

Solar Powered Smart Modular Helmet and Tail PIPE Exhaust Gas Monitoring and Alert System for Bike

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ABSTRACT: This proposed smart modular helmet is just not designed only to make the riders to avoid violating the rules, it also monitor the condition of the rider while riding the bike, if any bike accident occurred due to rash driving, and the smart modular helmet is designed to inform the occurrence of accident to authorized person. The impact of biofuels on the lubricant condition will be discussed. Monitoring the emission gases from the automobile, if it crosses the environment guidelines of Greenhouse gases will be informed to nearest traffic police station. In Present days, Road accidents kill 382 in India every single day. India's daily death index due to road accidents especially two wheelers is more than four times the annual death toll from terrorism. Predictably, most of those who die on the roads perish because of preventable causes: speeding, drink driving and driving without a helmet. Two-wheelers account for the largest share of vehicles on Indian roads.

Index Terms: Thin Solar Panel, Microcontroller, Force Sensitive Resistor, Carbon Monoxide Sensor, Pressure Sensor, RF Tx and Rx, GPS & GSM.

I. INTRODUCTION

In present Generation of bike riding most of the cities in India are enforcing to put helmet on their head during bike riding for all the human beings. And the strict rules have been made by the government not to ride a bike without helmet on the head, and also not to ride a bike during when the person is in alcoholic state and also not use the mobile phone while riding, but still rules are violated by bike riders, which lead to accident in the roads.

In order to strictly follow the rules and regulations by riders, either the police system has to be strict or there must be well designed modular helmet has to made which avoids violating of rules and regulations made by government. In this proposed project, a modular smart helmet is

designed specifically with comfort as it incorporates a hinge to open and also have inbuilt devices and sensors which makes rider to stop violating the rules.

This proposed smart modular helmet is just not designed only to make the riders to avoid violating the rules, it also monitor the condition of the rider while riding the bike, if any bike accident occurred due to rash driving, and the smart modular helmet is designed to inform the occurrence of accident to authorized family person. The impact of biofuels on the lubricant condition will be discussed. Monitoring the emission gases from the automobile, if it crosses the environment guidelines of Greenhouse gases, our technique which is developed in such a way that it informs to traffic police station by text message so and so vehicle is emitting the gases which is above threshold level.

II. PROBLEM STATEMENT

The main problem with reference Literature survey, the system which exists has only monitors the bike riders have worn the helmets or not and send the information to turn on the ignition switch .The existing method will never monitor the condition of the bike rider, such as frustration while driving, which decreases level of oxygen for the rider because of closed face. And also the existing system only detects the accident if the helmets have fall down during accident. So such failures are avoided in our proposed system.

In order to avoid the above said problem it is important to design a smart modular helmet which intimates the bike riders in technical way to wear the helmets and this system monitors and alerts accidents of bike, this system also monitors the Exhausts gas concentration which emits from tail pipe with suitable gas sensor. Totally system is design to avoid head injuries and environment pollution.

III. PROPOSED SYSTEM

By keeping in the mind of safety to the bike riders our developed technique is to make good protection in a helmet for the humans those who ride the bikes. This helmet which we called as smart helmet is built by using a various sensors which are responsible for noticing of helmet by bike rider or not. There are two main units in the system, one is modular Helmet unit and second one is Bike Monitoring unit. Each unit contains transmission of signals between bike unit and helmet unit by using RF module, microcontroller. The bike ignition will be turned off, until and unless the rider will wear the helmet, here the accident detection will be monitored by helmet unit and as well as bike unit, such that the accident detection will be inform by the bike unit, which sends an alert message to family with GPS location. The bike unit system units measure the percentage of CO gas by using suitable sensor and informed to the automobile user with a message containing the information. In case, if the user did not bother about the vehicle condition the message will be redirected to the district RTO office. Basically this system monitors the detection of accident in helmet as well as bike unit and informs the user by sending alert message.

IV. BLOCK DIAGRAM

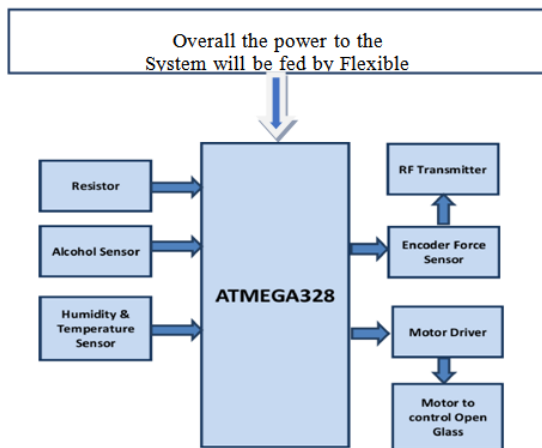


Figure 1: Smart Modular Helmet Unit of Proposed System.

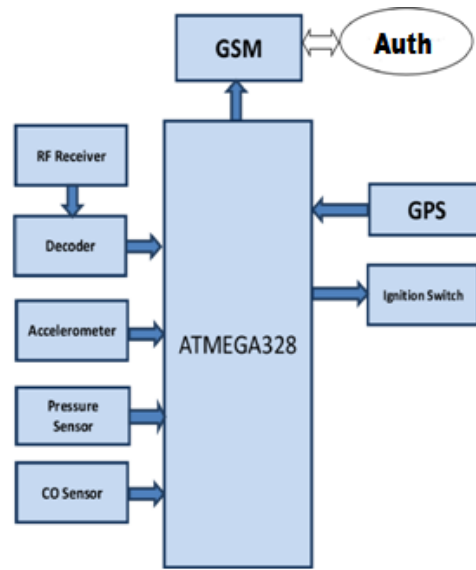


Figure 2 : Bike Unit of Proposed system.

V. BLOCK DIAGRAM DESCRIPTION

The block diagram for a developed system is shown in above figure 1 and 2, It mainly contains two units such as bike unit and smart modular helmet unit. It is already noticed that the developed system consists of two main units one is bike unit and another is smart modular helmet unit .the helmet un it also called as transmitter unit which transmits required signals to bike unit is shown in Figure 1 ,inside the upper par of the helmet a force sensing resistor is placed and in front of the bike rider mouth an alcohol sensor is also placed it senses the alcohol very easily.

On the upper side of the helmet a solar panels are placed with direct to the sunlight. A battery is fixed inside the helmet. It also consists of humidity and temperature sensor to monitor the frustration of bike rider so that motor will be control automatically to open the face of the helmet which provider air to the rider. RF transmitter circuit and controller are also placed inside the circuit. The bike system unit is mounted in the bike. RF Receiver and different sensors are mounted in the bike unit. Accelerometer is fixed below the petrol tank of bike, for the fall detection. Pressure sensor is placed in the inner part of petrol tank used to detect the accident, whenever accident occurs the petrol tank will damages and in turn create a pressure which tells the controller the accident has occurred.

The bike unit controller monitors the signals from the helmet unit and also by sensing the values from sensors present in the bike unit, It controls the ignition unit and also alert the users regarding the accident detection and concentration

level of exhaust gas to the authorized persons like family and police station.

1 Microcontroller

ATmega-328 is one of the AVR (Advanced virtual RISC) microcontroller. It has 32kb built-in memory internally and support data rates up to 8-bits. It consists of various features. In this proposed system control is the heart of the two units which acts like master and slave unit, which monitors and alerts the users by accessing the sensors and RF Transmitter and receiver.

2 FSR (Force sensitive resistor)

FSR (Force sensitive resistor) is one of the material it can change its resistance whenever a pressure or force is applied to it. We can give conductive film as an example in our developed system this FSR is used to identify the helmet condition with respect to bike rider.

3 Alcohol sensor

This sensor will identify the rider has taken alcohol or not. Technically this sensor is also called as MQ3 sensor which identifies the content of ethanol in air. If a person is drunken and breathes near this sensor then this identifies the ethanol in his breath and provides the required alcohol concentration as an output.

4 Temperature and Humidity sensors

Temperature and Humidity sensors continuously measure the environment humidity & temperature which is present in bike unit. The DHT (Data Humidity Temperature) sensors have two main parts one is thermistor and another is capacitive humidity. Inside it contains a basic chip which split out a digital signal with humidity and temperature because it will do analog to digital conversion. Since for a microcontroller it is very easy to read digital signal.

5 Pressure Sensor

Pressure sensor is used for the detection of helmet crashes during any accident. The pressure is assembled in a module located within the helmet. When the helmet is compressed due to an impact, it will provide the voltage which is proportional to pressure change inside the vacuum created in the helmet.

6 L293D Motor driver

This motor driver L293D is used to control the motor direction and also it contains closing and opening action of the helmet. This L293D motor driver is a 16-pin IC which can control to DC

motor in any of the direction.

7 RF Transmitter & Receiver Module

This RF transmitter and receiver module is an electronic device which is used to receive or transmit radio signals between any two communicating devices. The application of RF module is utilized by an embedded system to communicate with other devices wirelessly by using radio frequency communication. In this system the module is used to communicate between helmet and bike unit.

8 Accelerometer Sensor

Accelerometer is present in bike unit, which is used to measure axis of bike in which it is fall during occurrence of accident. Single and Multi and single-axis models are easily available to identify direction and magnitude of acceleration which is used to sense shock, falling, vibrations and acceleration. In order to detect the position of the device a micro machined accelerometers are placed in portable electronic devices

9 Carbon Monoxide Sensor

These sensors will make use of alarm if the threshold level of the carbon monoxide exceeds and senses the presence of carbon monoxide. By giving these outputs it helps in warning to safety ventilate the places or to evacuate. In the following system the concentration of CO is measured by these sensors which emits from vehicle tail pipe and it will send a message to authorized persons, if anything threshold level of the Carbon monoxide exceeds.

10 GPS NEO-6M

By using longitude and latitude value this GPS tracks the location of the vehicle. This GPS NEO-6M module will provide good performance by providing strong satellite search capability by having a built-in 25x25x4mm antenna

VI. CIRCUIT DIAGRAM

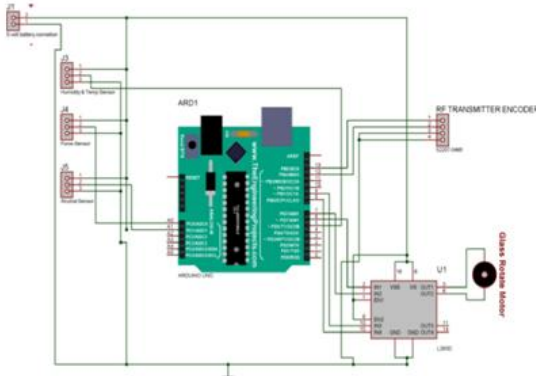


Figure 3: Circuit Diagram of Smart Modular Helmet Unit.

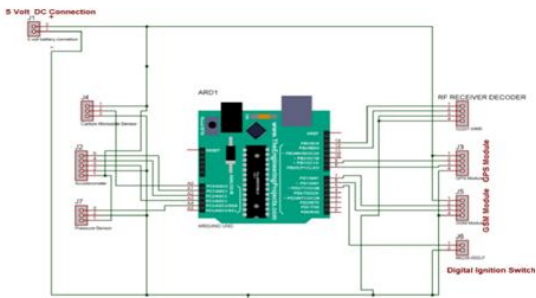


Figure 4: Circuit diagram of a bike unit.

VII. CIRCUIT DIAGRAM DESCRIPTION

The overall circuit diagram of helmet unit is as show in fig 3 . It contains At mega328 controller which control the overall process of the helmet unit, and it consists of Sensors like Humidity and temperature, Force Sensor, Alcohol Sensor, RF transmitter is used to send data signals from helmet unit to bike unit and motor with driver is used to control closing and opening of face cover in the helmet. which in turn used to command the bike unit and also the helmet face mask. Whenever the threshold level of sensor reaches the above value the controller of helmet unit will send different signals to bike unit through RF Transmitter.

The overall circuit diagram of a bike unit is as show in the below fig 4, it mainly consists of RF Receiver with decoder which is exactly connected to digital pins of a controller, the devices like accelerometer, Pressure Sensor and carbon monoxide sensor is connected to analog channels of controller. The Serial communication devices like GPS and GSM module is connected to serial communications pins controller. The controller in the bike unit will read the signals from helmet unit through RF receiver module, depends on the signals

it activates the ignition unit and it sends the alert messages through GSM .Accident alert messages will be forwarded to authorized persons with the exact location information with the help of GS M and GPS. Totally the system of helmet unit will send the digital signals to bike unit and also simultaneously by reading the signals from the different sensors the controller will inform the activity of bike and bike rider.

VIII. ADVANTAGES & DISADVANTAGES

1 Advantages

- The system is design to control the safety of bike rider by reading multidisciplinary sensor values from helmet as well as bike unit.
- Solar based Power is provided to the helmet unit
- User friendly Smart helmet.
- Accurate safety is provided to bike rider.

2 Disadvantages

- GSM Network is Compulsory to send the alert messages to authorized persons.

IX. CONCLUSION

In this project the accident of vehicle be detected and positioning of that accident place is done in the basis of longitude and latitude using GPS receiver. This longitude and latitude data is send to the family member, which is predefined in the controller using GSM module. Using this latitude and longitude value in Google map can find out the exact location and take early action depends on situation. And also the bike ignition cast be turned on until and unless rider will not wear the helmet. The accident can be identify based on the data which is received by the sensors present in helmet as well as bike unit. The system also informs carbon monoxide gas rise in the vehicle to traffic police using GSM. The Expected performance is achieved through implementation of the proposed system.

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