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An Elegant Smartware with Multi-Features

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Abstract—*In today's world, road accidents are the major reason for human deaths. Road accident, though an unexpected event but has claimed many lives till date .Wearing a helmet might prevent serious head injuries but will still cause loss of lives . Use of SMART HELMETS can make you aware of your surrounding environment and help you tackle the situation and prevent accident. Smart helmet has two HUD displays, dual rear view cameras, acoustic and visual traffic alerts, electro-tint visor, collision proximity warnings, detects crash and sends information to a relative/ambulance. It uses Peltier module for cooling and clotting of blood in case of injuries and solar panels for power system along with battery. It provides features like navigation, bluetooth communication, noise control and wireless music system that gives better riding experience. A smart helmet is a special idea which makes riding safer and comfortable than before. This uses GSM and GPS technology . This smart helmet solves a real world challenges with hi- tech solutions to create the optimal riding environment for the open road.*

1. INTRODUCTION

Project aims at the security and safety of the bikers against road accidents, while also providing them with a luxurious, comfortable two wheeler experience. This smart helmet solves a real world challenges with hi- tech solutions to create the optimal riding environment for the open road.

Studies shows that sustained exposure to free-way noise levels above 100dB's can cause permanent hear loss and cardiovascular effects. To overcome this Helmet uses noise cancelling head phones while still allowing to hear the vital audio cues like sirens, traffic, and rpms. Thus it helps rider to keep calm, alert, and focused.People abandon use of helmet primarily due to inconvenience caused by excess heat generated inside it. Comfortable temperature is maintained in helmet by using Peltier module and a temperature sensor.GPS and GSM modules are used for navigation.It also has the features like wireless audio speaker, proximity sensors to warn a rider of any approaching vehicles with LED notifications, E-tint visor and a wiper.

2. DETAILS EXPERIMENTAL

2.1 METERIALS AND IT'S DESCRIPTIONS:

MICROCONTROLLER : MSP4300F1121A- Microcontroller is the heart of this system. It processes the received data and then stores this data or transmits in the required form.

MAX 232E: MAX232 converts TTL logic levels to RS232 logic levels and vice versa. In RS232, a logical 1 is represented by -3V to+25V, while a 0 bit is +3V to +25V. For this reason, to connect any Rs232 to a microcontroller system we must use voltage converters such as MAX232 .

COMMUNICATION CABLES :TRS3112E :RS-232 is a standard communication protocol for linking computer and its peripheral devices to allow serial data exchange. In simple terms RS232 defines the voltage for the path used for data exchange between the devices.

BLUETOOTH MODULE: Bluetooth is a wireless technology standard for exchanging data over short distances (using short-wavelength UHF radio waves in the ISM band from 2.4 to 2.485 GHz[4]) from fixed and mobile devices, and building personal area networks (PANs).

HUD DISPLAYS: Two transparent LCD HUD displays that will offer different information. This helps a rider with wide 210degree field of view in the rear.

REAR-VIEW CAMERAS: These feed a live stream to HUD displays, and they are linked to a vehicle detection system that is monitoring the blind spots.

SOLAR PANEL: The solar panel built into the top of the helmet will help to eliminate the use of battery during the day time. Solar panel helps to harness the renewable solar energy which is abundant in nature and saves the battery life.

RECHARGEABLE BATTERY: Rechargeable battery is used so that even though the solar energy is not available the helmet can work with the battery.

GSM MODULE: A GSM modem is a specialized type of modem which accepts a SIM card, and operates over a subscription to a mobile operator. It acts just like a mobile phone. From the mobile operator perspective, a GSM modem looks just like a mobile phone. When a GSM modem is connected to a computer, this allows the computer to use the GSM modem to communicate over the mobile network. While these GSM modems are most frequently used to provide

mobile internet connectivity. It can also be used for sending SMS and MMS message.

GPS MODULE: The Global Positioning System (GPS) is the only fully functional Global Navigation Satellite System(GNSS). This utilizing a constellation of at least 24 Medium Earth Orbit Satellite that transmit precise microwave signals, the system enables a GPS receiver to determine its location. A GPS receiver is used here which detects the longitude and latitude of the place where accident occurred and gives the information to MCU.

AUDIO VISUAL INDICATOR: These are the combination of LED and BUZZER which shows different status like normal or safe condition, position acquisition details, and message sending status etc BUZZER gives audible alert.

PROXIMITY (ULTRA SONIC) SENSOR: Alerts the riders of possible collision if the distance of any vehicle at the rear end is less than the pre-set value.

ANALOG TO DIGITAL CONVERTOR :ADC34J42-Converts sensed signals or information in analog form into digital for the processing of signal by microcontroller.

TEMPERATURE SENSOR AND THERMO-ELECTRIC MODULE:The sensor sends information to thermoelectric module (peltier module) by comparing the inside temperature with that of surrounding and the module produce a cooling effect to maintain optimum temperature for the rider.

POWER SYSTEM :Power system is used to supply power for micro-controller and other peripheral devices. Solar panel and battery used.

NOISE CONTROL SYSTEM :Noise control system with the use of noise cancellation head phones.

AUDIO SYSTEM: For receiving phone calls and listening to music and directions through navigation while riding.

PELTIER MODULE:This module works on the basis of thermoelectric effect, if any bleeding occurs can be clotted by the thermoelectric module so that person can be rescued from critical conditions. It also helps to keep the temperature inside the helmet minimum as prefixed value thus providing cooling system.

MICROPHONE: For transmitting your voice electronically through the call.

RELAY 5V: It is used as a switch for sensor operations.

BJT (NPN) : If the sensed value exceeds the desired pre-set value by the rider, the Microcontroller sends output signal through the NPN Bi-polar Junction Transistor (BJT).

VIBRATION SENSOR: Vibration Sensor Alarm recognizes movement or vibration, it sends a signal to either control panel.

E-TENT VISOR: E-tent visors acts as a cooling glass thus helping a rider in a bright sun. Wiper helps a driver ina heavy rain to clear the visor and makes the road visible.

WIDESCREEN WIPER: Wiper that fits a helmet and gives multi speed visor wiping, wiper delay and visor cleaning spray. It charges via USB and snaps off in seconds when the sun comes out.

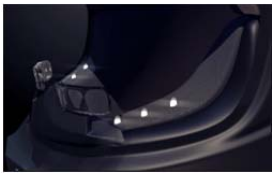
2.2 Implementation Of Components

HUD Display Simulated View:

210 degree Field View And Solar Panel On The Top:

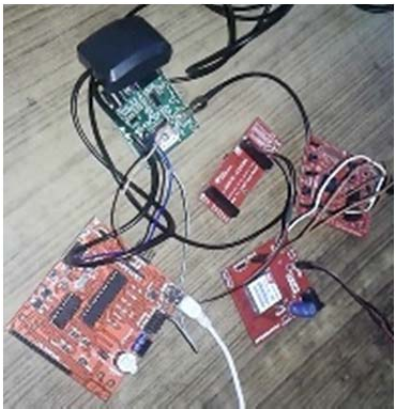
Detection Of Danger:

Warning With LED:



Widescreen Wiper:

Assembling the microprocessor and other components:



3. CONCLUSION:

With inventory included in helmet, comfortable temperature can be maintained in helmet by using Peltier module which works on the basis of thermoelectric effect. Also if any bleeding occurs it can be clotted by the thermoelectric module so that the person can be rescued from critical conditions. In the event of road accidents the precise location of the rider can be traced out using GPS system and uses GSM system to send the message to emergency vehicle. The solar panel built into the top of the helmet will help eliminate the use of battery during the day time. The collision proximity warnings are an unique touch –the helmet has a built-in ultrasonic sensor to warn riders about potential rear-enders ,for example while waiting at traffic lights. It has an audio navigation system to help riders with routes. It has an intelligent noise controlling system: The ear pockets are heavily padded with silicone to reduce noise .The active noise cancellation microphones are in ear pockets.The HUD display with dual rear view camera helps a rider to have a safer ride.

In summary, all the features included in helmet are:Solar power system along with internal rechargeable battery. Crash detector which sends the message to ambulance and parents when the rider meets with an accident. HUD display with dual camera . Rear-ender collision Proximity warnings when other vehicles are nearby. An intelligent Noise- controlling system with noise cancelling headphones which enables the rider to still to hear vital audio cues like sirens, traffic and RPMs. Ambient audio capability: If the rider wants to hear what's going in the surrounding the helmet has a built in Ambient Mode which can be easily switched on with a convenient button on the helmet's exterior without removing the helmet. The Bluetooth module includes mobile phone connectivity for calls, audio and navigation streaming. It is also designed to take voice commands. Comfortable temperature inside the helmet is provided with Peltier module. Inbuilt GSM and GPS module for audio navigation and to send a the emergency and accident alert to the parents/ambulance. The e-tent visor is impregnated with LCD crystals that darken "in less than a second". It has a wiper to clear heavy rain water dashing to the visor and helps to have a clear vision of the road for the rider during rainy season.

Thus the smart helmet provides the best riding experience for the riders and takes care of the safety and security of the motorcyclists thus decreasing the road accidents and death mortality.

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