

IOT BASED SMART HELMET FOR ACCIDENT DETECTION

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Abstract— We all talk about the trending technology, the Internet Of Things that is changing our lives day by day. It is creating a new world, quantifiable and measurable world where people and businesses can manage their assets in better informed way and make more timely decisions. This paper proposes a Smart Helmet for the accident detection using sensors and Arduino with IoT as a domain. The main feature of designing this helmet is to not only to make the helmet smart but also to provide safety to rider.

Index Terms—Internet of Things, Arduino, Accident detection, Sensors.

I. INTRODUCTION

The Internet of things (IoT) is the network of physical devices, vehicles, home appliances and other items embedded with electronics, software, sensors, actuators, and connectivity which enables these objects to connect and exchange data. The IoT allows objects to be sensed or controlled remotely across existing network infrastructure, creating opportunities for more direct integration of the physical world into computer-based systems, and resulting in improved efficiency, accuracy and economic benefit in addition to reduced human intervention. When IoT is augmented with sensors and actuators, the technology becomes an instance of the more general class of cyber-physical systems, which also encompasses technologies such as smart grids, virtual power plants, smart homes, intelligent transportation and smart cities. These devices collect useful data with the help of various existing technologies and then autonomously flow the data between other devices. The term "the Internet of things" was coined by Kevin Ashton of Procter & Gamble, later MIT's Auto-ID Center, in 1999.

Sensors is a device, module or a subsystem whose purpose is to detect events or changes in its environment and send the information to other electronics, frequently a computer processor. A sensor is always used with other electronics, whether as simple as a light or as complex as a computer. Sensors are used in everyday objects such as touch-sensitive, elevator buttons and lamps which dim or brighten by touching the base, besides innumerable applications of which most people are never aware.

The proposed system uses alcohol sensor, in general gas sensor, pressure sensor and accelerometer. When the rider wears

the helmet and buckles the belt of the helmet, pressure sensor senses the pressure of the helmet and allows the vehicle to start. Alcohol sensor checks whether the rider is drunk or not. If alcohol content is detected then it doesn't allow the rider to start the vehicle.

Arduino is an open source computer hardware and software company, project, and user community that designs and manufactures single-board microcontrollers and microcontroller kits for building digital devices and interactive objects that can sense and control objects in the physical world. Arduino board designs use a variety of microprocessors and controllers. The boards are equipped with sets of digital and analog input/output (I/O) pins that may be interfaced to various expansion boards (shields) and other circuit

II. RELATED WORK

The impact when a motorcyclist involves in a high speed accident without wearing a helmet is very dangerous and can cause fatality. Wearing helmet can reduce shock from the impact of accident and may save a life. As the bikers in our country are increasing, the road mishaps are also increasing day by day, 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. Traffic accident in Malaysia have been increasing at the average rate of 9.7% per annum over the last few decades. The increase of road accidents is in link with the rapid growth in population, economic in development, industrialisation and motorisation encountered by the country.

III. OBJECTIVE

Smart helmet is an innovative way of designing a helmet for safety purpose using the latest and trending technology, IoT. Today a number of countries has made it mandatory to wear helmet for both rider and pillion rider. Motorcycle engine will start only when the rider wears the helmet and buckles the belt of the helmet. This will reduce the impact of accidents. In case if the rider is drunk, alcohol sensor detects the alcohol content and stops the rider from starting the vehicle. In case of emergency, SOS message will be sent to the concerned person selected by the user through the Blynk app.

IV. PROPOSED SYSTEM

The core element of the model is the arduino board which controls and manages all the functions performed by the other components of the model. The instructions to the components are given through arduino programming language.

This model consists of the following hardware components:

- Arduino consists of both a physical programmable circuit board and a piece of software, or IDE that runs on a computer, which we are using to write and upload computer code to the physical board.
- Accelerometer ADXL335 will detect the tilt and record the values based on co-ordinate system and sends the signal to the arduino board.
- The Gas sensor MQ3 has high sensitivity to alcohol and sends signal to stop the vehicle. This module provides both digital and analog output.
- Pressure sensor comes into picture when the rider wears the helmet and buckles it.

SOS message can be sent when rider meets with an accident. This is achieved using android app, sensors, Wifi and Cloud. Cloud send the data to the concerned person through Wifi. The android app analyzes data and performs specific actions.

Fig. 1 Architecture

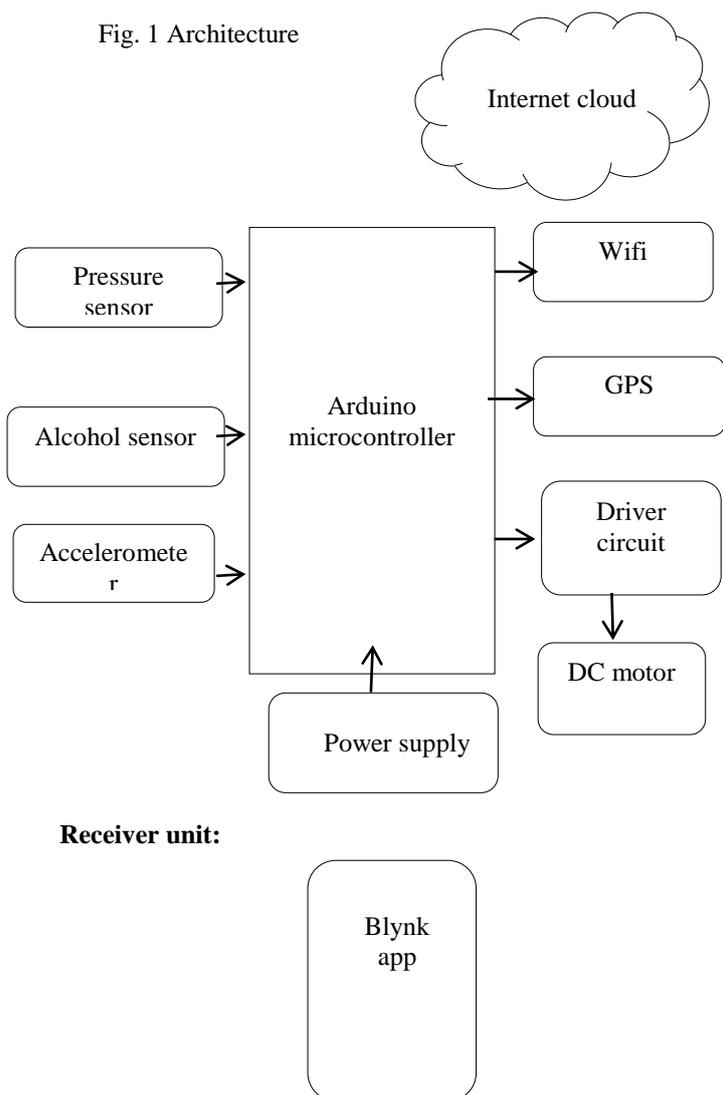


Fig. 2 Pressure sensor

B. Alcohol Sensor

Alcohol sensor that we use in the model is MQ3, which is a low cost semiconductor sensor which can detect presence of alcohol gases at concentrations from 0.05mg/L to 10mh/L.



Fig. 3 Alcohol sensor

C. Accelerometer

Accelerometer is an electromechanical device which is used to detect acceleration. The acceleration can be static such as gravitational force, while dynamic acceleration can be sudden movement or vibration.

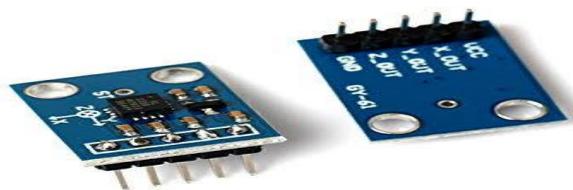


Fig. 4 Accelerometer

D. Arduino Board

Arduino is an open-source electronics platform based on easy-to-use hardware and software. Arduino boards are able to read inputs - light on a sensor, a finger on a button, or a Twitter message - and turn it into an output - activating a motor, turning on an LED, publishing something online.



Fig. 5 Arduino board

VI. FUTURE SCOPE

This model can be equipped with a camera mounted to the helmet where entire video will be recorded and it will be stored in the data storage of the helmet, videos can be accessed wirelessly so that helmet will act like a BLACK BOX containing all data.

Biometric device can be embedded into the helmet to make it more secure and avoid theft.

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