DESIGNING OF AN INTELLIGENT HELMET SYSTEM

[1] A Bala Vardhan Kumar, [2] Dr. Kamala Kumari

[1]PG Scholar, Department of Instrumentation Engineering, Andhra University College of Engineering (A), Visakhapatnam, India

[2]Assistant Professor, Department of Instrumentation Engineering, Andhra University College of Engineering (A), Visakhapatnam, India.

ABSTRACT

In this paper, we have surveyed the ongoing patterns in creating Smart Helmet framework. The shrewd protective cap framework is utilized to forestall the mishaps in engine bicycles and to distinguish the bicycle mishaps on schedule for wellbeing of individual. The examination additionally assists with understanding the savvy protective cap framework developed over the period and at present by utilizing rising innovation. This work likewise addresses the clever engine bicycle protective cap framework which is utilized to advise the rider about back enormous trucks/transports for staying away from crashes. The proposed framework permits the rider to begin a bicycle just on wearing the protective cap. This framework won't permit driver to ride on the off chance that he had expended liquor. This framework recognizes the bicycle mishaps with exactness and offers data to the close by clinic and family members of the rider who met with a mishap. It additionally tracks the area subtleties of the rider and liquor utilization of the rider and will be put away in the cloud/worker.

Keywords: *ArduinoAtmega328P, LEDs, LED Cube, PCB ,Sensors, GSM.*

I. INTRODUCTION

Presently a day's wearing protective cap is necessary for each bike riders and furthermore it is similarly significant for pillion riders also to wear the head protector, however the uneasiness or bother caused because of wearing ordinary cap makes the rider to abstain from utilizing the cap lastly it prompts demise of the rider. Regardless of the way that protective caps are being accessible to everyone, individuals are simply not wearing them and the principle explanation for it is that the regular head protectors are producing unequivocal temperatures inside it which makes bother to the individual.

Right now in the current framework, when the individual met with a mishap we are not in a situation to guarantee the prompt emergency treatment; because of this late drug the individual may kick the bucket. With the assistance of proposed framework in this paper, it triggers a programmed alarm message to the concerned individual or to the rescue vehicle if there should arise an occurrence of any crisis circumstance like a mishap. The alarm message comprises of the subtleties, for example, area of the mishap and season of mishap, which will assist with accelerating the emergency treatment administration to the setback. Proposing this framework has chiefly originated from the social duty towards the general public.

Fig. 1: Indian road accident safety report

The proposed framework permits the rider to begin a bicycle just on wearing the protective cap. This framework won't permit driver to ride on the off chance that he had expended liquor. This framework recognizes the bicycle mishaps with precision and offers data to the close by emergency clinic and family members of the rider who met with a mishap. It likewise tracks the area subtleties of the rider and liquor utilization of the rider and will be put away in the cloud/worker.

II. LITRATURE REVIEW

During the time spent writing study, we have discovered a ton of shrewd protective caps with various methodologies and with various methodologies.

C. J. Behr et al [2] had proposed a brilliant protective cap for mining industry so as to distinguish perilous occasion discovery and air quality. This framework can distinguish the focus level of the unsafe gases, for example, CO, SO2, NO2, and particulate issue by utilizing electro compound sensor and furthermore identifies the evacuation of Helmet by utilizing an IR sensor. It additionally recognizes an occurrence when excavators are struck by an item in inconsistency to their head with a high power surpassing an estimation of 1000 by utilizing the Head Injury Criteria. An accelerometer was utilized to figure the speeding up of the head after hit and the HIC was determined in programming.

Edna Elizabeth et al [3] had built up a keen protective cap device for identifying and detailing bicycle mishaps. Savvy helmet system involves different sensors, and it recognizes the mishap by assessing lopsided or unpredictable varieties obtained from sensor framework, and a trigger will be shipped off Pager Duty from the microcontroller. Pager Duty will at that point triggers a call to the telephone number enrolled by the driver. In the event that the driver doesn't react to it for a time of 5 minutes after the primary call is started, at that point the crisis contacts will be informed with the insights concerning the mishap. The crisis contacts will be cautioned through instant message, email, and call until they recognize the episode. Continuously, this framework guarantees a dependable and snappy conveyance of data identifying with the mishap.

Rashmi Vashisth et al [4] had proposed a system which uses Piezo electric signal so as to recognize over speeding bicycle and it likewise furnished with a component called speed limiter, hich confines the speed furthest reaches of the bicycle? It additionally has an element which forestalls the alcoholic and drive situations of the rider called as ALCHO-LOCK and an accelerometer to distinguish mishaps, after recognizing mishaps it consequently make an impression on concerned individual. A mist sensor has been utilized in this framework so as to improve the perceivability for the rider in the event of haze or brown haze. It likewise includes programmed derivation of required or required sum from the riders enrolled virtual wallet in remote to causes the rider to stop and do the installment.

Selvathi et al [5] had planned a framework which naturally recognizes if the rider is wearing a protective cap and furthermore checks whether the rider has devoured liquor before beginning the ride. The hand-off connected to the motor will turn ON if and just if both the conditions are met. The Microcontroller in the framework controls the working of transfer and subsequently the start. This framework likewise recognizes the bicycle mishap at any spot and alarms the concerned individual about the mishap.

Archana D et al [6] had proposed a framework which won't permit driver to turn over the motor without wearing the cap. At the point when rider wore the protective cap, head protector will be bolted and motor will be turned ON. This framework likewise recognize the moving toward vehicle's speed on the two sides of the bicycle while riding by utilizing ultrasonic sensor and caution the rider by creating vibrations in bicycle's handlebar.

Sayan Tapadar et al [7] had proposed a philosophy for keen protective cap which can recognize if rider is wearing the head protector, and distinguish whether the individual has over-expended liquor and can likewise identifies about the mishap. This framework accumulates the information created from the accelerometer and weight sensors and a similar will be shipped off cloud worker through an online application programming interface (API) to prepare a help vector machine (SVM). SVM can help in distinguishing mishap exactly so later on enough information will be accumulated and investigated to give more precision about occasion recognition. The proposed framework (savvy head protector) can be associated with any PDA by means of Bluetooth so as to speak with the online API, by utilizing the advanced cell web association.

III. TECHNOLOGIES USED

EXISTING SYSTEM

The existing project basically has a wireless telecommunication, and is connected to a smart phone. This prototype uses sensors to detect a crash or accidents and the communication hardware is used to automatically dial a predefined emergency contact. It

helps the victim to reach doctors as early as possible. The other existing system is to control the speed in which the biker is going in. The helmet is fixed with all the components and sensors that read the speed of the bike and accordingly instruct the rider to reduce or increase the speed based on the obstacles ahead the bike.

PROPOSED SYSTEM

In this project consist of two sections. They are HELMET SECTION and VEHICLE SECTION. In helmet section consists of arduino, helmet switch, alcohol sensor and ZIGBEE. Here whenever the Rider wants to ride the bike first he need to switch on the ignition key on vehicle section. After that the vehicle section checks the helmet wore data is received or not, if the helmet wore data is received then only vehicle will be start otherwise vehicle is in off state only, whenever the vehicle is started then after the helmet section continuously checks the riders alcohol consumption, if the rider consumed high alcohol then helmet section sends high alcohol data to vehicle section, whenever the vehicle section receives high alcohol data then it will give alerts continuously. In vehicle section we are using ultrasonic sensor to calculate the front obstacles distance and based on the distance the vehicle speed will be reduced and any zone name plates are detected then automatically reduced the vehicle speed otherwise it will move on normal speed only. If Blink sensor high the rider get an alert signal. To communicate the vehicle section and helmet section we are using ZIGBEE communication.

HELMET SECTION

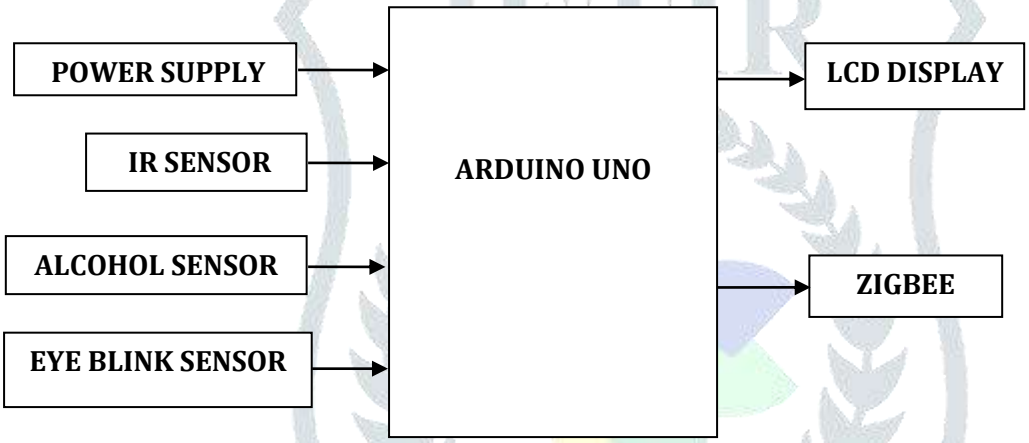


Fig. 2: Block diagram of the Helmet Section

VEHICLE SECTION

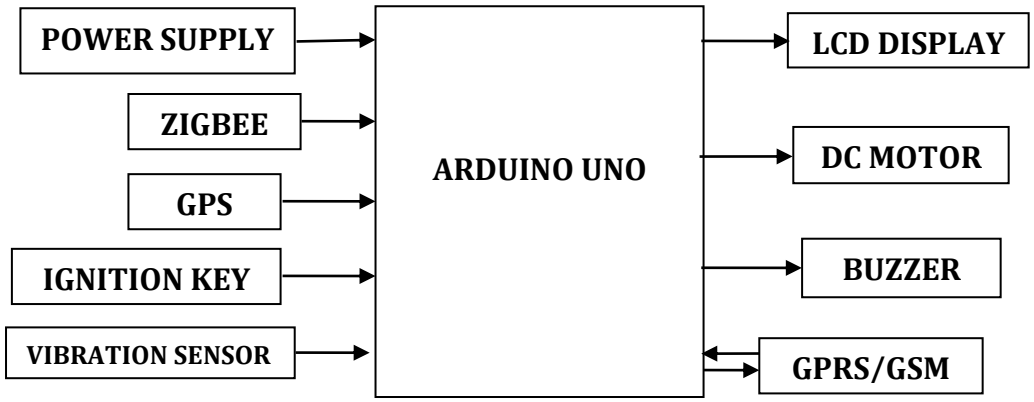


Fig. 3: Block diagram of the proposed system

It consists of two blocks helmet section and vehicle section. The input to the circuit is supplied from the regulated power source. The microcontroller power is of 5v.Micro Controller act as heart of the project because it contains the program and control the operations. In the Proposed system alcohol sensor eye blink sensor and IR sensor act as input to the micro controller unit. This sensors measures the percentage of alcohol consumed by Rider and position of the helmet.LCD screen shows the status of inevitable information. Zigbee act as a communication network between helmet section and vehicle section. When Ignition key is on, vehicle will start it will check the inputs from the sensors depend on the status will on or off the motor. The ATMEGA328P plays a key role In handling signals from the sensors and give output DC Motor through its Analog signal pins. Vibration sensor operates on the principle of piezoelectric-effect. Which means it measures the acceleration and pressure and it converts into electrical energy. Buzzer unit helps to awake the rider whenever drowsiness detected. These all sensors tracks the status of the safety of the rider. In the coming of an accident, the GPS module will gain the coordinates of the accident site. These co-ordinates are sent by means of GSM module to a pre defined number. The person who belongs to this number receives the detection of accident along with location with the help of GPS.GPS and GSM module helps in finding the accident location and it will update in web page.

SCHEMATIC DIAGRAM

HELMET SECTION

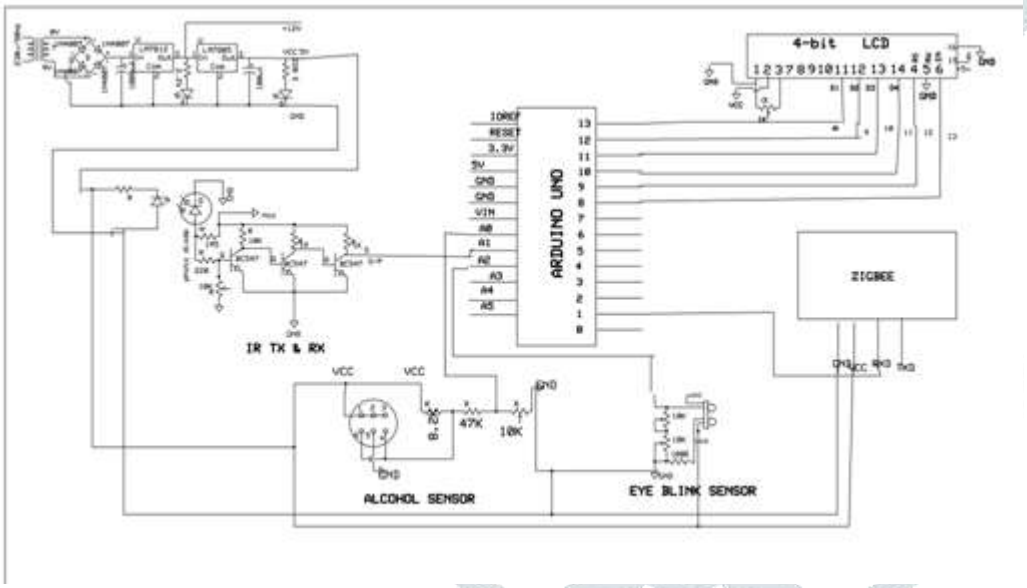


Fig 3: Schematic Diagram of Helmet Section

SCHEMATIC EXPLANATION

In this undertaking we required working voltage for ARDUINO regulator board is 5V. Henceforth the 5V D.C. power flexibly is required for the ARDUINO board. This controlled 5V is created by venturing down the voltage from 230V to 18V now the progression brought down a.c voltage is being corrected by the Bridge Rectifier utilizing 1N4007 diodes. The amended a.c voltage is presently sifted utilizing a 'C' channel. Presently the corrected, separated D.C. voltage is taken care of to the Voltage Regulator. This voltage controller gives/permits us to have a Regulated consistent Voltage which is of 5V. The redressed; separated and controlled voltage is again sifted for swells utilizing an electrolytic capacitor 100µF. Presently the yield from this segment is taken care of to microcontroller board to gracefully working voltage.

VEHICLE SECTION

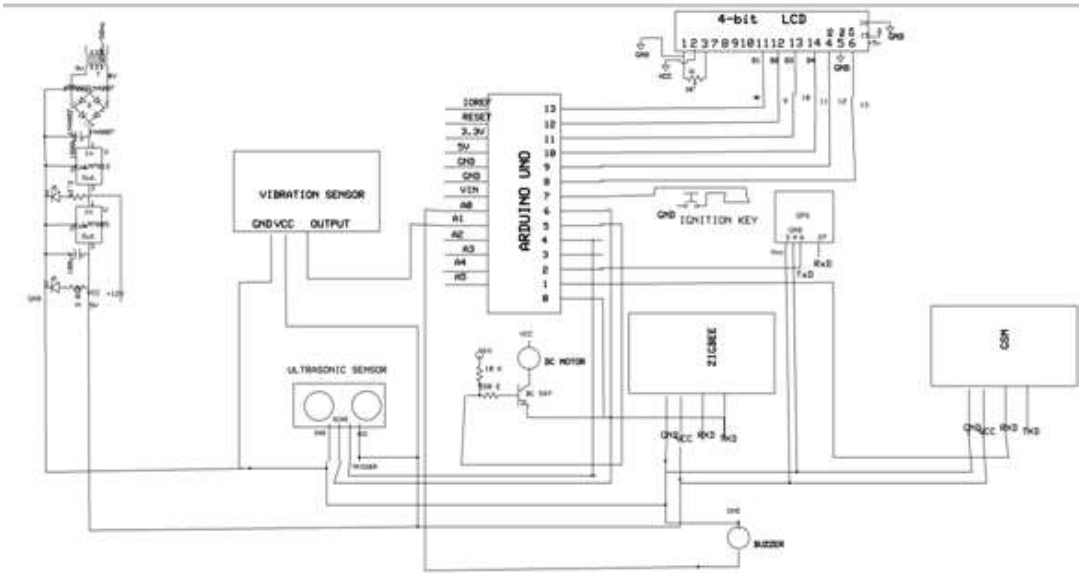


Fig 4: Schematic Diagram of Helmet Section

SCHEMATIC EXPLANATION

In this task we required working voltage for ARDUINO regulator board is 5V. Subsequently the 5V D.C. power gracefully is required for the ARDUINO board. This controlled 5V is created by venturing down the voltage from 230V to 18V now the progression brought down a.c voltage is being corrected by the Bridge Rectifier utilizing 1N4007 diodes. The amended a.c voltage is presently separated utilizing a 'C' channel. Presently the corrected, separated D.C. voltage is taken care of to the Voltage Regulator. This voltage controller gives/permits us to have a Regulated steady Voltage which is of 5V. The redressed; separated and directed voltage is again sifted for swells utilizing an electrolytic capacitor 100µF. Presently the yield from this part is taken care of to microcontroller board to gracefully working voltage.

ARDUINO UNO (ATMEGA328P)

Fig 5: Arduino board

The Arduino Uno is a microcontroller board dependent on the ATmega328 (datasheet). It has 14 computerized input/yield pins (of which 6 can be utilized as PWM yields), 6 simple data sources, a 16 MHz earthenware resonator, a USB association, a force jack, an ICSP header, and a reset button. It contains all that expected to help the microcontroller; essentially associate it to a PC with USB link or force it with an AC-to-DC connector or battery to begin.

IV. SOFTWARE DESCRIPTION

SOFTWARE

Before you start controlling the world around you, you'll need to set up the software to program your board.

USE THE ONLINE IDE (ARDUINO WEB EDITOR) ARDUINO IDE

1. Arduino UNO board along with the USB cable and DC power supplies.
2. Read about, understand what you are working with and download the IDE: http://www.arduino.cc
3. Mac, Windows and Penguin friendly versions available
4. Then you are ready to plug it in!

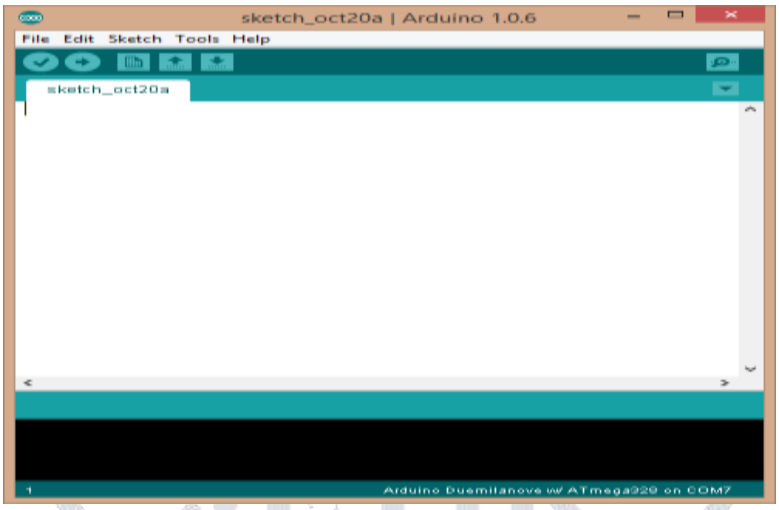


Fig 6: Arduino Sketch

The main features you need to know about are:

1. **Code area:** This is where you will type all your code
2. **Verify:** This allows you to compile your code to code the Arduino understands. Any mistakes you have made in the syntax of your code will be show in the info panel
3. **Upload:** This does the same as verify but will then send your code to your Arduino if the code is verified successfully
4. **Info panel:** This will show any errors during compiling or uploading code to your Arduino
5. **Serial Monitor:** This will open a window that allows you to send text to and from an Arduino. We will use this feature in later lectures.

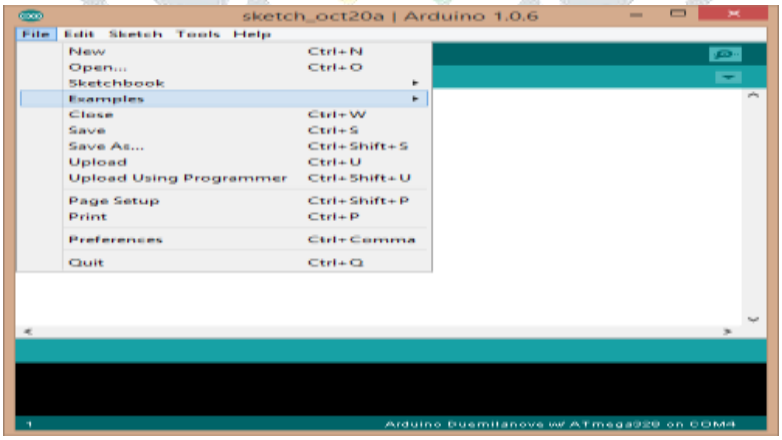
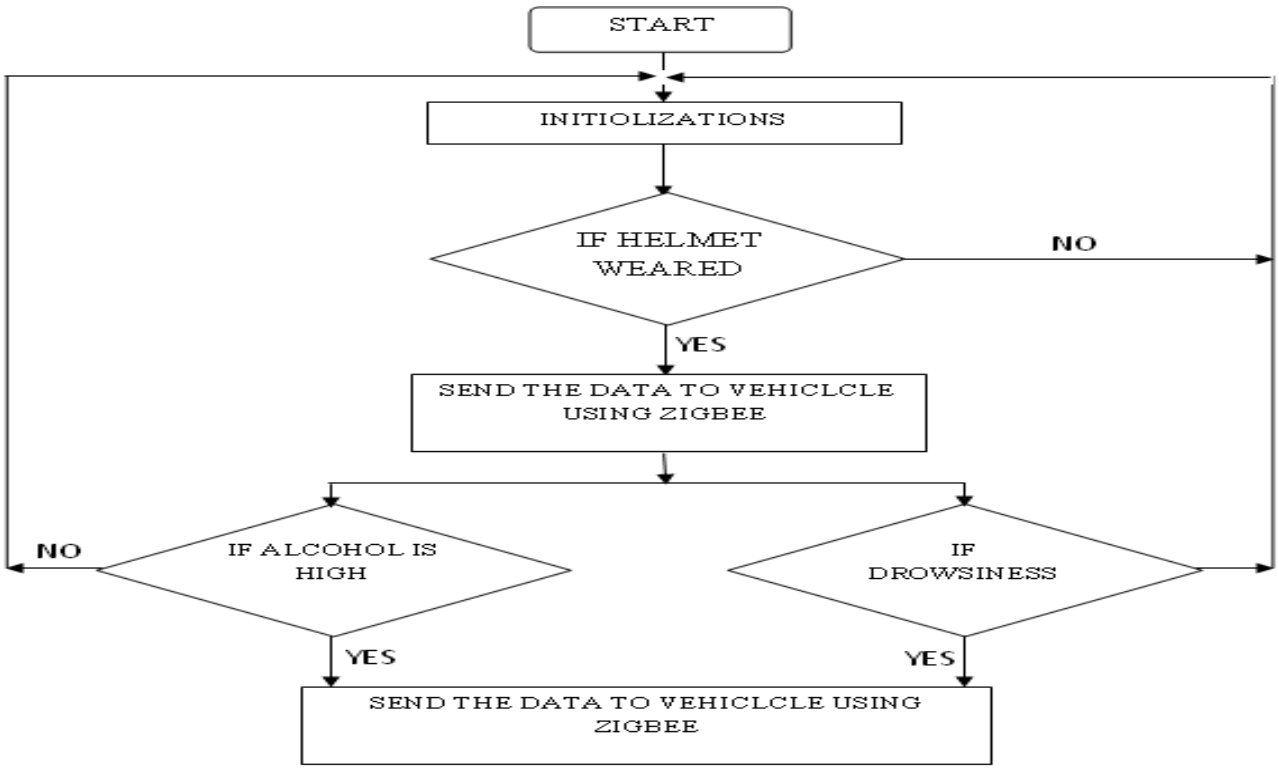


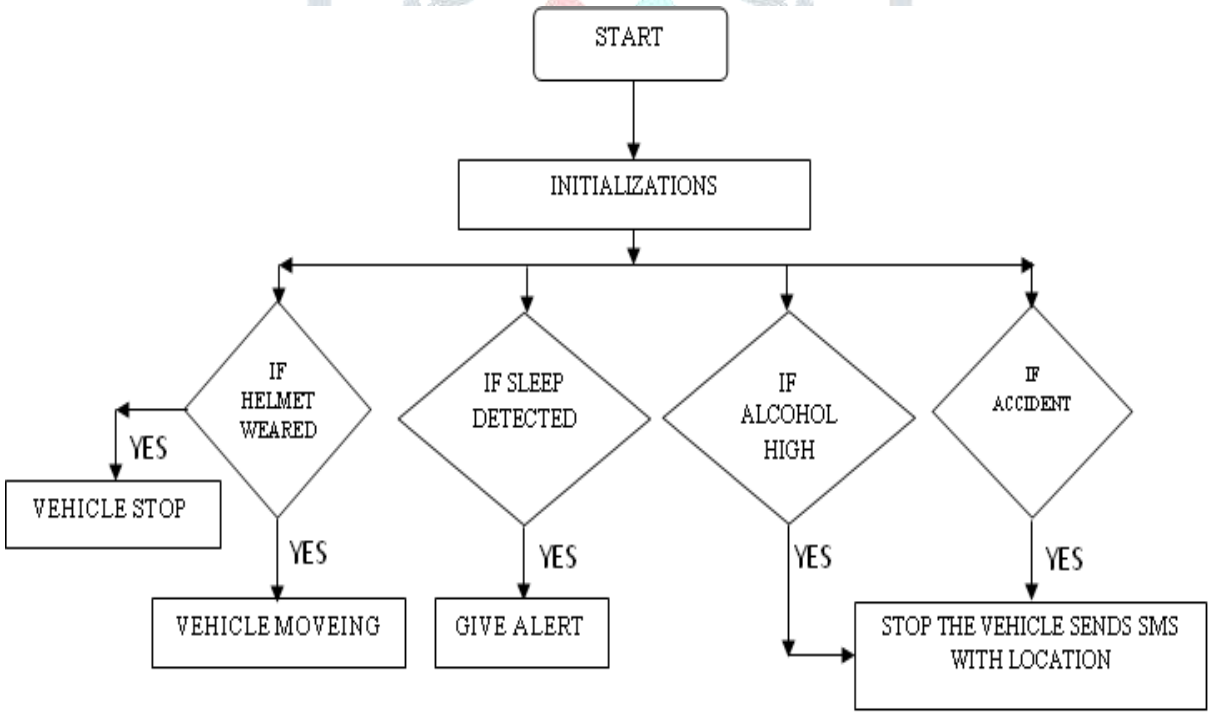
Fig 7: showing Arduino Sketch Examples

By far one of the most valuable part of the Arduino software is its vast library of example programs. All features of the Arduino are demonstrated in these.

Flow charts



Helmet section Flow chart



Vehicle Section Flow chart

V. CONCLUSION

The system designed provides safety and reduces the after effects of the accident, notifying about the accident will provide timely care and treatments to the victim reducing the severe impacts on the person. The alcohol detection will prevent drink and drive scenario and the effects of drink and driving to public and the rider himself. Speed monitoring of the vehicle will prevent over speeding rash riding and violation of traffic rules. The eye blink sensor alerts the rider and prevents accident. This project has good real life scope, if it is implemented by the government. It saves a lot of time of traffic police and most precious life of humans. It can also help to prevent the damage occurred to the Vehicles by the accidents. GPS technology has been used in the project because it allows utilizing the internet services to make the system smarter and more accurate. the longitude and latitude can be known by this technology. We can find victim through Google maps. The features in helmet make the journey of riders safe, comfortable and convenient.

As a Future extension of the work, solar charger can be incorporated. Solar charger helps to increase power backup from efficient natural resource. The complexity of the circuit should reduce for ease of using. Camera can be used for monitoring purpose. Communication between helmets makes riders to be more targeted.

ACKNOWLEDGEMENTS

Intelligent helmet project incorporated with the GSM/GPRS and sensors systems by the guidance bestowed by Dr. Kamala kumari, Assistant Professor, support extended by the team of Instrumentation laboratory, Andhra University.

REFERENCES

[1] P. I. Bureau, "Road Accidents in India- 2016," Government of India, Ministry of Road Transport & Highways, 2017.[Online].
Available:http://pib.nic.in/newsite/PrintRelease.aspx?relid=170577.
[2] A.Garg, S.Gupta, and H.Kaur,"Smart helmet," Int.J.Comput.Appl, pp.19–22, 2004.
[3] K.Singh and R.Nandu, "Smart Helmet for Two-Wheelers," Adv.Automob.Eng, vol.3, no.1, pp.1–2, 2014.
[4].M.K.A.Mohd Rasli, N.K.Madzhi, and J.Johari, "Smart helmet with sensors for accident prevention,"2013Int.Conf.Electr.Electron.Syst.Eng.ICEESE 2013, no.December, pp. 21–26, 2013.
[5] Texas Instruments, "Digital-Switch Hall Effect Sensor," DRV5023 datasheet,May 2014[Revised Sept.2016].
[6] Sky lab "Ultra High Sensitivity and Low Power GPS ReceiverModule" SKG13C datasheet April 2010 [revised March2012]
[7] InvenSense Inc. "MPU6000and MPU-6050ProductSpecification"Document Number:
PS-MPU-6000A-00Revision: 3.4Release Date:08/19/2013
[8] Raspbery pi "RAspberry pi 3 B model" Datasheet also available:
"http://docseurope.electrocomponents.com/webdocs/14ba/090076 6b814ba5fd.pdf"
[9] knit "Makerville Knit"document available:https://makerville.io/knit/#misc-get-in-touch"
[10] Nitin Agarwal, Anshul Kumar Singh, and Pushpendra Pratap Singh, Rajesh Sahani "SMART HELMET"International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056 Vol. 2, 02 May 2015
[11] Tutorial point "HTTP tutorial "tutorial point.com Available:" https://www.tutorialspoint.com/http/"