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# ABSTRACT

Road accidents are becoming very common in the country. The impact of road accidents can lead to the loss of many lives and can also damage many body parts. This situation becomes more serious if the riders won't wear the helmet which can be prevented by wearing the helmet and can reduce these impacts. While riding the bike, the government made it a mandatory rule to wear the helmet. Using this rule as a base, a smart helmet system is proposed which helps in providing safety to the riders and prevents accidents. The system mainly consists of NODEMCU as a processor for processing the data, IOT modules for and sending a message to authorized mobile, a on the helmet screen, and The system will ensure a safe journey for riders and gives a helping hand in case of emergency. The cost of installing the whole system onto the helmet is affordable.

The smart helmet has a module to detect whether the rider is wearing the helmet and also analyses the breath of the rider to check for consumption of alcohol. The rider will not be able to start the vehicle if the rider is drunk and is not wearing the helmet. The current situation is to take measures for the bike handlers who would lose their lives due to alcohol consumption and for not wearing the helmet. In order to overcome the death rate of the people due to this, we can use “Smart helmet which has automatic Alcohol detection and Accident detecting technique in it”

Today in India and most other countries, accident is considered as an unexpected and unintended event. According to the survey road accidents lead to hospitalization, injuries and disabilities, considering these facts the safety of the riders has become a most crucial and important issue and concern in majority of the countries. The usage of two wheeler’s vehicles is increasing day by day for transport convenience we need to have proper

Safety and efficient measures to handle accidents. MQ3 sensor is also embedded in the helmet to check whether the motorcyclist has consumed alcohol or not. The sensor data captured is stored in the cloud so that the accident information can be fetched anywhere and anytime at a faster rate. Considering the above facts, the prototype of smart helmet is designed and implemented to enhance the safety of the motorcyclist. This new idea will reduce the risk of motorcyclist life. The experimental results confined that the developed prototype model gives 84% accurate result of the accident detection and concerned persons will receive notification message.

## Key words:

Node MCU, Alcohol Sensor, Arduino Board, Push Button, IOT, Smart Helmet, Gear Motor.

# INTRODUCTION

Today, motorcycle has become a very common mode of transport for individual riders. Motorcycle gives the freedom and flexibility for the riders to move anywhere they want and at any time. Riders do not have to be dependent on the public transportation services, which in many cities and countries are extremely unreliable. However, motorcycle riding has its own risks involved, especially when the rider does not follow the rules and do not take the necessary precautions to avoid unfortunate situations, which can lead to accidents, which are sometimes fatal. Although there are laws related to safe operation of motorcycles most of the times the rules are not followed. The traffic police who are responsible for enforcing the laws on the riders find it very challenging due to rapid increase in the number of motorcycle riders and not having adequate manpower to monitor the situation. In March 2015 there were 154 million registered two wheelers operating on Indian roads. In such circumstances technological innovations can significantly assist the traffic police in maintaining the rules on the road. There are many novel ideas proposed to tackle this problem. Cameras can be installed at important traffic junctions to monitor the traffic as well as to identify the traffic violators and issue appropriate fines to such riders. Apart from jumping of traffic junctions or similar violations of the traffic laws one major issue with riders is not wearing the helmet while operating a motorcycle and another major problem is of drunk driving especially during night. Here in this project the authors are proposing a novel concept of embedding sensors in the b and the helmet to analyze the breath and the wearing of the helmet by the rider. If the rider is not following the rules the bike will not start. The aim of the project is to provide reliability and soundness on the helmet to the bikers against road accidents. A Smart Helmet is innovative recommendation which make motor cycle driving safer than before. The one more supremacy

of this project is to know the alcohol level of drunken motorcyclist who is sitting on the bike. An embedded kit or an embedded system which consists of microcontroller, RF decoder and sensors, is incorporated in the helmet which monitor whether the biker is drunk or not and also some sensors to check whether the biker has worn the helmet or not. Whenever the alcohol is detected by the alcohol sensor in the helmet, the vehicle won't start and buzzer is blown and the respective authorized people will get the notification. In today's world vehicles accidents are one of the main causes for increase in the death. This death rate can be reduced by forwarding a message and the location of the accident to the victim's family and concerned authorities who can take the necessary action in a timely manner. In many cases the delay in giving the appropriate medical treatment is the major cause of death after an accident**.**

# PRODUCT DESCRIPTION

Everyday around the world a large percentage of people dies from road accident. An effective approach is made to solve the problem by using smart helmet. A smart helmet is a special idea which makes motorcycle driving safer than before. This is implemented using Arduino. The main objective of this paper is to build a safety system which is integrated with the smart helmet and intelligent bike to reduce the probability of two-wheeler accidents and drunk driver cases.

This smart helmet consists of vibrator sensor for detection of accidents. And alcohol sensor detects the alcoholic content in riders' breath. For the detection of helmet, we are put one switch if that switch was pressed then it will detect as helmet detected. If the rider is not wearing the helmet or if there is any alcohol content found in rider's breath, the bike remains off. So when the rider crashes and the helmet hits the ground, then it will sense by the vibrator sensor.

The first step is to identify whether the helmet is worn or not. If helmet is worn then ignition will start otherwise it remains off. For this, Force Sensing Sensor (FSR) sensor is used. The second step is alcohol detection . Alcohol sensor is used as breath analyzer which detects the presence of alcohol in rider's breath and if it exceeds permissible limit ignition cannot start. When these two conditions are satisfied then only ignition starts.

# LITERATURE SURVEY

Smart Helmet is a system which aims to make all motorcyclists to aware and compulsory to wear Helmet whether the travel distance is in 100 meter radius or long distance.

The Smart Helmet Using IOT is a project undertaken to increase the rate of road safety among motorcyclist. The idea is obtained after knowing that the increasing number of fatal of fatal road accidents over the years is cause for concern among motorcyclists. Though the study identified, it is caused the helmets used is not in safety features such as not wearing a helmet string and not use the appropriate size.

Therefore, this project is designed to introduce security systems for the motorcyclists to wear the helmet properly.

According to the Research paper in 2016 titled 'Smart Helmet', in this paper the main objective of author is to force the rider to wear the helmet. In this competitive world one of the surveys says that the death trolls due to motor bike accidents are increasing day by day out of which most of these casualties occurs because of the absence of helmet. Traffic police cannot cover remote roads of city. That's why over primary objective is to make the usage of the helmet for two wheelers "compulsory " .Thus ,no one other than the owner himself ,who doesn't have "password" which would have been created by the owner, can use the bike. In this author has proposed the feature that the bike will not start unless the bike rider does not wear the helmet .The other this module basically deals with the checksum of rider if he is wearing the helmet or not on first place to achieve this ultrasonic sensor is been used .based on this the signal are been sent to the next module voice recognition module use for authentication purpose. Arduino is also used in this project which is an open source tool for making computer that can sense.

According to the Research paper in 2015 titled ‘Smart Helmet’, in this project the author has proposed the smart helmet because of growing bike accident. People get injured or might be dead because of not wearing helmet. Continuously no one follows road rules .So to overcome these problem this helmet is been designed. The middle class families prefer to buy motor bike over four wheelers, because of the low prices, various varieties available in the market. Author has also used encoder IC that receives parallel data in the form of address bits and control bits the other author has used smart system for helmet

| Paper Studied | Old Featured | New Featured |
|---|---|---|
| International journal of science and research(IJSR) ISSN(online):2319-7064 Volume 3 issue 3,march 2014 K.Sudharshan,Kumaraguru | A. Helmet Checking Applications<br>B. Sobriety test application<br>C. Exhaust checking Applications | A. Helmet checking via in transmission<br>B. Alcohol Detection<br>C.No exhaust checking |
| International journal of Electrical and Electronic Research IISN 2348-6988(online) vol.2 issue 4 oct 2014 Manjesh.N,Prof. Sudharshan Raj | A. Robotic Helmet unit<br>B. Headphone , Speaker<br>C. GPS satellite unit | A. Code C |
| International journal of science and research (IJSR) ISSN 2319-2518 vol.4 ,no.2 April 2015 C. Manasi Peuta 2015 | A. Helmet Checking<br>B.No entry no parking | A. Helmet checking via in transmitter<br>B. Alcoholic Detection<br>C. SMS to Family Members in case of accidents. |

# EXISTING SYSTEM

The objective of the existing model of smart helmet is to prevent accidents. For detection of various activities of bike rider many types of sensors are attached to the helmet. A set of sensors are fixed to the helmet whether the user is drunken or not for their security purpose.

There are many Research papers on 'Smart Helmet' for preventing of road accidents and to protect head from injuries. Many authors are working to build smart helmet with different applications for the convenient of the users.

One of the examples is that if the bike is stolen then by using smart helmet the identification is simple to know who had stolen it. For different types of applications and uses this smart helmet is much benefited.

# PROPOSED SYSTEM

We are developing a smart helmet using the internet of things (IOT) technology, in which we ensure the safety of the bike rider by avoiding road accidents of the bikers. The system detects whether the rider is wearing a helmet or not if he wears then only the vehicle will start .It detects the amount of alcohol consumed by the rider, if the rider has over drunk, the bike engine will not start. For the safety of the bike rider, we are using the latest technology IOT, this technology provides the advance techniques for alerting the rider and ensures that rider follows the rules and regulations. For two-wheeler rider, Helmet is the most basic protection device and it is necessary for every bicycle or motorbike riders. But it does not ensure the safety of the rider and the rider won't follow the traffic rules.

Most of the people use ordinary helmet just to avoid giving challan to the traffic police, these helmets do not ensure the safety of the driver. So, to overcome these problems we need to use the smart helmet.

## OBJECTIVE OF SMART HELMET PROJECT

The Objective of Smart Helmet project is to increase the usage of wearing Helmet and Decrease the dead due to accidents.The first step is to identify whether the helmet is worn or not. If helmet is worn then ignition will start otherwise it remains off. For this, Force Sensing Sensor (FSR) sensor is used.

The second step is alcohol detection. Alcohol sensor is used as breath analyzer which detects the presence of alcohol in rider's breath and if it exceeds permissible limit ignition cannot start. When these two conditions are satisfied then only ignition starts.

# BLOCK DIAGRAM

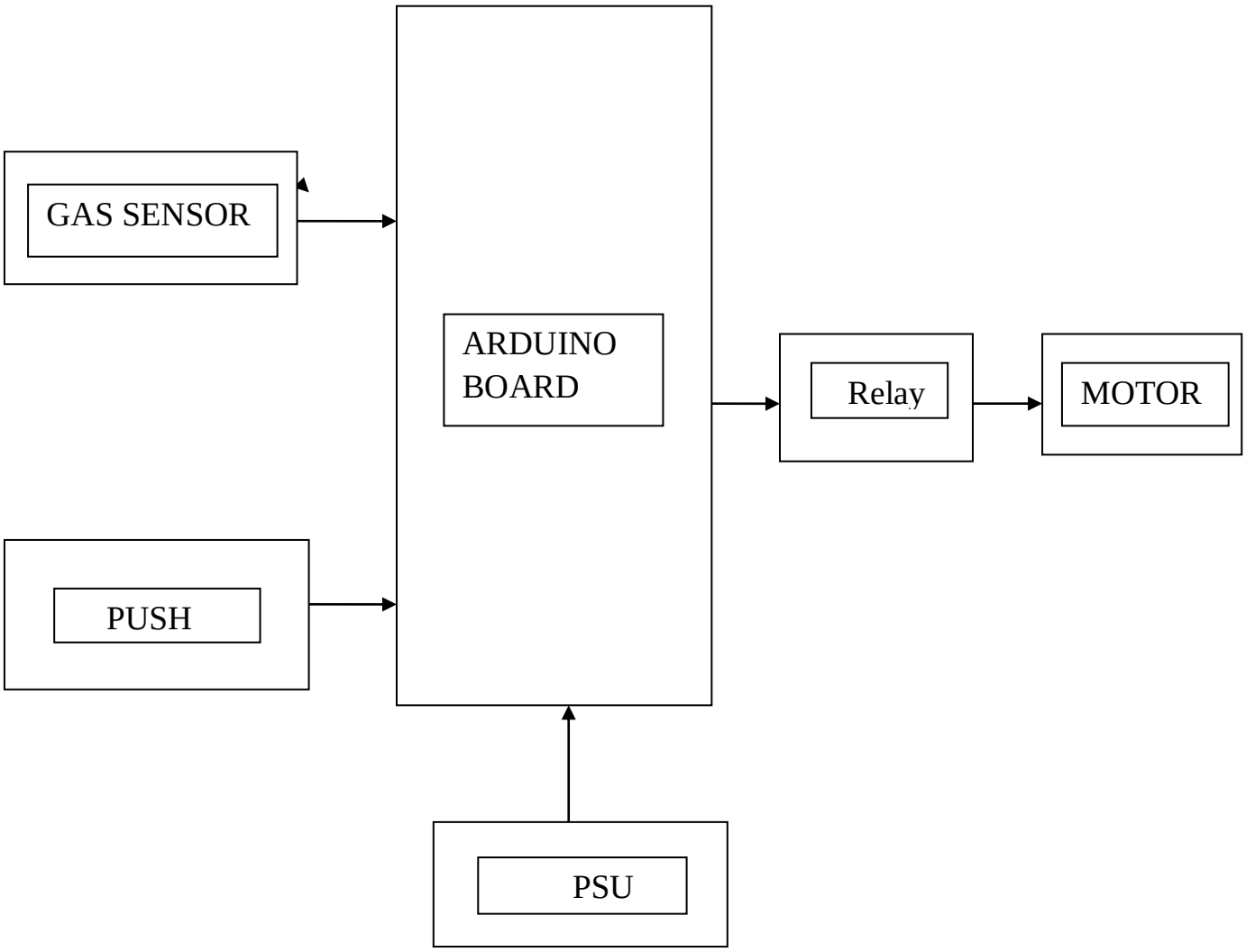



**Fig-1: Block Diagram for Smart Helmet**

# FLOW CHART

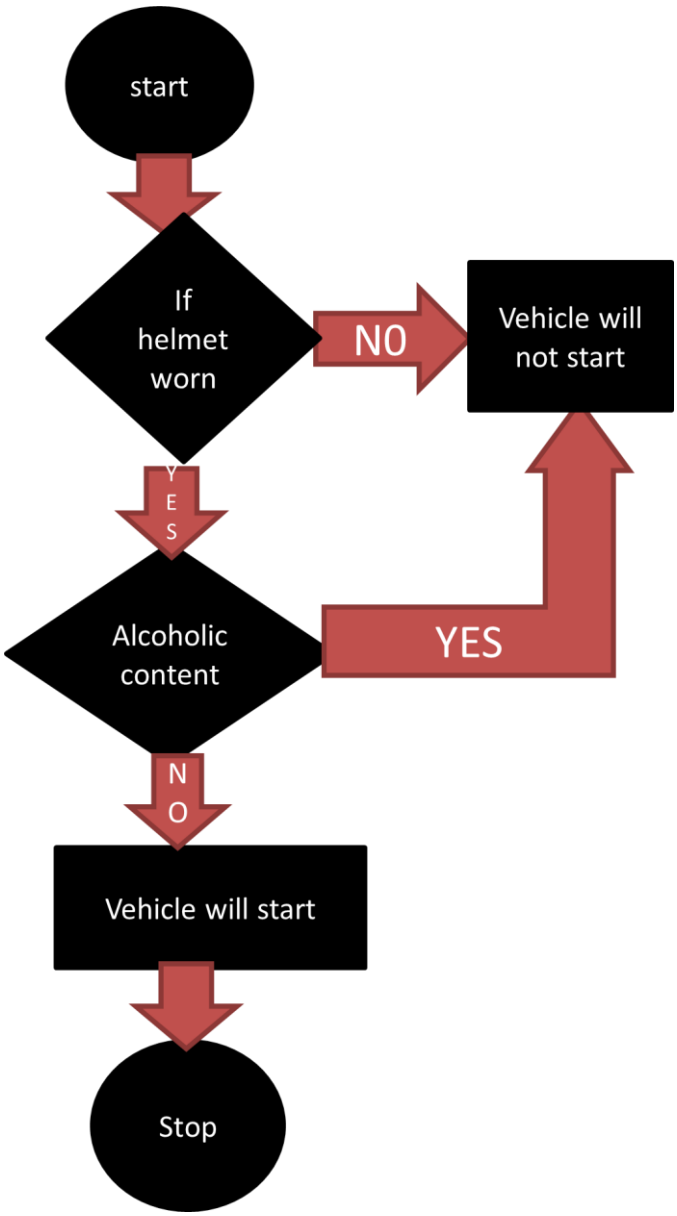



**Fig-2: Flow Chart for Smart Helmet**

# SYSTEM DESIGN

## UML DIAGRAMS:

UML stands for Unified Modelling Language. UML is a standardized general-purpose modelling language in the field of object-oriented software engineering. The standard is managed, and was created by, the Object Management Group.

The goal is for UML to become a common language for creating models of object-oriented computer software. In its current form UML is comprised of two major components: A Meta-model and a notation. In the future, some form of method or process may also be added to; or associated with, UML.

The Unified Modelling Language is a standard language for specifying. Visualization, Constructing and documenting the artefacts of software system, as well as for business modelling and other non- software systems.

The UML represents a collection of best engineering practices that have proven successful in the modelling of large and complex systems.

The UML is a very important part of developing objects-oriented software and the software development process. The UML uses mostly graphical notations to express the design of software projects.

## GOALS:

The Primary goals in the design of the UML are as follows:

1. Provide users a ready-to-use, expressive visual modelling Language so that they can develop and exchange meaningful models.

2. Provide extendibility and specialization mechanisms to extend the core concepts.

3. Be independent of particular programming languages and development process.

4. Provide a formal basis for understanding the modelling language.

5. Encourage the growth of 00 tools market.

6. Support higher level development concepts such as collaborations, frameworks, patterns and components.

7. Integrate best practices.

# USE-CASE DIAGRAM

A use case diagram is used to represent the dynamic behaviour of a system. It encapsulates the system's functionality by incorporating use cases, actors, and their relationships. It models the tasks, services, and functions required by a system/subsystem of an application. It depicts the high-level functionality of a system and also tells how the user handles a system.

A use case diagram in the Unified Modelling Language (UML) is a type of behavioural diagram defined by and created from a Use-case analysis.

Its purpose is to present a graphical overview of the functionality provided by a system in terms of actors, their goals (represented as use cases), and any dependencies between those use cases.

## Purpose of Use Case Diagrams:

The main purpose of a use case diagram is to portray the dynamic aspect of a system. It accumulates the system's requirement, which includes both internal as well as external influences. It invokes persons, use cases, and several things that invoke the actors and elements accountable for the implementation of use case diagrams. It represents how an entity from the external environment can interact with a part of the system.

## Following are the purposes of a use case diagram given below:

1) It gathers the system's needs.
2) It depicts the external view of the system.
3) It recognizes the internal as well as external factors that influence the system.
4) It represents the interaction between the actors.

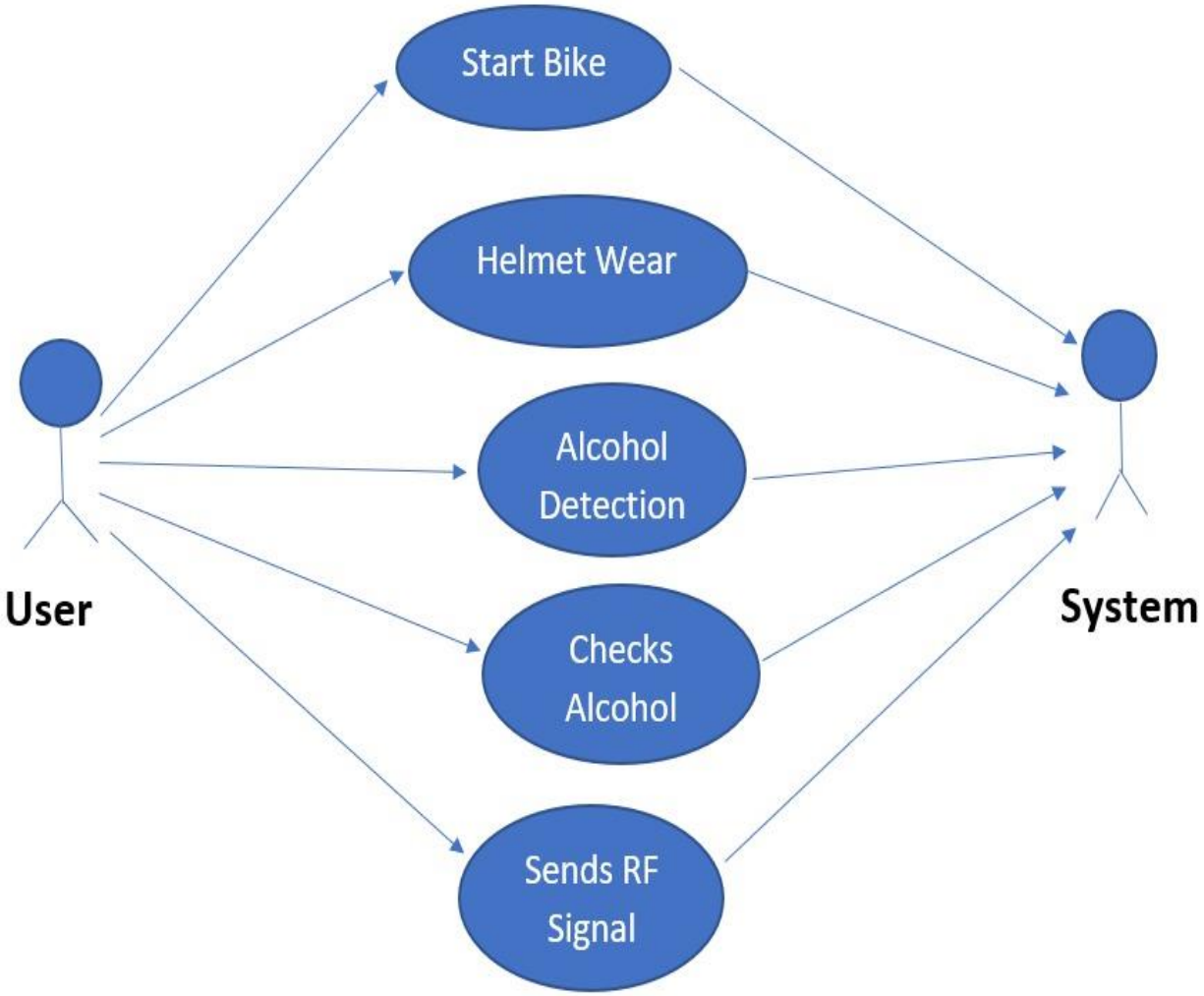



**Fig-3: Use-Case Diagram**

# SEQUENCE DIAGRAM

The sequence diagram represents the flow of messages in the system and is also termed as an event diagram. It helps in envisioning several dynamic scenarios. It portrays the communication between any two lifelines as a time-ordered sequence of events, such that these lifelines took part at the run time.

In UML, the lifeline is represented by a vertical bar, whereas the message flow is represented by a vertical dotted line that extends across the bottom of the page. It incorporates the iterations as well as branching.

## Purpose of a Sequence Diagram:

1) To model high-level interaction among active objects within a system.
2) To model interaction among objects inside a collaboration realizing a use case.
3) It either models generic interactions or some certain instances of interaction.

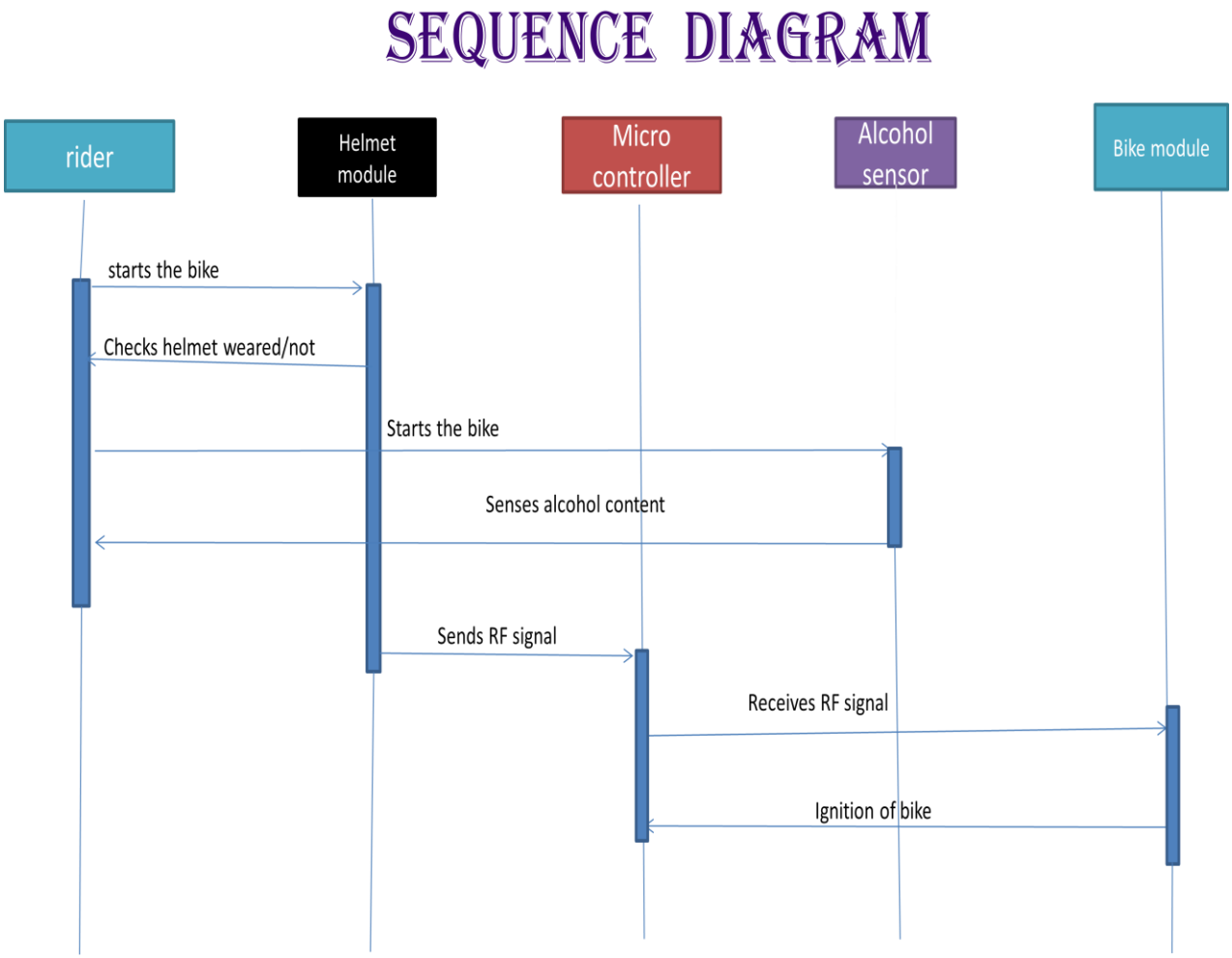



**Fig-4: Sequence Diagram**

# CLASS DIAGRAM

In software engineering, a class diagram in the Unified Modelling Language (UML) is a type of static structure diagram that describes the structure of a system by showing the system's classes, their attributes, operations (or methods), and the relationships among the classes. It explains which class contains information.

## Purpose of Class Diagrams:

The purpose of class diagram is to model the static view of an application. Class diagrams are the only diagrams which can be directly mapped with object-oriented languages and thus widely used at the time of construction.

UML diagrams like activity diagram, sequence diagram can only give the sequence flow of the application; however class diagram is a bit different. It is the most popular UML diagram in the coder community.

The purpose of the class diagram can be summarized as −

1) Analysis and design of the static view of an application.
2) Describe responsibilities of a system.
3) Base for component and deployment diagrams.
4) Forward and reverse engineering

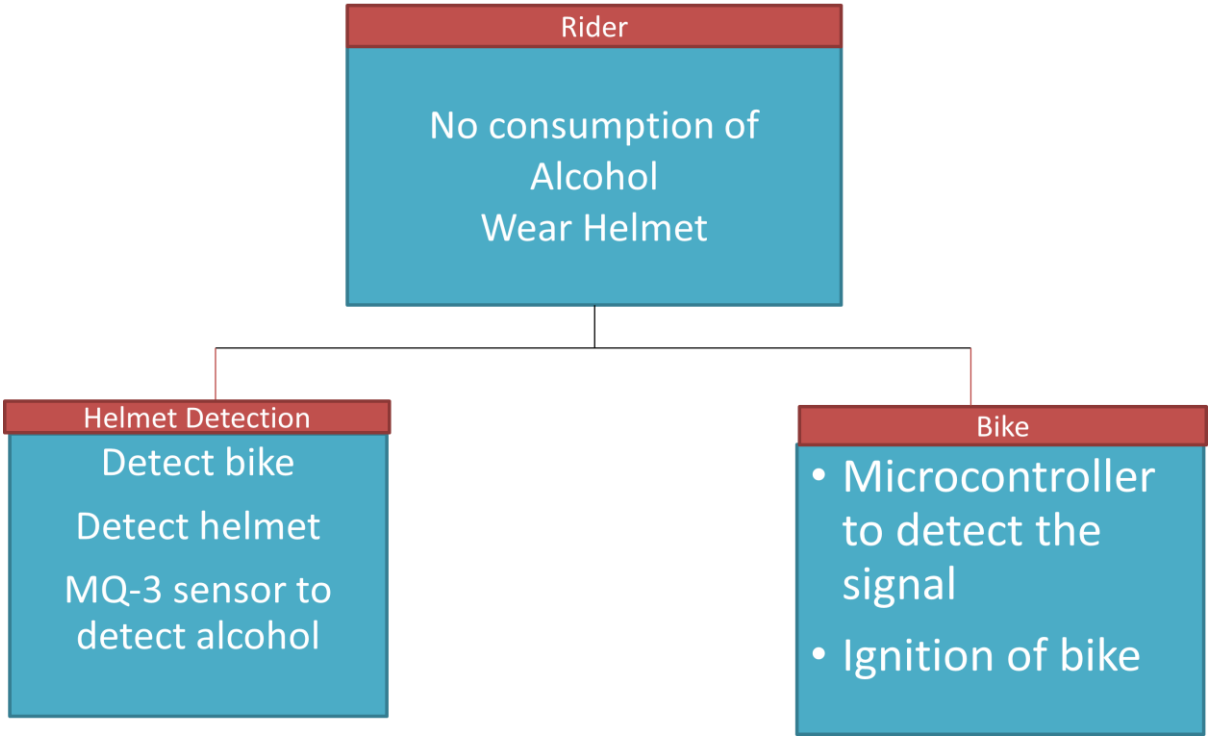



**Fig-5: Class Diagram**

# HARDWARE COMPONENTS

## ARDUINO BOARD

The Arduino Uno is an open-source microcontroller board based on the Microchip ATmega328P microcontroller and developed by Arduino.cc and initially released in 2010.The board is equipped with sets of digital and analog input/output (I/O) pins that may be interfaced to various expansion boards (shields) and other circuits. The board has 14 digital I/O pins (six capable of PWM output), 6 analog I/O pins, and is programmable with the Arduino IDE (Integrated Development Environment), via a type B USB cable. It can be powered by a USB cable or a barrel connector that accepts voltages between 7 and 20 volts, such as a rectangular 9-volt battery. It is similar to the Arduino Nano and Leonardo.

Arduino boards available in the market like Arduino UNO, Arduino Nano, Arduino Mega, Arduino Lilypad, etc with having different specification according to their use. In this project, we are going to use Arduino UNO to control home appliances automatically. It has ATmega328 microcontroller IC on it which runs on 16MHz clock speed. It is a powerful which can work on USART, I2C and SPI communication protocols. This board is usually programmed using software Arduino IDE using a micro-USB cable. ATmega328 comes with pre-programmed onboard boot loader which makes it easier to upload the code without the help on external hardware.

It has vast application in making electronics projects or products. The C and C++ language is used to program the board which is very easy to learn and use. Arduino IDE makes it much easier to program. It separates the code in two parts i.e., void setup () and void loop (). The function void setup () runs only one time and used for mainly initiating some process whereas void loop () consists the part of the code which should be executed continuously.


**Fig-6:Arduino Board**

## FEATURES OF ARDUINO BOARD:

1. Supports for Windows, Mac, Linux
2. Boot loader for easy uploading of programs
3. Serial monitor is used to monitor the output values from sensor.
4. User friendly with IDE Latest 1.8.19
5. Language: combination of C , C++ and at most Inbuilt commands

## 9-VOLTS BATTERY

The nine-volt battery, or 9-volt battery, is an electric battery that supplies a nominal voltage of 9 volts. Actual voltage measures 7.2 to 9.6 volts, depending on battery chemistry. Batteries of various sizes and capacities are manufactured; a very common size is known as PP3, introduced for early transistor radios. The PP3 has a rectangular prism shape with rounded edges and two polarized snap connectors on the top. This type is commonly used for many applications including household uses such as smoke and gas detectors, clocks, and toys.

The nine-volt PP3-size battery is commonly available in primary zinc-carbon and alkaline chemistry, in primary lithium iron disulfide and lithium manganese dioxide (sometimes designated CRV9), and in rechargeable form in nickel-cadmium (Ni–Cd), nickel-metal hydride (Ni–MH) and lithium-ion. Mercury batteries of this format, once common, have been banned in many countries due to their toxicity. Designations for this format include NEDA 1604 and IEC 6F22 (for zinc-carbon) or MN1604 6LR61 (for alkaline). The size, regardless of chemistry, is commonly designated PP3—a designation originally reserved solely for carbon-zinc, or in some countries, E or E-block. A range of PP batteries was produced in the past, with voltages of 4.5, 6, and 9 volts and different capacities; the larger 9-volt PP6, PP7, and PP9 are still available. A few other 9-volt battery sizes are available: A10 and A29.


**Fig-7: 9-Volts Battery**

## ALCOHOL SENSOR

MQ3 Alcohol Gas Sensor detects the concentrations of alcohol gas in the air and outputs its reading as an analog voltage. The sensor can measure concentrations of 0.04mg/L to 4mg/L. The concentration sensing range is suitable for breathalyzers. The sensor can operate at temperatures from -10 to 50°C and consumes less than 150 mA at 5 V.


**Fig-8: Alcohol Sensor**

# MICRO CONTROLLER

A Micro Controller is a compact integrated circuit designed to govern a specific operation in an embedded system. A typical microcontroller includes a processor, memory and input/output peripheral on a single chip.

**Fig-9: Micro Controller**

## GEARMOTOR

The direct current (DC) motor is one of the first machines devised to convert electrical power into mechanical power. Permanent magnet (PM) direct current converts electrical energy into mechanical energy through the interaction of two magnetic fields. One field is produced by a permanent magnet assembly; the other field is produced by an electrical current flowing in the motor windings.

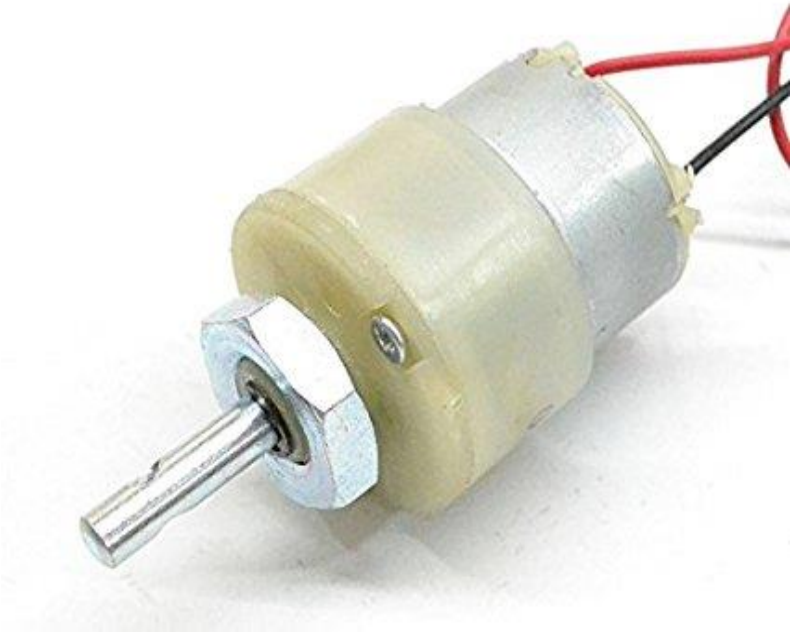


**Fig-10: Gear Motor**

## PUSH BUTTON

Switches are used to turn ON/OFF devices and to connect different parts of a circuit. The slide-switch in Arduino moves the slider of the switch from the open position (ON) to the closed position (OFF). It allows the flow of current in the circuit without the need for splice wire.


**Fig-11: Push Button**

## ARDUINO BOARD POWER SUPPLY

a) The Arduino Uno needs a power source in order for it to operate and can be powered in a variety of ways.
b) Connect the board directly to your computer via a USB cable.
c) 9V battery pack can be given.
d) 9V or 12V AC power supply adapter.

**Fig-12: Power Supply Cable**

## POWER SUPPLY AND SKETCH UPLOADING TO ARDUINO UNO BOARD:

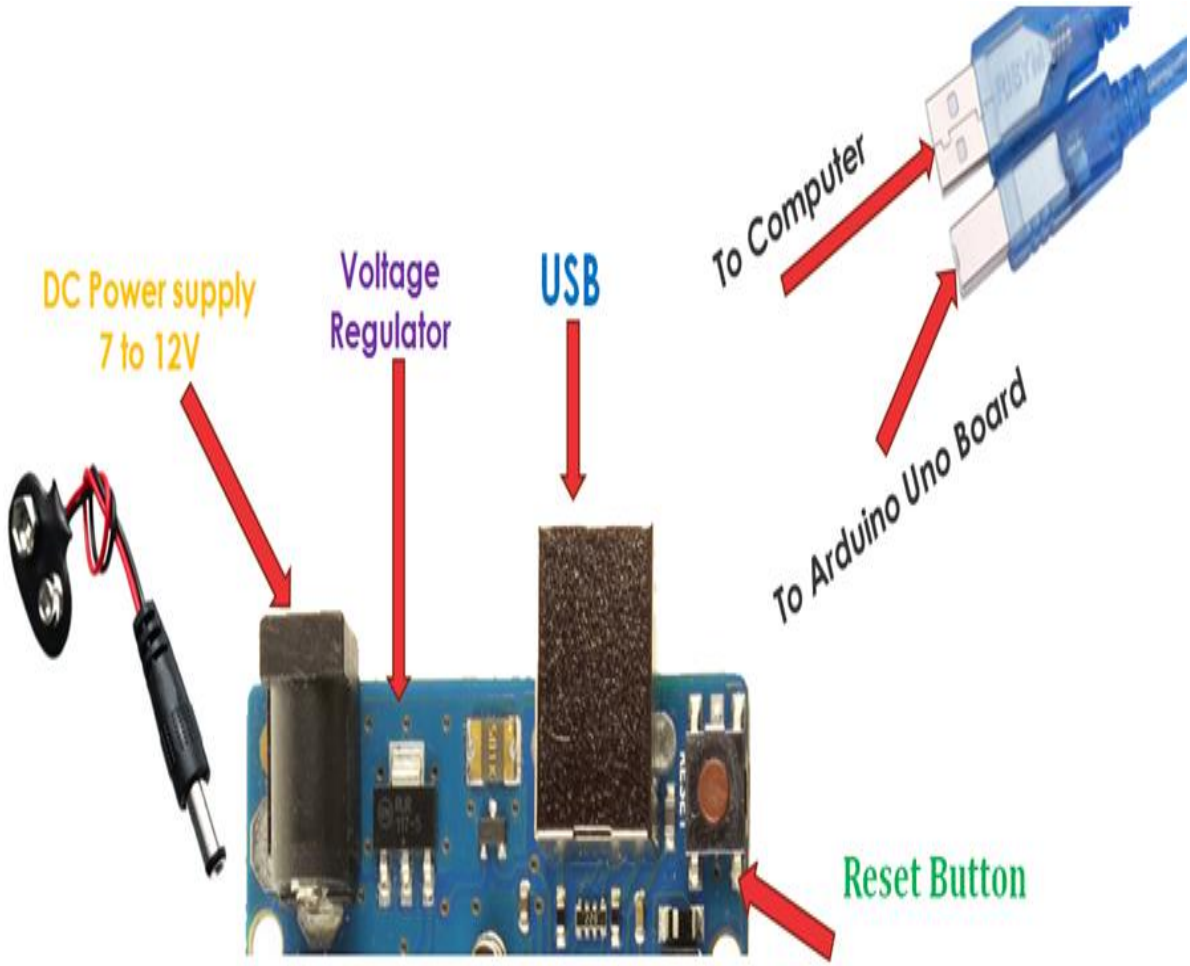



**Fig-13: Sketch Diagram of Arduino Board**

# TECHNICAL SPECIFICATIONS

| Microcontroller | ATmega328P |
|---|---|
| Operating voltage | 5 Volts |
| Input Volt. (limit) | 7-12 Volts |
| Digital I/O Pins | 14 (6 PWM outputs) |
| PWM Digital I/O Pins | 6 |
| Analog Input Pins | 6 |
| DC Current per I/O Pin | 20 mA |
| DC Current for 3.3v pin | 50 mA |
| Flash Memory | 32 KB (ATmega328P) of which 0.5 KB used by boot loader |
| SRAM | 2KB (ATmega328P) |
| EEPROM | 1KB (ATmega328P) |
| Clock Speed | 16 MHz |
| LED_BUILTIN | 13 |
| Length | 68.6 mm |
| Width | 53.4 mm |

**Fig-14: Technical Specifications**

## ON BOARD LED'S OF ARDUINO

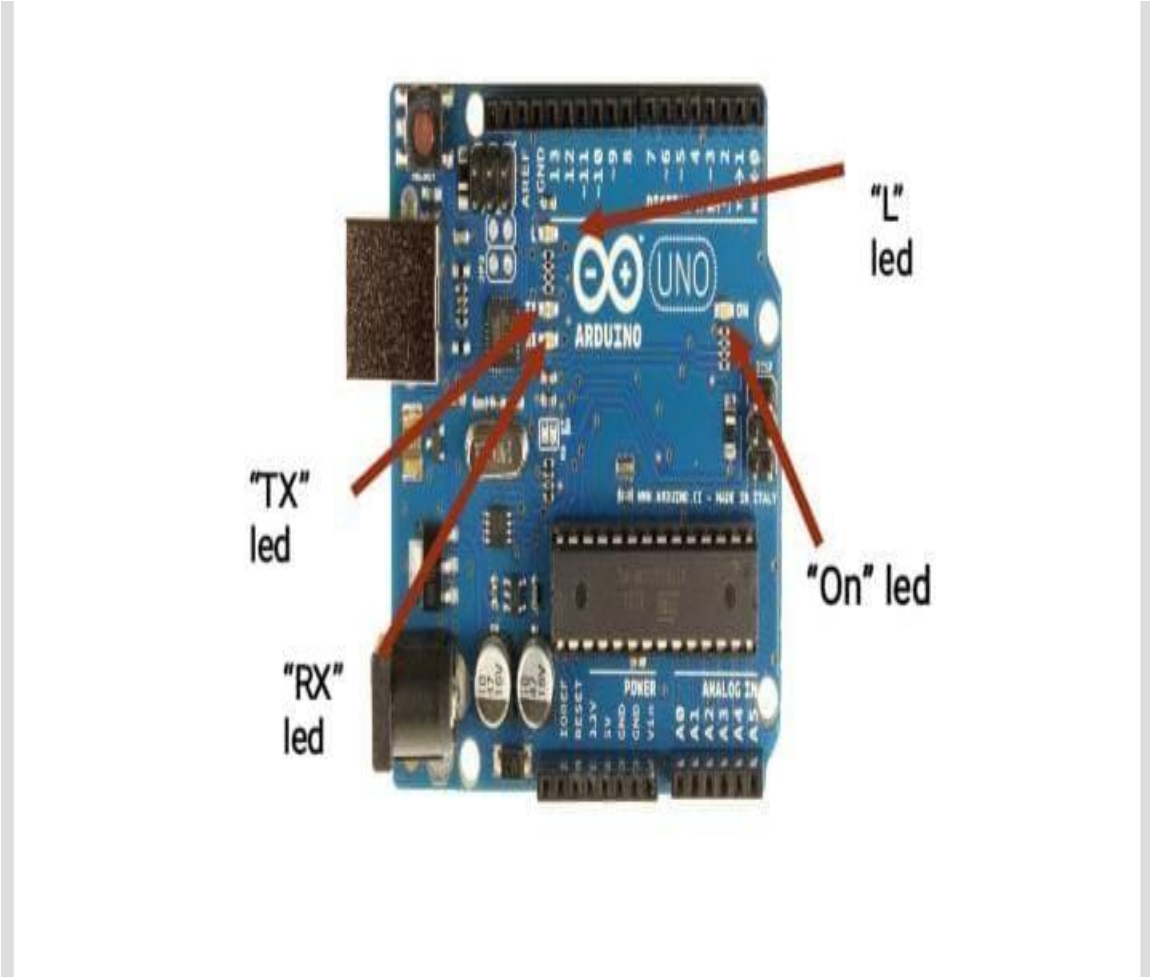



**Fig-15: On Board LED's Of Arduino**

## DIGITAL PINS OF ARDUINO BOARD

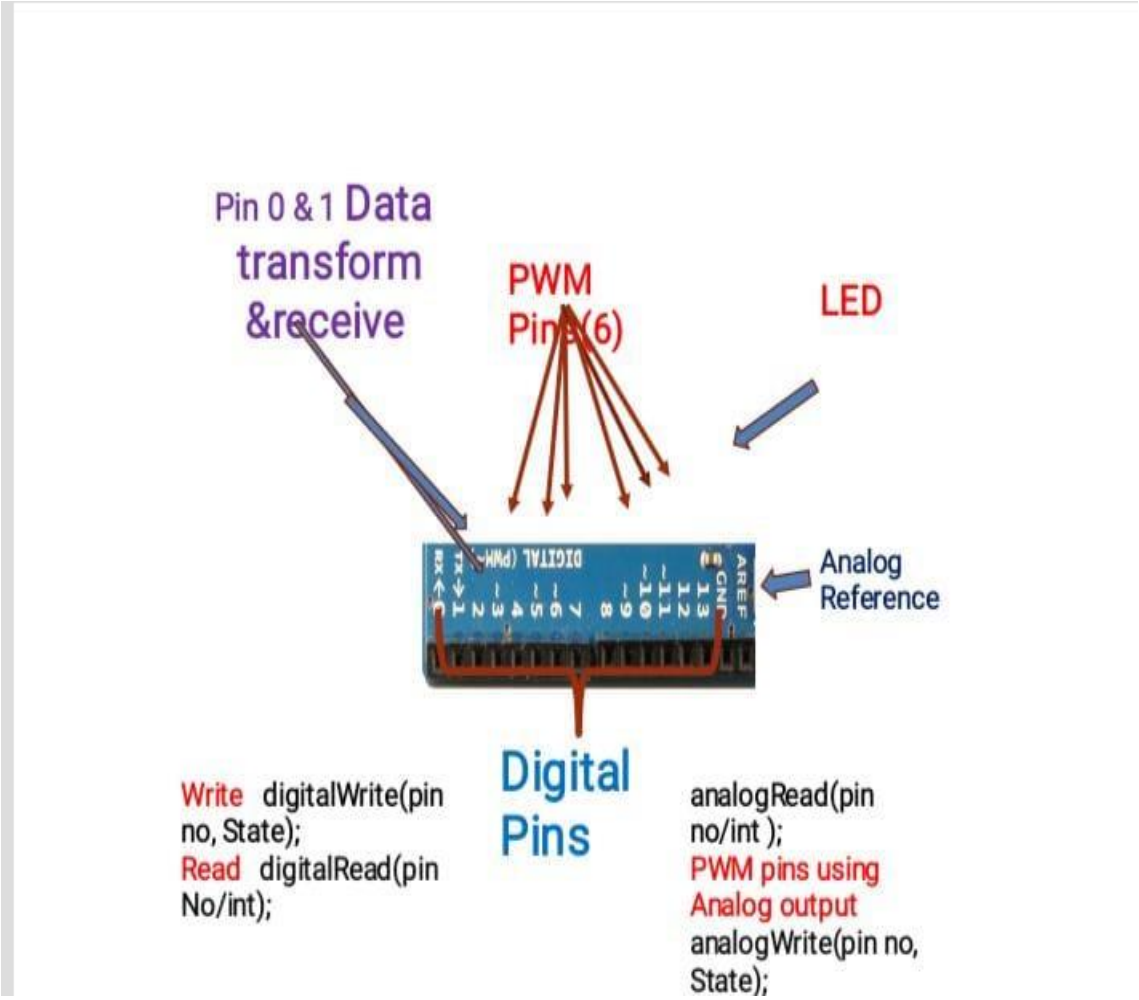



**Fig-16: Digital Pins Of Arduino**

## INPUT AND OUTPUT PINS

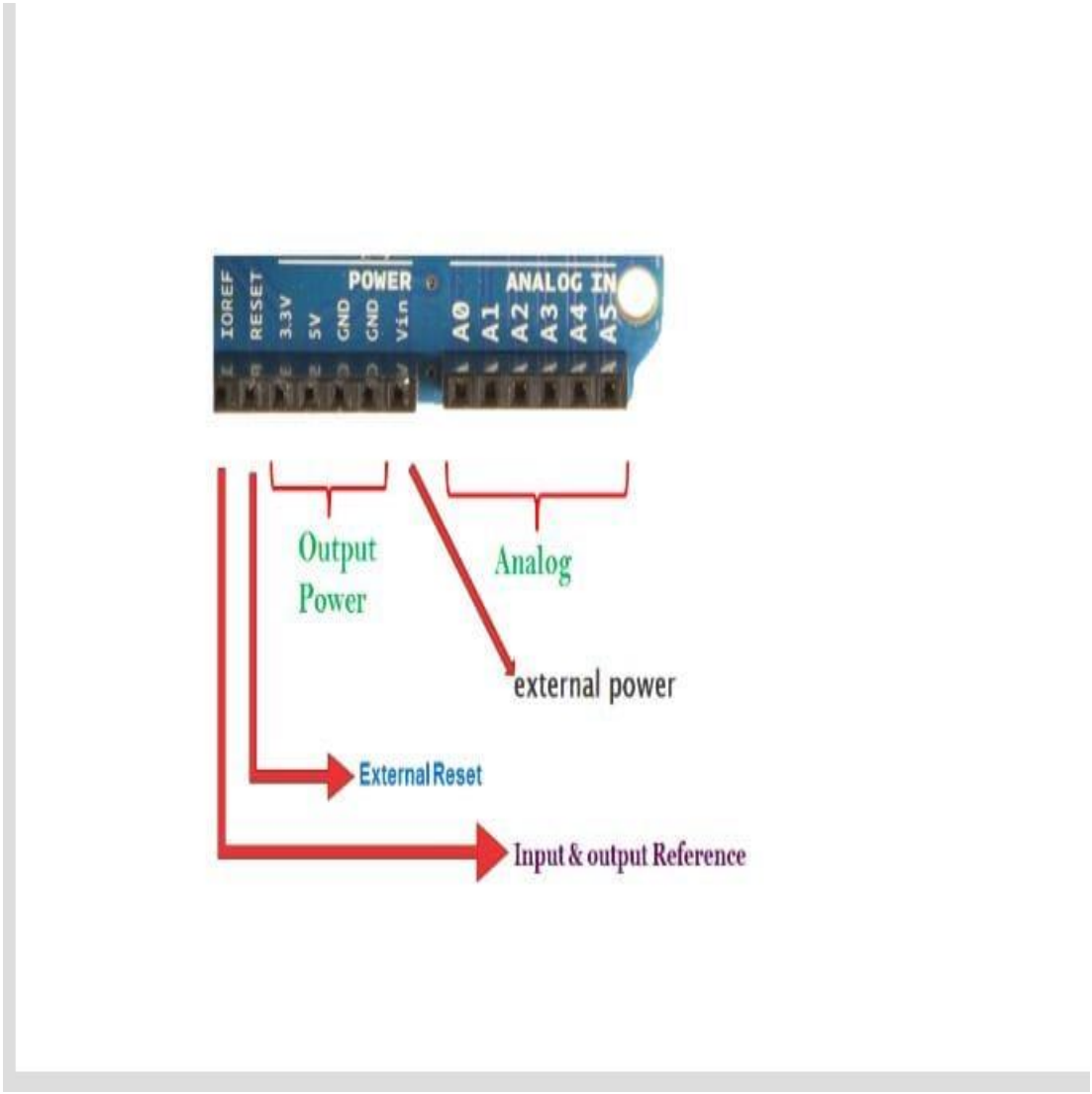



**Fig-17: Input and Output Pins**

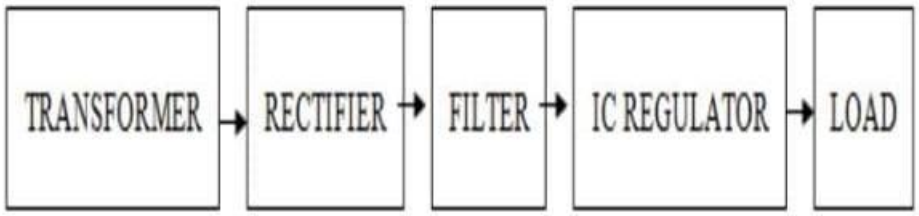
# POWER SUPPLY

A power supply is an electronic circuit that converts the voltage of an alternating current (AC) into a direct current (DC) voltage. It is basically consisting of the following elements: transformer, rectifier, filter and regulator circuits.

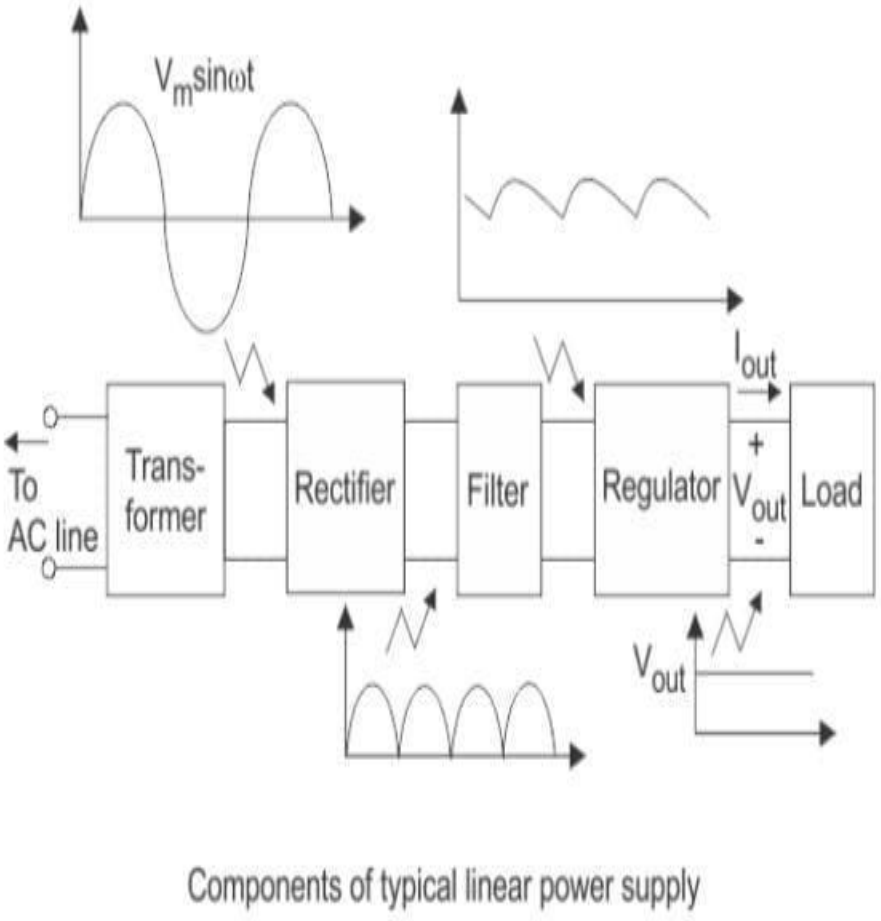
Electronic circuits made up of semiconductors need specific value of Direct Current (DC) voltage.

Batteries are common DC voltage source for electronic equipment especially portables like cell phones and iPods

Most non-portable equipment uses power supplies that operate from the AC power line but produce one or more DC outputs.



# BLOCK DIAGRAM




Components of typical linear power supply

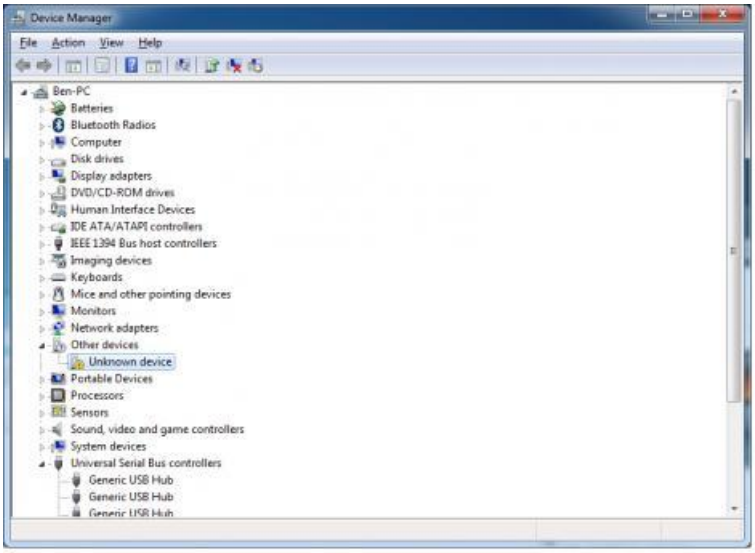
**Fig-18: Block Diagram of Power Supply**

# SOFTWARE REQUIREMENTS

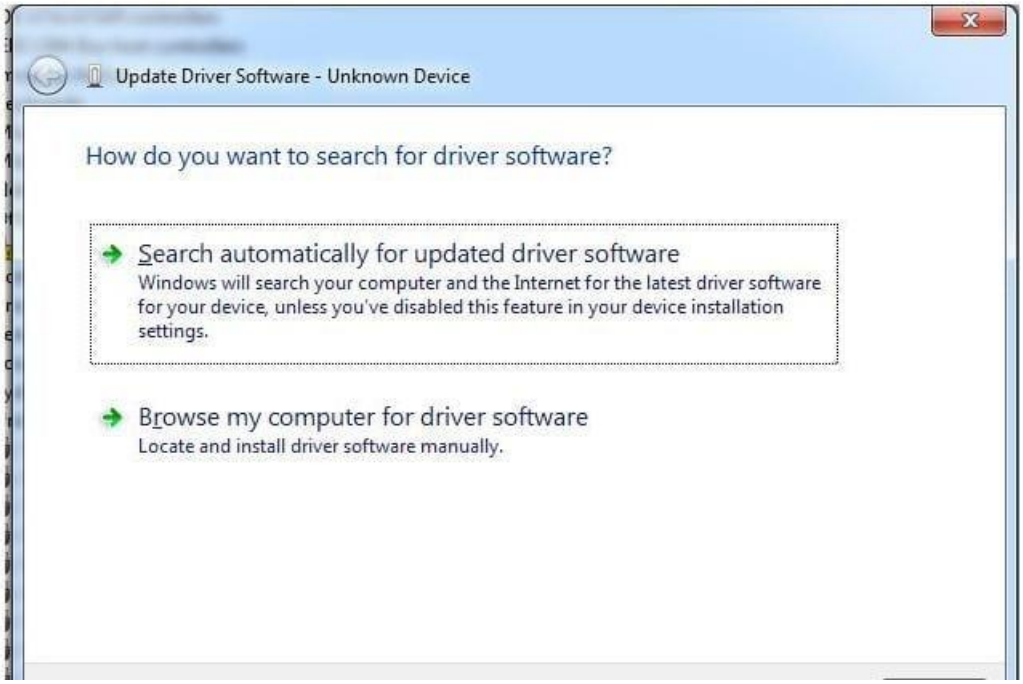
## ARDUINO IDE:

The Arduino is a family of microcontroller boards to simplify electronic design, prototyping and experimenting for artists, hackers, hobbyists, but also many professionals. People use it as brains for their robots, to build new digital music instruments, or to build a system that lets your house plants tweet you when they're dry. Arduinos (we use the standard Arduino Uno) are built around an AT mega microcontroller — essentially a complete computer with CPU, RAM, Flash memory, and input/output What you will need:

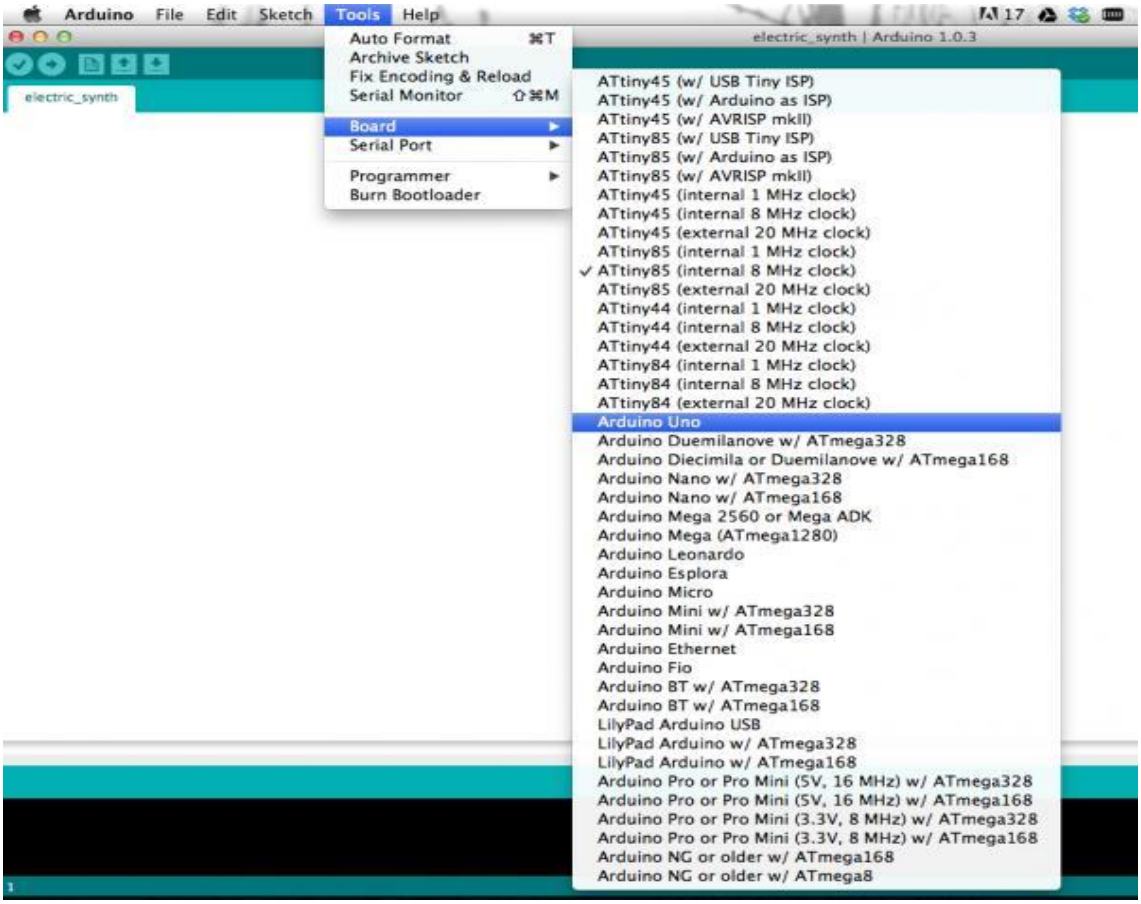
I. A computer (Windows, Mac, or Linux)
II. An Arduino-compatible microcontroller (anything from this guide should work)
III. A USB A-to-B cable, or another appropriate way to connect your Arduino-compatible microcontroller to your computer (check out this USB buying guide if you're not sure which cable to get.
IV. Installing the Drivers for the Arduino Uno (from Arduino.cc)
V. Plug in your board and wait for Windows to begin it's driver installation process After a few moments, the process will fail, despite its best efforts
VI. Click on the Start Menu, and open up the Control Panel
VII. While in the Control Panel, navigate to System and Security. Next, click on System Once the System window is up, open the Device Manager.
VIII. Look under Ports (COM & LPT). You should see an open port named "Arduino UNO (COMxx)".
IX. If there is no COM & LPT section, look under 'Other Devices' for 'Unknown Device'



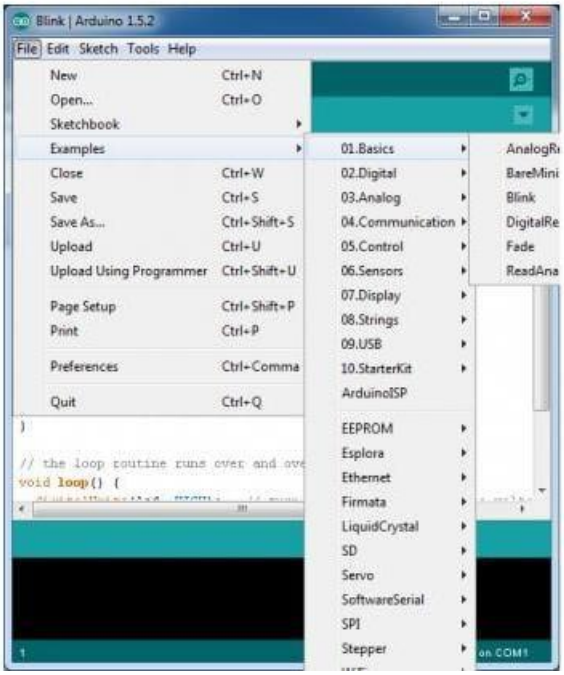

Finally, navigate to and select the Uno's driver file, named "ArduinoUNO.inf", located in the "Drivers" folder of the Arduino Software download (not the "FTDI USB Drivers" sub-directory). If you cannot see the .inf file, it is probably just hidden. You can select the 'drivers' folder with the 'search sub-folders' option selected instead.



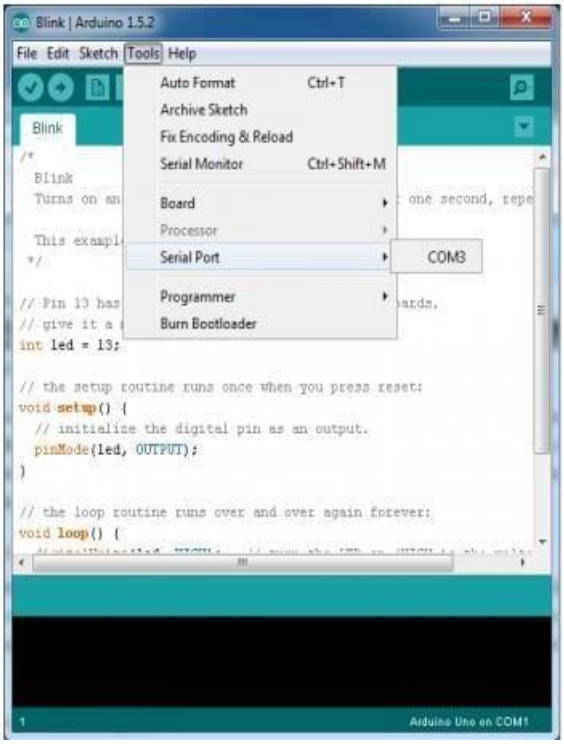
After following the appropriate steps for your software install, we are now ready to test your first program with your Arduino board! Then Launch the Arduino application and Select the type of Arduino board you're using: Tools > Board > your board type.




If you disconnected your board, plug it back in Open the Blink example sketch by going to: File > Examples >1.Basics > Blink

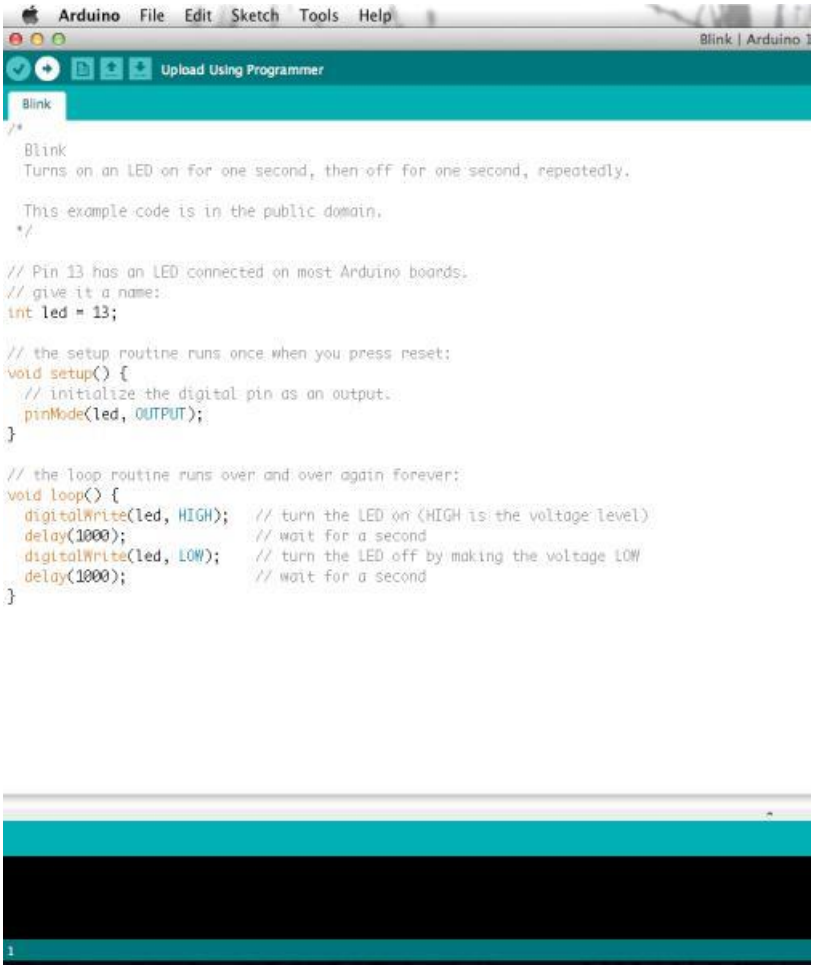



Select the serial/COM port that your Arduino is attached to: Tools > Port>COMxx



Select the serial port that your Arduino is attached to: Tools>Port>xxxxxx(it'll probably look something like "/dev/tty.usbmodemfd131" or "/dev/tty.usbserial-131" but probably with a different number)

If you're not sure which serial device is your Arduino, take a look at the available ports, then unplug your Arduino and look again. The one that disappeared is your Arduino. With your Arduino board connected and the Blink sketch open, press the 'Upload' button.




After a second, you should see some LEDs flashing on your Arduino, followed by the message 'Done Uploading' in the status bar of the Blink sketch. If everything worked, the onboard LED on your Arduino should now be blinking! You just programmed your first Arduino!

## SOURCE CODE

```
#define sw 4
#define alc 5
#define relay 6
int ctrl=0;
Void setup () {
Serial.begin (9600);
pinMode (sw, INPUT);
pinMode (alc, INPUT);
pinMode (relay, OUTPUT);
delay (100);
}
 void loop()
 {
int swv=digitalRead (sw);
int alcv=digitalRead (alc);
Serial.println (alcv);
Serial.println (swv);
If (alcv==LOW)    // ALCOHOL PRESENT
{
digitalWrite (relay,LOW);
}
If (alcv==HIGH)    //NO ALCOHOL
{
If (swv==HIGH && !ctrl)
{
Serial.println ("PRESENT");
```

```
digitalWrite (relay,HIGH);
delay (3000);
digitalWrite (relay,LOW);
Serial.println ("NO STOP");
Ctrl='1';
}
If (swv==LOW)
{
digitalWrite (relay,LOW);
}
}
Delay (300);
}
```

# MODULES

The smart helmet system mainly consists of 2 modules; helmet module and the bike module. Helmet contains switches which are connected with a microcontroller unit. Sensors like alcohol sensor, Push Button are placed on the helmet.

The bike module consists of an accelerometer, RF decoder microcontroller unit, relay, GPS module and an IOT system.

## A. Helmet Module:

Two switches are placed on the helmet. One of the switches is placed on the centre of the inner surface of the helmet and next one is placed on the helmet buckle. It checks the position of the helmet continuously and send the helmet status to the microcontroller and then to the RF transmitter. The switches turned ON only when the rider wearing the helmet on his head properly. Thus the proper placement of the helmet ensured by these two switches.

The alcohol sensor used in this section senses the alcohol content of the rider's breath. The speed sensor of the bike is recorded by using a Hall Effect sensor. The comparator checks the data stored by the alcohol sensor and the speed sensor and given it to the RF encoder. If the rider has an alcoholic breath, then the bike ignition starts otherwise engine remains OFF.

## B. Bike Module:

The main task of this section is to receive the helmet position data by the bike unit through a RF receiver and send data to the microcontroller on the bike unit. When the transmitted signal from helmet unit is received by the bike unit, then the vehicle ignition system will be turned ON.

# WORKING

The Arduino UNO is placed in the Helmet Unit. The Inputs from different sensors are given to Arduino Unit and which is analyzed by the arduino and given to the Bike Unit. The Power Supply is given to the Bike Unit. This Section Consists of a receiving part and a control signal. A Push Button is placed inside the Helmet to check whether the rider wears helmet or not.

Another scheme uses a gas sensor (MQ-6), which can detect the presence of alcohol. The surface of the sensor is sensitive to various alcohol concentrations. It detects alcohol in the exhaled air of the rider. The value of the resistance decreases which leads to a change in the voltage. This changed voltage is fed to the comparator, which compares the voltage with the predetermined value, and changes according to the alcohol concentration below the level of illegal consumption. If the sensor voltage exceeds the voltage at the output of the present comparator, the microcontroller performs the appropriate action.

All the components are assembled and tested successfully. The circuit is designed in such a manner that bike does not start until and unless rider wears the helmet. Also the bike won't start if the rider is drunk, this helmet alarms the rider if he crosses a certain speed limit by buzzing an alarm. If an accident occurs the engine automatically shuts off to avoid further injuries.

## REAL TIME IMPLEMENTATION OF SMART HELMET USING GEAR MOTOR:

**Fig-14: Implementation Of Smart Helmet**

## APPLICATIONS

1. It can be used in real time safety system.
2. We can implement the whole circuit into small VLSI chip that can be embedded into the helmet and bike unit.
3. It can be designed for less power consuming safety system.

This safety system technology can further be enhanced in car or other vehicle by replacing the helmet with seat belt.

## CONCLUSION

The designed smart helmet ensures the safety of the rider by making it necessary to wear helmet, and also ensures that the rider hasn't consumed alcohol more than the permissible limit. If any of these prime safety rules are violated, the proposed system will prevent the biker from starting the bike. The system also helps in efficient handling of the aftermath of accidents by sending a SMS with the location of the biker to the police station. This ensures that the victims get proper and prompt medical attention, if he/she met with an accident.

## FUTURE SCOPE

Smart Helmets of the future may not have integrated Bluetooth, GPS, Communication, head-up display and noise-cancelling technology but also air pollution alerts! And in future the helmet can be enhanced by applying Augmented Reality technology to provide onscreen navigation.

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