Smart helmet for detection using IOT technology and reporting system

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ABSTRACT **- The main objectives of smart helmet is to provide means for detecting and reporting accidents .rapid increase of 2weelers,range of accidents will be increased rapidly. A main cause of mortalities occur because the person not wearing helmets otherwise accident was not reported in time, he was not be saved because delayed of ingress to a hospital, or because he was drunk while in the riding. The accident is a unexpected and unmotivated event. Now a days the road accidents are leading to human death, the road safety for driver is essential for the society. the number of vehicles increased by day by day the collision of vehicles also increases. In this circumstances this projects full fill the saving reproduction. The smart helmet is new idea which makes motor cycle driving safer. And this was unenforced using IOT technology. The service of this smart helmet is very simple and vibration of sensors are placed in the different places of helmet where the possibility of hitting is connected to microcontroller board .when the rider crashes and the helmet is hit on the ground ,immediately this sensor sense and gives information the microcontroller board, then controller elite IOT module that is interfaced to it. when the data exceeds minimum stress limit then the IOT module automatically send message to ambulance or family.**

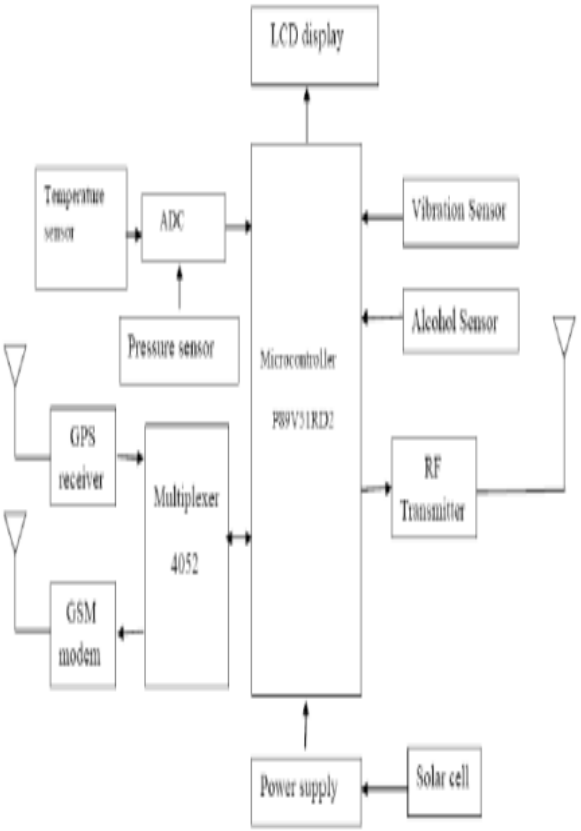
Key words- microcontroller, IOT, safety.

I. INTRODUCTION

Industrial safety is the characteristics of mining industry. In mining industry is very essential factor .to avoid this types of unwanted phenomena all mining industry follows the basic safeguard and event. For any industry the communication is main key factor to monitor other parameters and take mandatory actions correspondingly to avoid this type of hazards. For the loss of material and damaging of human health, projection system and Faithfull communication system is necessary inside the underground mines. For the safety and productivity in mines use the reliable communication is established .In the wired communication networks the installation cost and maintenance cost is unpleasant situation in the inside mines. the wired communication system is difficult to reinstall in the inside mines after under cliff. Due to the roof fall the workers are trapped inside the mines and maintain the continuity in communication system. The radio signals are transmitted, diffraction, attenuation, multipath and scattering .the wireless communication now a days is very helpful in underground mines. By using wireless communication is burning need today for the rapid, precise, flexible, safety, undisturbed process in the underground mines.

II. BLOCK DIAGRAM PROTOTYPE

Power supply: The 5V battery is used to provide power supply to components inside the helmet.



Microcontroller: The micro controller used in AT89C51 .and it is operates at 11.0592MHz at 5VDC. It controls the all the operation. the microcontroller input is obtain by key board and displays the data on LCD. It also used in sensors to receive the sensor outputs and take necessary decisions.

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Liquid Crystal Display (LCD): The LCD is a low cost, low power device and the capable of displaying the text and LCD operates at 5VDC. A microcontroller connected to LCD controller ,which in turn is connected to an LCD. The LCD controller receives the words from the microcontroller. and it decodes the control words and perform the action of control words. once the initialization sequence is done the LCD send control words or send actual data is to be displayed.

Gas Sensor: MQ5 smoke/gas sensor is used in this helmet. Smoke sensor output is connected to pin 39 po.0 of microcontroller.

Temperature Sensor: LM35 Temperature sensor is used in this helmet. It is connected to ADC.

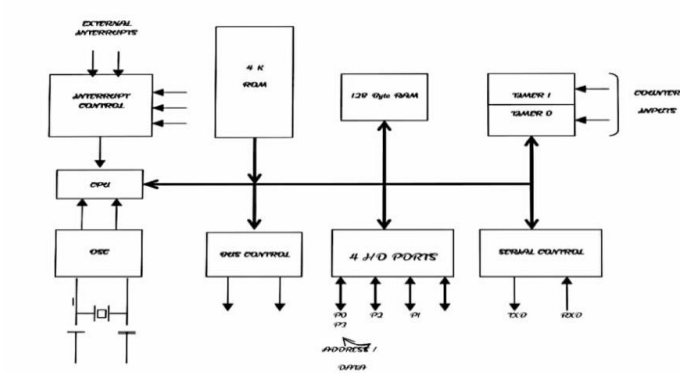
Humidity Sensor: HSM 20G humidity sensor is used in this helmet. output of Humidity sensor is connected to pin 38 po.1 of microcontroller.

Voice Module: APR9600 is used as the voice module. Voice module M1, M2,M3,M4 are connected to pins of po.2,po.3,po.4,po.5.

single chip. and this lead to many version of 8051 with different speed and amount of on chip ROM by various manufactures.

III. THE 8051 MICROCONTROLLER

The 8 bit microcontroller was introduced in 1981.
And Intel Corporation was introduced 8051 microcontroller. This microcontroller consists f 128 bytes of RAM, 4k bytes of ROM, two timers, one serial port and four ports of eight bit in the single chip. and this lead to many version of 8051 with different speed and amount of on chip ROM by various manufactures.



General block diagram of 8051microcontroller

RELAYS:

Relay is an electrical switch which opens and closes under the control of another electrical circuit. It is able to controls the higher power output than input circuit and also considered in a broad sense, to be form of electrical amplifier. Normally relay can contacts with open connected then only it activate if its closed connected then it will disconnected. Change-over contacts control two circuits: one normally-open contact and one normally-closed contact a common terminal. Relays are manufactured to operate quickly. In a low voltage application, this is to reduce noise. In a high voltage or high current application, this is to reduce arcing.

Temperature sensor:

This will be depends upon the atmosphere temperature. These devices are sometimes soldered to a small light-weight heat fin, to decrease the thermal time constant and speed up the response in slowly-moving air. On the other hand, a small thermal mass may be added to the sensor, to give the steadiest reading despite small deviations in the air temperature.

Humidity Sensor :

The module of HSM-20G is essential for those applications where the relative humidity can be converted to standard voltage output.

Applications: humidifier and data loggers, automatic climate control

Gas Sensor :high sensitivity, fast response, simple, small sensitivity to alcohol, smoke, long life.

IV.KEIL SOFTWARE

The KEIL 8051 Development Tools are designed to solve the complex problems facing embedded software developers. In this project we select the KEIL software of version8.08. Because it provides Device Database and the µVision IDE sets all compiler, assembler, linker, and memory options for you. Numerous example programs are included in this software, and also the KEIL µVision Debugger accurately simulates on-chip peripherals (I^2C, CAN, UART, SPI, Interrupts, I/Ports, A/D Converter, D/A Converter, and PWM Modules) of

your 8051 devices. Simulation helps you understand hardware configurations and avoids time wasted on setup problems. When testing the software application with target hardware, use the MON51, MON390,MONADI, or FlashMON51 Target Monitors, the ISD51 In-System Debugger, or the ULINK USB-JTAG Adapter to download and test program code on your target system

V. IOT BASED SMART HELMET

The increased complexity associated with integrating monitoring, deployment and ticketing systems results in

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inefficient delivery of alert, straining the competent working of the helmet. The major problems that needed to be overcome include alert fatigue, possibility of missing an event, sending the message to a wrong person, increased time for information transfer an incident resolution.

In order to overcome these drawbacks ,we make use of the pager duty .we make use of the pager duty rest.API to inform the emergency contacts whenever an accident has been detected. The monitoring tools send pager duty a trigger event to report a new or ongoing problem. Incoming events that are sent via the API are routed to a pager duty service and processed. Usually a customized API is created by making by making the system make a simple HTTP call or run a command line script. The REST (Representational state on demand) is an architectural style based on which protocols are designed. it is resource based and the resources are identified by URIs. The representation is transferred between client and server in the form of either JSON or XML. Pager duty REST API accepts JSON and form encoded content as input and output is in JSON.

VI. WORKING PROTOTYPE

Whenever the driver passes through RF transmitter balance is automatically reduced from his wallet known as E-wallet indicator ,DC motor. The R F receiver receives the encoded binary data transmitted by the RF transmitter and provides it to the decoder. The decoder decodes the incoming digital data and provides four bits in the MCU, only if the address bit of the encoder and the decoder match. This is done to ensure the safety and security of the system. Thus matching of encoder and decoder increases the security and integrity of the system. The MCU controls the DC motor upon receiving data. If the sensor detects that the rider is wearing the helmet, then the engine is turned on and also if the MQ6 sensor detects alcohol, the module installed on the bike turns o_ the engine to avoid any accidents and so that the drunken person takes appropriate measures to reach his destination. Decoder HT12D decodes all incoming data and then forwards it to the microcontroller for implementation. The AT89S52 is a programmable microcontroller with a small instruction set. It controls the working of the module by analyzing the input data stream and then giving correct control signals. Voltage regulator 7805 is used to regulate the erratic voltage received from the power source. The 7805 voltage regulator gives a 5V output. The above components together make our helmet smart and work in synchronization to ensure a safe and comfortable experience for the user. Also whenever the rider enters the specific range of speed limiter its maximum speed limit is set and whenever that limit is exceeded LCD displays over speeding and alarm buzzes.

VII. RESULTS

As soon as the erratic variations are obtained, a trigger is sent to Pager Duty from the microcontroller. Pager Duty then initiates a call to the motorist's phone number. This is shown in figure 2. The phone call gives the driver information regarding the service that caused the alert and some basic information about the alert. If the driver does not respond for a period of 5 minutes after the first call is initiated, then the emergency contacts will be informed. The emergency contacts are alerted through e-mail, text, phone call until the In case the motorist does not pick up the call, a text message. This is shown in Fig. 3. The motorist is expected to reply by either acknowledging ,resolving or escalating the alert. The email id of the emergency contact is also specified in the text. The details of users who will be alerted when incidents occur is assigned beforehand. The motorist is expected to reply by either acknowledging, resolving or escalating the alert. The text messages will be

continuously sent for a period of 5 minutes, beyond which the accident notification is sent to the emergency contact. The email id of the emergency contact is also specified in the text.

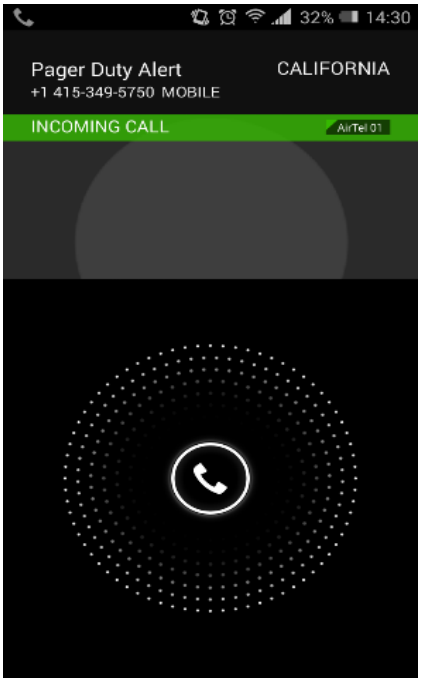
a 

Fig. 2: Screenshot of call being received by the motorist

Smart helmet

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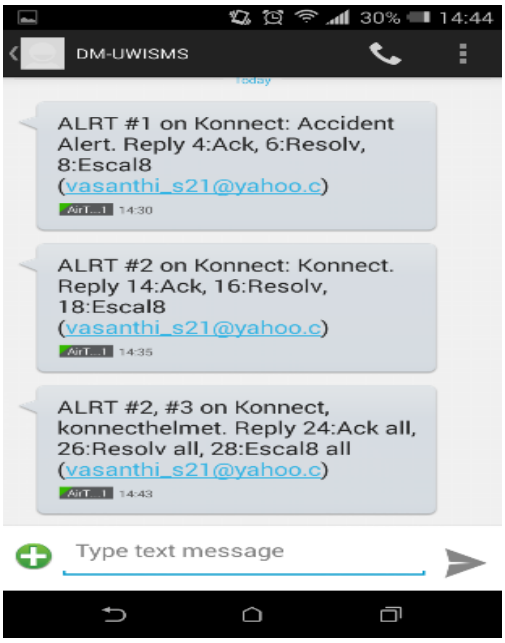

Fig. 3. Screenshot of Text Messages received by the motorist

VIII. CONCLUSION

The smart helmet developed is a smart and reliable piece of technology that is cheap to develop and operate and yet not compromise on safety. Additionally, it offers several advantages over the existing methods of accident detection and notification systems that rely heavily on the data collected from cellular devices of the drivers. Also, most of the systems that are available in the automobile market are designed for only four-wheeled vehicles. Thus, the Internet of Things based application- connect is proposed

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