

# Smart Helmet for Accident Detection and Navigation

Rupesh G. Mahajan<sup>1</sup> Pawan D. Godwani<sup>2</sup> Akshay U. Dhokrat<sup>3</sup> Gunjan D. Kubde<sup>4</sup>  
 Rohan R. Kumbhar<sup>5</sup>

<sup>1</sup>Assistant Professor <sup>2,3,4,5</sup>BE Student

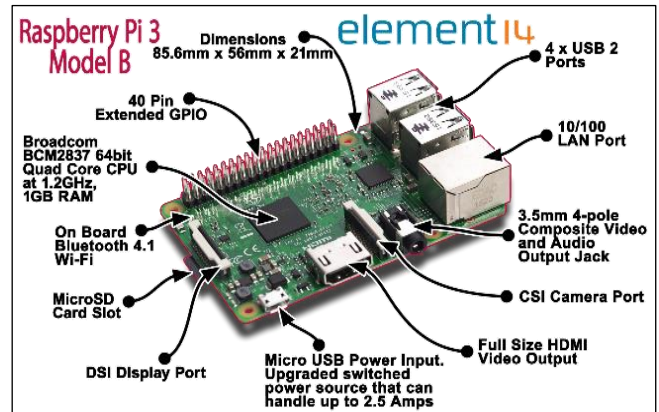
<sup>1,2,3,4,5</sup>Department of Computer

<sup>1,2,3,4,5</sup>D.Y. Patil Institute of Technology, Pune-18, India

**Abstract**— Many researches in the past have been done on wearable devices which provide user a smart system for tracking human actions and also taking preventive measures in emergency conditions. Smart Helmet's made before used seven segment display for generating notifications and grey scale was used for tracking rare view. This paper motivates the use of advanced technologies available today like Raspberry pi, camera module, led display and vibration sensors. GPS technology is used for generating location report when vibration sensor faces an accidental impact. This report is sent from rider's cell phone to emergency services and his/her family members. The head mounted led screen displays the rear view and also provides navigation support to the rider. Using this helmet, a rider will achieve an obstruction free ride and will also be facilitated with smart features.

**Key words:** Raspberry Pi, Vibration Sensor, GPS, Camera Module, Rear-View, Led Display, Navigation, Smart Helmet

foundation to promote the teaching of basic computer science in schools and in developing countries. It consists of various ports for connecting peripherals like led display, camera module, sensors, etc.



## I. INTRODUCTION

The likelihood of injury is extremely high in motorcycle accidents: 97% of the vehicle accidents resulted in some kind of injury to the motorcycle rider; 45% resulted in more than a minor injury. The most deadly injuries to the accident victims are injuries to the chest and head. The use of the safety helmet is the single most critical factor in the prevention of reduction of head injury. Helmeted riders have fewer neck injuries than un-helmeted riders. Helmets are estimated to be 37-percent effective in preventing fatal injuries to motorcycle riders.

Government has taken several steps for road safety, one of such includes compulsion for wearing helmet. The police and the district administrations in India, have been conducting a series of awareness programmes on the advantages of helmet. Under such conditions providing a smart helmet to the rider could help to serve the cause. The helmet along with safety should provide several advanced features to the user to increase riders interest in wearing a helmet. Hence the motive of this paper is to provide the idea about Smart Helmet which is safe and secure for the user and will also be consisting of certain smart features.

Smart helmet in this paper will consist of rear view display and navigation support on a head mounted display attached to the helmet. It will also generate location report for a emergency system under which various emergency services and riders family will be informed about the accident. By this user will be provided with safety and also with the measures which will be undertaken under emergency conditions.

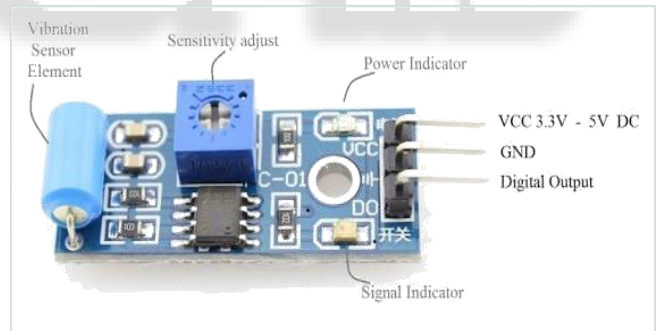
Smart helmet will consist of the following main components:-

### A. Raspberry Pi

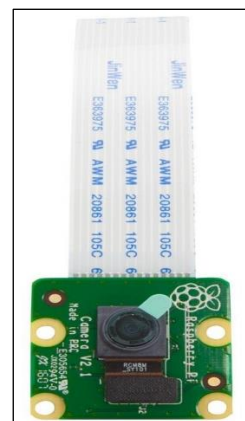
The Raspberry Pi is a series of small single-board computers developed in the United Kingdom by the Raspberry pi

### B. Vibration sensor

Vibration sensor is used to detect impact on helmet in case of accident. Vibration sensor SW-420 can be used with Raspberry Pi. The input from sensor can be converted using ICMPC3008 and can be given to the raspberry pi. By sensing strong vibrations we can detect that if the user is in emergency situation or not.



### C. Camera Module



A camera on the rear side of the helmet will be installed to fetch the view behind riders back, the same will be displayed on led display. On the raspberry pi 3 version dedicated camera port is provided. Using this port we can connect camera to the raspberry pi module. Using specific commands we can either take pictures, record videos, live feed to a display from camera.

#### D. Mounted Display

Similar to the camera port a display port is also provided. Using this dedicated displays such as LCD, touch screen displays can be connected. This can be used to display user interface or specific task such as footage from camera. Navigation will also be displayed on the mounted display, this will reduce users obstruction while riding.

We will install Android operating system on raspberry for installation of application supporting multiple modes like navigation and rear view. With the above components we will be providing the rider with a smart helmet. The camera module installed on the rear side will be connected with the led screen, because of this the user will be aware of the rear environment and the vehicles behind his back. This will eliminate the users effort to adjust himself for getting rear view from the side mirrors of his bike thereby proving a obstruction free ride. Navigation support will also be displayed on the led screen for user convenience.

In case of emergency like accidental situations, the vibration sensor will detect the impact and a location report of rider will be generated if the impact reaches certain threshold. This report will be forwarded to the emergency services and riders family. This will serve as precaution post accident and can also save lives.

The overall smart helmet will provide safety and obstruction free ride to the rider and will also take precautionary measures in case of severe accidental condition. The motive is to reduce the accidents caused due to obstructions faced by rider while riding and making a smart helmet which attract user's interest for wearing helmet while riding.

## II. MOTIVATION

In today's world, we face number of accidents. These have a severe affect if the rider has no protection like helmet. So we can make a helmet which is smart as well as keeps the rider safe from accidents and also takes necessary steps in case the accident occurs.

## III. LITERATURE SURVEY

In today's era, especially in the young generation, the craze of motor bikes is really remarkable. The middle class families prefer to buy motorbikes over 4-wheelers, because of their low prices, various varieties available in the market, due to cutthroat competitions between 2wheeler companies and durability. As the bikers in our country are increasing, the road mishaps are also increasing day by day [1], due to which many deaths occur, most of them are caused due to most common negligence of not wearing the helmets, also many deaths occur due to lack of prompt medical attention needed by the injured person. This motivates us to think about making a system which ensures the safety of biker, by making

it necessary to wear helmet, as per government guide lines, also to get proper and prompt medical attention, after meeting with an accident. The project aims at the security and safety of the bikers against road accident [1].

This section describes the development and implementation of the advanced traffic visualization in HMDs. As stated above, this module is integrated with the head down traffic display. Recalling the role dentition of the head-mounted module within the overall traffic visualization concept, the central requirement is that the advanced traffic visualization in head-mounted displays should include as much important information as possible in order to decrease the pilots head-down time, but not more than needed to avoid cluttering. Thus, the definition of an advanced visualization strategy is started with the identification of methods for de-cluttering the HMD while presenting all relevant information in a way that conforms with the requirements of head-mounted see-through symbologies [2].

The thought of developing this project comes to do some good things towards the society. Day by day the two wheeler accidents are increasing and leads to loss of many lives. Accord to a survey of India there are around 698 accidents occurring due to bike crashes per year. The reasons may be many such as no proper driving knowledge, no fitness of the bike, fast riding of bike, drunken and drive etc. Sometime the person injured, the accident may not be directly responsible for the accident, it may be fault of rider, but end of the day it's both the drivers involved in the accidents who is going to suffer. If accidents are one issue, lack of treatment in proper time is another reason for deaths. According to the survey India 698 accidents occur per year, nearly half the injured people die due to lack of treatment in proper time. Many reasons for this such as late arrival of ambulance, no persons at place where the accident occur to give information to the ambulance or parents [4].

A motorcycles helmet is a type of protective headgear used by the motorcyclist. The main purpose is for safety, which is to protect the rider's head from the impact during an accident. It protects the riders head as the helmet provides ventilation system. Speeding and not wearing a helmet are the main reasons of fatalities and injuries. It is proven that, as the speed of motorcycles increased, so did the number of accident and fatalities. This is again due to the shock of an impact during the accident [3].

## IV. CONCLUSION

With the help of smart helmet we can minimize the accidental conditions by providing obstruction free ride to the rider. As we have included Global Positioning System (GPD) the rider can have directional support on the mounted display anytime. This helmet will incorporate very simple and cost effective technology, which if implemented has the potential of drastically reducing fatalities in road accidents due to negligence in not wearing a helmet.

## REFERENCES

- [1] Nitin Agarwal, Anshul Kumar Singh, Pushpendra Pratap Singh, Rajesh Sahani, "SMART HELMET", 2015
- [2] Ferdinand Eisenkeil, Johannes Ernst, Oliver Deussen, "TRAFFIC VISUALIZATION IN HELMET-

MOUNTED DISPLAYS IN SYNCHRONIZATION WITH NAVIGATION DISPLAYS”, 2015

- [3] Nina Korlina Madzhi, Juliana Johari, “SMART HELMET USING SENSORS FOR ACCIDENT PREVENTION”, 2013
- [4] Manjesh N1, Prof.Sudarshan Raj, “SMART HELMET USING GSM and GPS FOR ACCIDENT DETECTION AND REPORTING”, 2014
- [5] EUROCONTROL, ACAS II Guide: Airborne Collision Avoidance System II (incorporating version 7.1). 2014
- [6] H. Abdi and L. J. Williams, “Principal component analysis,” Wiley Interdisciplinary Reviews: Computational Statistics, vol. 2, no. 4, pp. 433–459, 201
- [7] International Journal of Science and Research (IJSR) ISSN (Online): 2319-7064 Volume 3 Issue 3, March 2014

