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Fabrication of Intelligent Helmet to avoid Road Accident during Peak Hours

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ABSTRACT: Nowadays helmet is must to wear while driving two wheeler vehicles. It will protect our head and brain from accident. But when we go into a narrow road can't see mirror and can't respond the horn from back side vehicles. While wearing a helmet, we can't rotate our head in rush traffic place. These are all may leads to an accident. The main objective of the project is to fabricate the intelligent helmet to avoid the accident due to helmet wearing in rush traffic place. This intelligent helmet having camera is placed on the back side of the helmet and LCD screen are placed inside the helmet for easily viewed by driver. The camera can be record continuously and telecast the total video of rear view and the camera can be record the process and stores the last 15 minutes rear view video in storage device application. The main advantage of the project is to avoid the accident in narrow roads and traffic places. The recording application is use to make an evidence of crime such as theft, murder and attempt to accident and etc. It is mainly used in narrow roads and metropolitan cities in peak hours. It makes a safety and happy journey of the person. It can help to reduce a tension and fear more than normal helmet.

.KEYWORDS: Two wheeler, Helmet, Camera, LCD screen, Video Recording.

I. INTRODUCTION

In 1966 Congress enacted the Highway Safety Act (HSA) to deal with mounting highway safety problems. The Act provided incentives for states to enact helmet laws, and the states responded immediately by enacting these laws. States the enacted universal motorcycle helmet laws in 1966 and by 1975 forty-seven states and the District of Columbia had such laws.

The laws were enacted by the states in order for those states to receive federal highway construction funds, which were contingent on the enactment of helmet laws. Currently only twenty states require helmets for all motorcycles riders while the remaining states do not require helmets or have partial laws usually requiring helmets for riders less than eighteen years of age.

The motorcyclists have successfully organized and exerted significant influence over state legislatures in defeating universal helmet laws. Because society bears the burden of the increased costs associated with injuries and deaths of non-helmeted riders, the individual rider's freedom of choice may have to be curtailed.

Increased education of the motorcycle enthusiasts and the public along with a concerted, direct and organized effort by health care organizations will be necessary to enact universal helmet laws. Others measures such as increased insurance requirements and the use of helmet defense by defendants to allow for the mitigation of damages may help encourage the use of helmets.

Many studies of motorcycles accidents have related the increasing incidence of morbidity, in particular brain injuries, and mortality due to brain injuries, to the repeal of the helmet laws. Overall, the helmeted riders sustained less severe injuries and had a lower mortality rate as compared to the non-helmeted riders.

Paper is organized as follows. Section II describes Literature review about the design of intelligent helmet. The list of components used to design helmet as road safety guard and its operations are explained in Section III. After

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the components description, the block diagram and its functional overview, fabrication results for helmet module is given in Section IV. Finally, Section V presents conclusion.

II. RELATED WORK

Defence Science Journal [1] was published about three different two wheeler helmets were studied to investigate their dynamic performance. First is helmet with ABS shell, second is helmet with metal foam, and third is helmet with single groove in the liner foam for providing ventilation. Front and side impact analyses were carried out at 10 m/s velocity by using LS-DYNA. Forces on the helmet and on the head due to impact were studied with function of time. Pressure and stresses in the brain were investigated and found not to change significantly due to the presence of groove in the liner foam, which was provided to improve the ventilation in helmets. The dynamic performance of a helmet with outer shell as metal foam was examined and compared with ABS material.

ZigBee Based Intelligent Helmet for Coal Miners [2] was published about a cost effective ZigBee-based wireless mine supervising system was presented. This scheme used intelligent helmets as voice terminal and ultra-low power nodes of wireless sensor network. The programme adopted ZigBee wireless technology to build wireless sensor networks, realized real-time surveillance with early-warning intelligence on methane, temperature, humidity in mining area, and used speech communication to reduce potential safety problems in coal production.

Smart Helmet with Sensors for Accident Prevention [3] was published about the impact when a motorcyclist involves 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, Malaysia is an example. With the reason, this project is specially developed as to improve the safety of the motorcycle's rider. Motorcyclist will be alarmed when the speed limit is exceeded.

A Force Sensing Resistor (FSR) and BLDC Fan are used for detection of the rider's head and detection of motorcycle's speed respectively. A 315 MHz Radio Frequency Module as wireless link which able to communicate between transmitter circuit and receiver circuit. PIC16F84a is a microcontroller to control the entire component in the system. Only when the rider buckled the helmet then only the motorcycle's engine will start. A LED will flash if the motor speed exceeds 100 km/hour. The following are the list of disadvantages which are prevailed in this literature review. (i) It makes disturbance in narrow roads. (ii) Horn sound didn't get audible clearly while wear normal helmet (iii) Can't see nearby passing vehicles (iv) Makes irritating feeling in rush traffic this may leads to accidents.

III. INTELLIGENT HELMET

Basic Information about Helmet: For adequate protection, the helmet shall fit closely and the chin strap shall be under tension at all times of vehicular use. The helmet is made to absorb the energy of blow by the partial destruction of its component and parts even though damage may not be readily apparent, any helmet subjected to severe impact should be discarded and maintain the full efficiency of the helmet there or its component parts.

Impact Absorption Mechanism: The outer shell provides safety against penetration of sharp objects as also absorbs some part of the energy of an impact. The protective padding absorbs most of the energy of the impact upon its partial or complete destruction. In many cases when a helmet gets subjected to an impact, the damage to the outer shell may not be apparent since most of the energy absorption has been done by the protective padding.

Visor : To maintain a good field of the vision, formation of the scratches and accumulation of dirt on the visor screen shall be avoided. No organic solvents or materials containing organic solvents such as a metal polish, wax& polish shall be used to clean the visor screen. A soft cloth shall be used to wipe the visor for removing dust, dirt etc.

Road Safety Guard: The portable road safety guard is a device which is used to capture the rear view of the vehicle and it can telecast with help of the LCD screen on front side of the helmet. The road safety guard is the main setup of the project is to avoid the accident in narrow roads and traffic places. The recording application is use to an evidence of crime such as theft, murder and attempt to accident and etc. It is mainly used in narrow roads and metropolitan cities in peak hours. It makes a safety and happy journey of the person.

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This road safety guard is mounted on the intelligent helmet so it can help to reduce a tension and fear more than normal helmet. It makes recording the video and it can store in a memory storage device of the component. It can store the colour video and clear vision and high quality image of the camera.

IV. EXPERIMENTAL RESULTS

Block Diagram of Intelligent Helmet

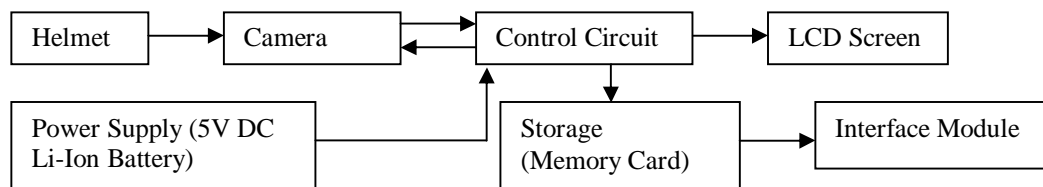


Fig 4.1 Block Diagram of Intelligent Helmet

The figure 4.1 shows the block diagram which includes Helmet, Camera, Control Unit, LCD screen, Power Supply, Storage and Interfacing Module.



Fig. 4.2 shows the fabricated model of intelligent helmet

Working of Intelligent Helmet: Generally normal ordinary helmet is used nowadays. It is used to protect our head from accident. Ordinary helmet have only a protective padding and visor with these elements to make comfort protection of drives head but while wearing this helmet, when we go into a narrow road. It makes some disturbance with this helmet because this helmet hides the side view of the roads. So it makes a disturbance and it may leads to accident. In a rush traffic we cannot see a mirror for a rear view of the vehicle.

The helmet was design with style in mind as well solving a problem that plagues most street biker riders-not being able to see behind us. The “rear-view mirror” found in cars and trucks does not translate well into the design of a motor cycle and the two tiny little side mirrors don’t seem to be able to provide hardly enough rear road visibility.

The proposed intelligent helmet provides safety, comfort and Low Street or wind noise with high style makes the user friendly. This helmet offers head up display with real time of what is going on behind us. LCD screen is to be mounted on front side of the helmet with the help of spring rod camera and the LCD display is connected by a bus cable.

The Whole set up of intelligent helmet circuit is worked by 5V dc power supply with the help of rechargeable battery. It gives a continuous power supply to operate the camera and display system. The main working of the intelligent helmet is the capturing the video from the camera for rear view and it can telecast via LCD screen with that additional feature is the record the rear view video and it can be stored in a SD card.

The SD card is mounted on the road safety guard circuit board and then it will make the storage of videos. In this intelligent helmet the display is fitted with the spring rod it is a flexible one, so it can able to move a LCD Display with a comfortable for the person who operate the intelligent helmet.

With the display it can show the live telecast of the rear view of the vehicles. Main feature of this helmet it can able to play a recorded video with a video player. In this system inbuilt video player is available. One more advantages of this helmet are it can able to record the video in night mode also, because of this helmet is to operate with the help of

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IR LEDs. IR LEDs are used to make a clear vision in night mode of operation for this helmet. Essentially this helmet bends the travel of any light all the way around the shell of the helmet- just like the mirror in a car.

In this mode of operation the recording of the video depends upon the memory card. In this storage system from 1GB to 32GB memory card storage capacity is available. While wearing an intelligent helmet, we can drive a safe and pleasant journey. It can make a clear vision of rear view with the help of LCD display instead of seeing a mirror. By using the camera continuous monitoring of the back side view, in the rush traffic zone, one way and narrow roads we can't be able to see nearby passing vehicles so we make this solution for these problems in a single way that is called as an intelligent helmet.

After finishing the recording and storing process of the video. Road safety guard device can interface with the computer via USB 2.0 cable. This cable is used to interface between computer and road safety guard device that means intelligent helmet circuit board. The main purpose of the interfacing process is the data sharing between intelligent helmet and computer. With the help of interfacing cable stored video file can be copied via that interfacing cable.

Main application of this intelligent helmet is to reduce accidents in rush traffic, narrow and one way traffic zones. Reduce time to see a side mirror instead of LCD display. Recorded video is used to make evidence for accident cases. Advantages include (i) Reducing time to see a mirror (ii) Helps to prevent accidents (iii) Make a clear vision of rear view (iv) Can be able to see rear nearby vehicles even rush traffic (v) Make evidence for accident cases. Some of the applications for this intelligent helmet are listed as follows (i) It is used to make a video recording while driving, for safety purpose (ii) It makes a simple view of rear side vehicles (iii) When the person who wears this helmet, can easily be detected by using GPS (iv) Whole bike is controlled and stored data like a BLACK BOX of Airplane (v) With the help of LCD screen it shows more measurements like distance of destination.

V. CONCLUSION

The intelligent helmet is a safety and protects the head and face of the bike riders. Face is covered by glass (visor) and view the road ways. The display attached by a spring rod and mounted on the inner layer of the helmet. Camera is located on top of the helmet. Infrared LEDs are attached to the camera and it is used in night time to capture the image detection by camera.

Normal helmet function is only protection and safety of the face and head but this helmet is to avoid seeing a mirror instead of the display of real view and storing the video by the storage device. SD card is used for storage device of helmet. It is not compulsory in bike riding. But if we want to see a rear side view we can switch ON the camera and open the display to view the live video. This display can rotate 270 degrees. If not needed we can switch OFF the camera and close the display. When we want to see a rear view we can use it.

In this intelligent helmet lots and lots of additional features are available in the future include with a built-in ultra wide angle rear view camera and transparent heads-up display, this helmet displays our blind spots right in front of us. With fully integrated Bluetooth speakers and built-in GPS navigation, we get turn-by-turn directions even in areas of low reception and we get to rock out while riding. Using Bluetooth with built-in speakers, we can listen to our favourite music on the go. Solar power based intelligent helmet also a future scope of this design.

Solar power supply is a main advanced feature normally this intelligent helmet is operated by the 3.7V power supply by Li-ion battery. In the future solar panel is mounted on the top layer of the helmet it will give the power supply for the helmet circuit.

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