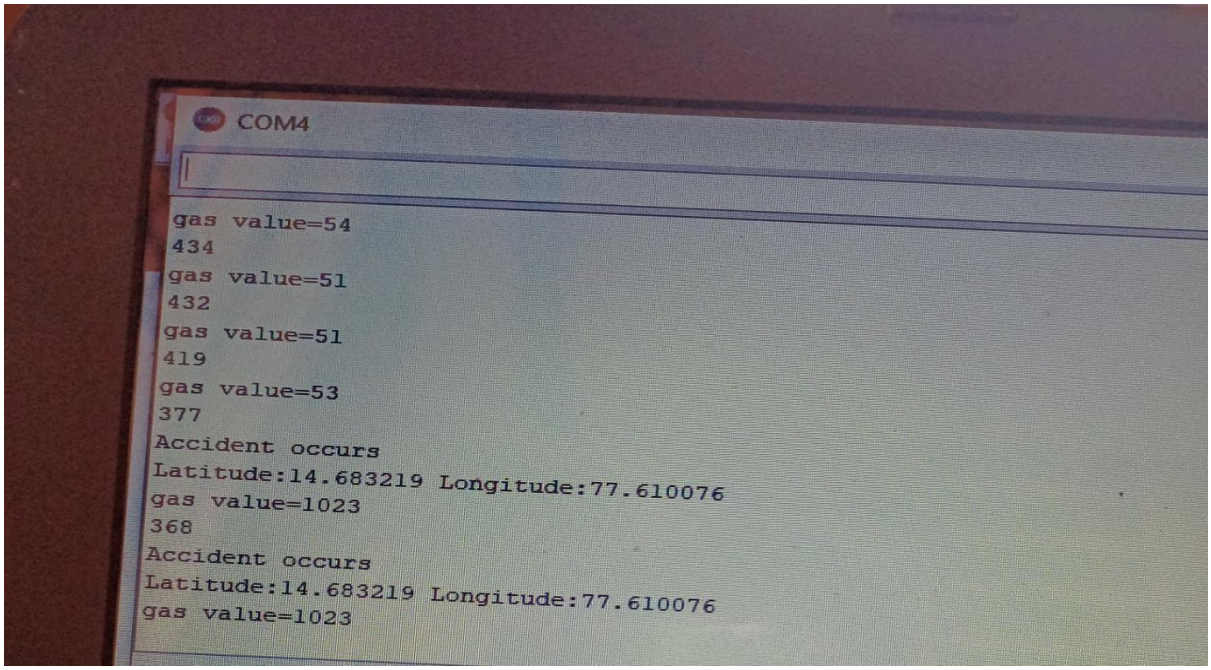
If gas detected motors turns of automatically we can see value of gas and motor off in below image



5.2 MOTOR OFF

5.2 MEMS SENSOR

With the help of a mems sensor, we can easily decide if an accident occurred. If this occurs, we will use GPS to locate the car**.**



5.3 ACCIDENT OCCURED

5.3 WIFI MODULE

With the help of IOT cloud data we can access every moment of vehicle with time to time

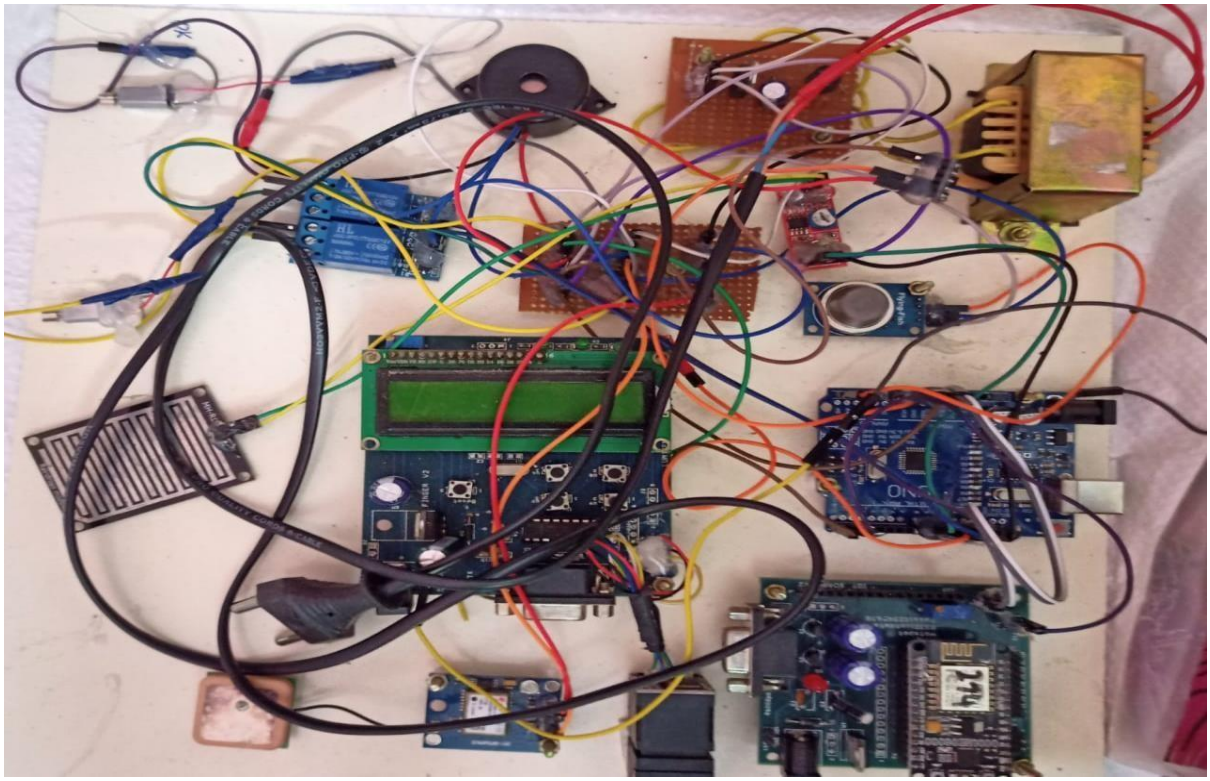
LogID	DATA	Logdate	LogTime
391	394Accident_occursLatitude:14.683219_Longitude:77.610076Latitude:14.683219___Longitude:77.610076gas_	03/20/2021	12:01:01
392	391Accident_occursLatitude:14.683219_Longitude:77.610076gas_value=1023388Accident_occursLatitude:14.	03/20/2021	12:01:19
393	397Accident_occursLatitude:14.683219_Longitude:77.610076Latitude:14.683219___Longitude:77.610076gas_	03/20/2021	12:01:32
394	66Accident_occursLatitude:14.683219_Longitude:77.610076gas_value=069Accident_occursLatitude:14.68321	03/20/2021	12:01:48
395	65Accident_occursLatitude:14.683219_Longitude:77.610076gas_value=066Accident_occursLatitude:14.68321	03/20/2021	12:02:00
396	gas_value=0motor_off65Accident_occursLatitude:14.683219_Longitude:77.610076gas_value=1023419gas_valu	03/20/2021	12:02:54
397	408gas_value=54motor_off405gas_value=54motor_off412gas_value=1023413gas_value=1023414	03/20/2021	12:03:10
398	gas_value=1023406gas_value=1023402gas_value=1023407gas_value=1023408gas_value=1023401gas_value=10234	03/20/2021	12:03:31
399	gas_value=54motor_off408gas_value=1023405gas_value=1023405gas_value=1023406gas_value=1023413gas_valu	03/20/2021	12:03:52
400	402gas_value=1023418gas_value=1023407gas_value=1023401gas_value=1023416gas_value=1023421gas_value=10	03/20/2021	12:04:13

Showing 391 to 400 of 402 entries Previous 1 ... 37 38 39 40 41 Next

5.4 *IOT CLOUD DATA*

5.4 HARD WARE MODULE:

The Smart Car Protection hardware module, shown below, includes a supply and gas sensor, as well as a rain sensor fingerprint for robbery, and is powered by an IoT power supply, Arduino, IOT or WiFi module, and motors modules.



5.5 HARDWARE MODULE

CHAPTER -6

6. CONCLUSION

With the recent increase in car robbery and the thrill that car robbers acquire in new ways and experiences, modern and successful approaches for reducing car theft are critical. In this text, the fingerprint module is shown at the car's front door. When the finger is inserted into the finger print module, the door will automatically open; otherwise, the buzzer will sound. The GPS module is used to track vehicles. Wherever the vehicle robs, this device monitors its location over the cloud with time and date. It also has an alcohol sensor that senses the person's alcohol intake. When alcohol is consumed, the engine shuts down automatically. This unit is equipped with a rain sensor that automatically activates when it rains. The study demonstrates that these devices are effective in reducing car theft. The above-mentioned results were obtained using this unit.

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