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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

INDIAN INSTITUTE OF INFORMATION TECHNOLOGY , ALLAHABAD

MINI PROJECT REPORT

ON

SMART HELMET

SUBMITTED BY -

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UNDER SUPERVISION OF-

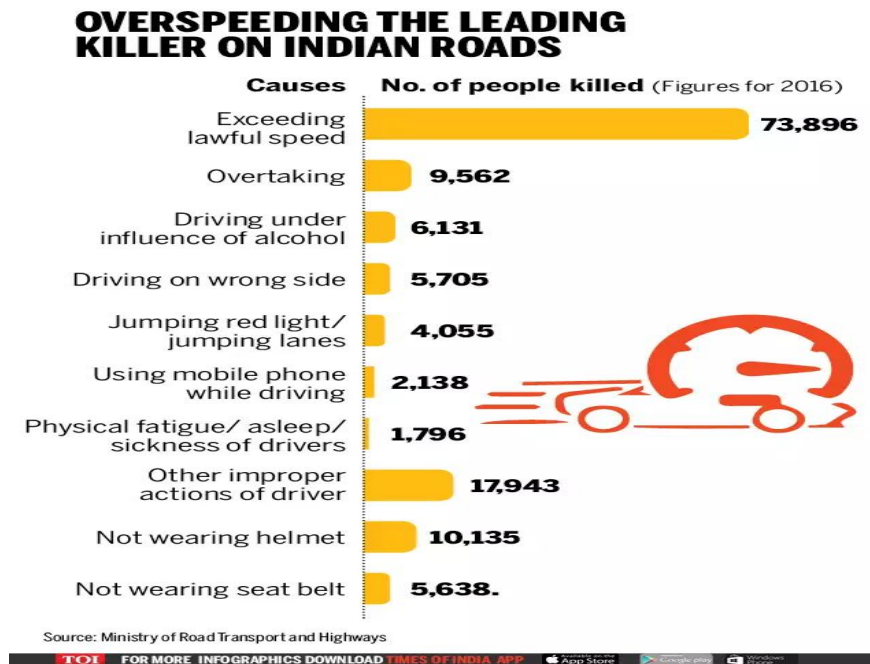
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ABSTRACT:

The impact when a motorcyclist involve in a high-speed accident without wearing a helmet is very dangerous and can cause fatality. Wearing a helmet can reduce shock from the impact and may save a life. There are many countries enforcing a regulation that requires the motorcycle's rider to wear a helmet when riding on their motorcycle, India is an example. A smart helmet is a special idea which makes motorcycle driving safer than before. This is implemented using Arduino, TSOP1838 and various other electronics component . The working of smart helmet us very simple : the IR transmitter module are placed on helmet which operate at around 38KHz frequency and IR receiver module is connected with bike to control the self-start switch . Bike starts only when receiver receives the signal from transmitter which is on helmet . So , biker will need to keep wearing helmet while riding bike .

Here are the data according to times of india(TOI)



Keywords : Arduino Uno , IR transmitter , IR receiver , 555 timer IC , Buzzer,Capacitor Resistor,BJT(npn).

INTRODUCTION

Now a days most of the countries are enforcing their citizens to wear helmet while riding bike , but still rule are being violated.

Motivation :The motivation of this project comes from the real-world challenges that we face daily on the roads. Road accidents are on the rise day by day and in countries like India where bikes are more prevalent many people die due to carelessness carried in wearing helmets. In present day scenario we encounter numerous cases of death due to two-wheeler road accidents.Despite of the fact that helmets are available everywhere, people are not wearing them.

Problem Definition :As the bikers in our country are increasing, the road mishaps are also increasing day by day, due to which many deaths occur, most of them are caused due to most common negligence of not wearing helmet.

Objective of the project :The objectives of this project are to design the circuit that can improve safety of motorcyclists, to develop a smart safety helmet for complete rider.

ANALYSIS:

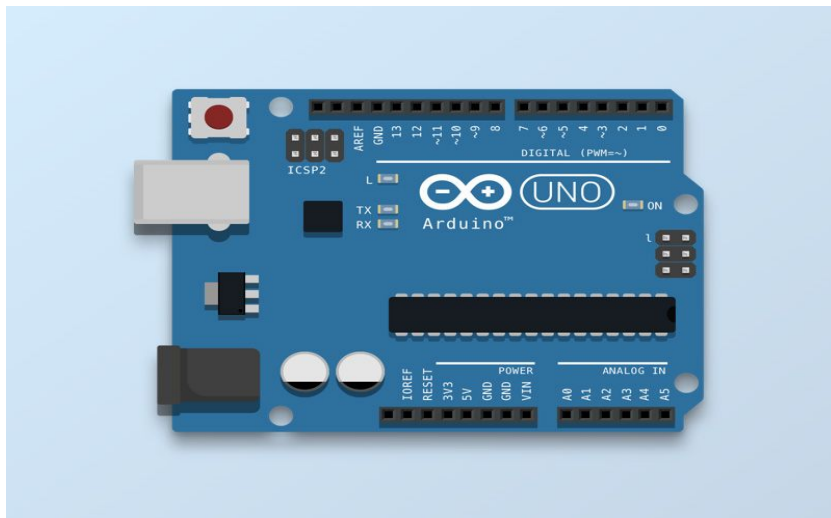
Introduction :There has been a sharp rise in the total number of deaths that occur due to road accidents in the past few years. Reckless driving, ignorance of traffic rules and absence of protective shield have been some of the most important reasons for these deaths. Most of the accidents occur due to drinking and then driving bikes and death caused due to neglecting helmets. Government adopted few measures like helmet and alcohol checking by traffic police but they are hardly useful.

Proposed solution :The module on bike check weather the rider has wear helmet or not . If yes, bike will start after pressing the self-start button and if rider has not wear helmet then self-start button will not work . If he removes the helmet after starting the bike a buzzer will start beeping after few seconds so, rider needs to have wear helmet throughout the ride.

MODULES:

Microcontroller (Arduino Uno) :

The Arduino Uno is a microcontroller board based on the ATmega328. (It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz of clock frequency, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to support the microcontroller, simply connect it to computer with a USB cable or power it with a AC-to-DC adapter or battery to get started. ARDUINO IDE is used for writing and dumping code into microcontroller. Operating system will be Windows versions.

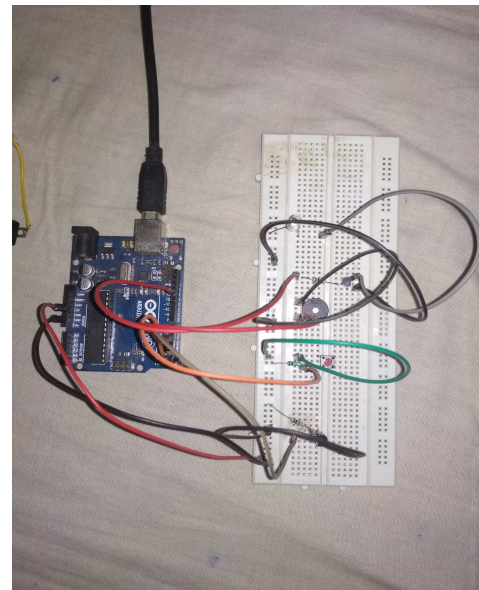


IR Communication :

IR, or infrared, communication is a common, inexpensive, and easy to use wireless communication technology. perfect for short distance wireless communication. In our project, when you hit a button of helmet module, an IR LED repeatedly turns on and off around 38,000 time a second, to transmit information to an IR receiver TSOP1838 on bike .



Helmet side Module



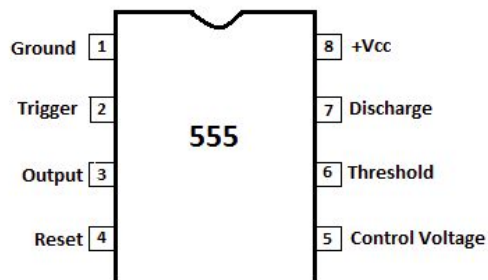
Blke side Module

Components :

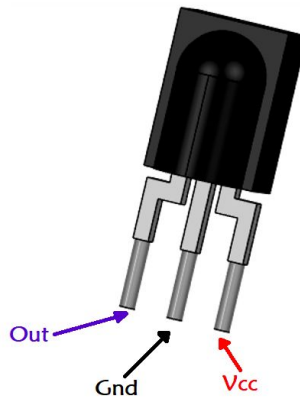
555 Timer IC : The 555 Timer IC is an integral part of electronics projects. These provide time delays, as an oscillator and as a flip-flop element among other applications. The 555 is still in widespread use due to its low price, ease of use and stability.

The 555 generally operates in 3 modes:

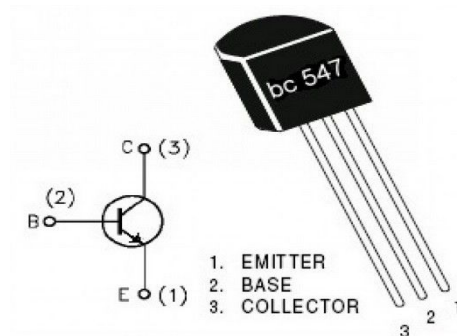
1. A-stable 2. Mono-stable 3. Bi-stable modes.



TSOP1838 : TSOP1838 is a miniature IR receiver IC form the TSOP18xx series. This particular model TSOP1838 will respond to 38kHz IR signals from remote control devices. It is normally used as IR receiver in remote control applications like TV, AC etc. This version is small in size and hence can be used in compact devices.

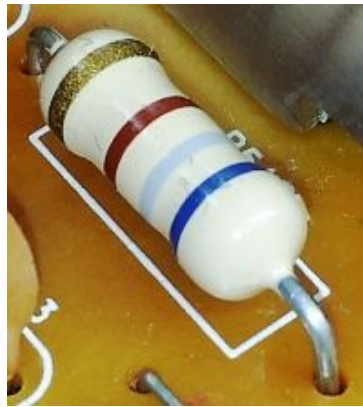


Bipolar Junction Transistor (BJT) : The BJT basic construction consists of two PN-junctions producing three connecting terminals with each terminal being given a name to identify it from the other two. These three terminals are known and labelled as the Emitter (E), the Base (B) and the Collector (C) respectively. Bipolar Transistors are current regulating devices that control the amount of current flowing through them from the Emitter to the Collector terminals in proportion to the amount of biasing voltage applied to their base terminal, thus acting like a current-controlled switch. As a small current flowing into the base terminal controls a much larger collector current forming the basis of transistor action. we use BJT(547 npn) and use as switch.



Resistors :The resistor is a passive electrical component to create resistance in the flow of electric current. In almost all electrical networks and electronic circuits they can be found. The resistance is measured in ohms. An ohm is the resistance that occurs when a current of one ampere passes through a resistor with a one volt drop across its terminals. The current is proportional to the voltage across the terminal ends.

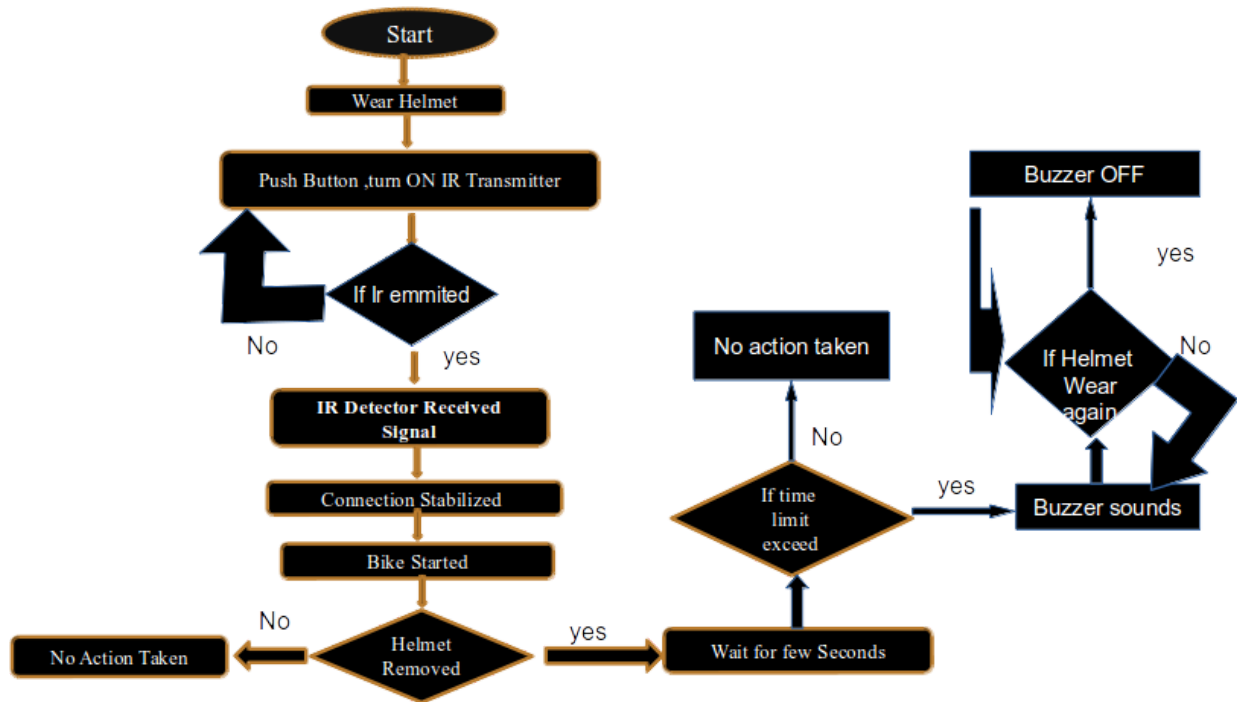
The value of Resistors we use are 10k,1k,22k potentiometer,10k potentiometer,220 in ohm.



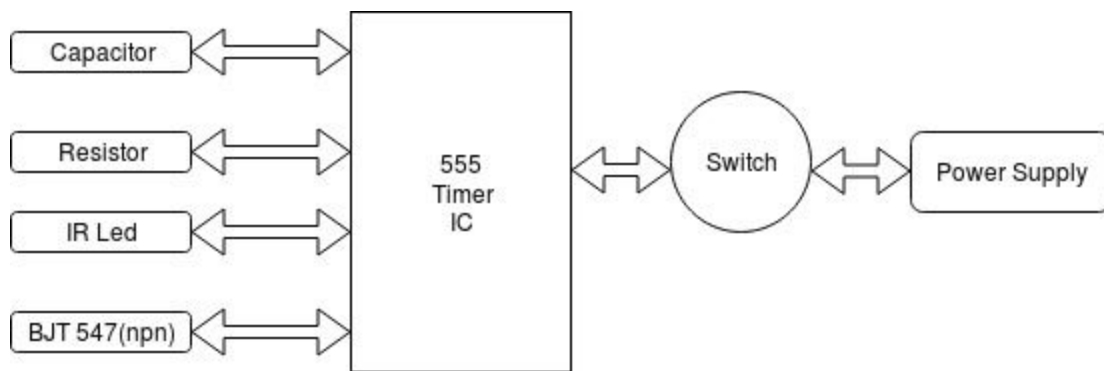
Capacitor : The capacitor is a component which has the ability or “capacity” to store energy in the form of an electrical charge producing a potential difference (*Static Voltage*) across its plates, much like a small rechargeable battery. We are using capacitor for frequency tuning .we use 1nf,0.1nf,10uf.



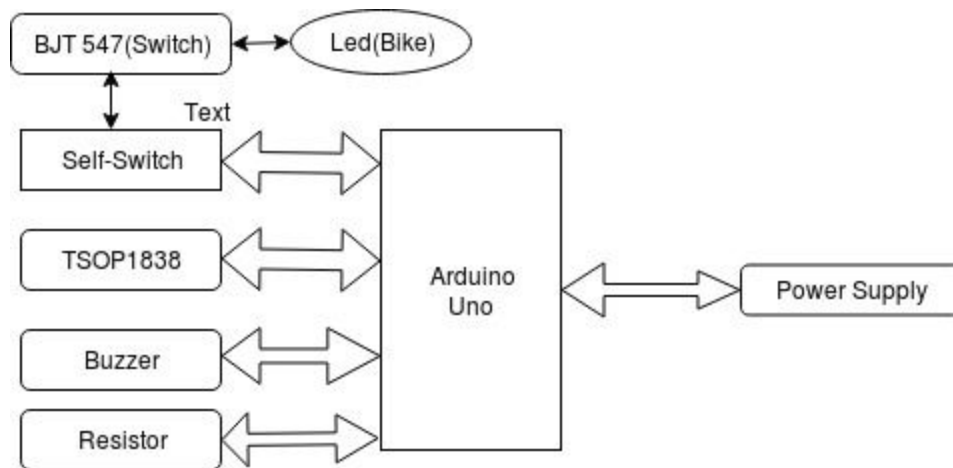
Flow Chart of the Mechanism:



Project Architecture:



Helmet Side Module



Bike Side Module

CONCLUSION: The developed project efficiently ensures:

- Rider is wearing helmet throughout the ride.
- By implementing this project, a safe two-wheeler journey is possible which would decrease the head injuries during accidents. The helmet may not be a 100% foolproof but is definitely the first line of defense for the rider in case of an accident to prevent fatal injuries.

FUTURE ENHANCEMENT:

- We can create an anti-theft system by providing a unique helmet to a bike.
- We can add alcohol sensor to detect drunk state of rider.
- We can Control Starting of Bike on the basis of mental state of Rider using EEG and via Arduino Communication.

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