

Accident Avoider using Advanced Sensor Based on IoT

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Abstract- Our project is based on the technology of avoiding accidents using advanced sensors; grip sensor and tilt sensor to control accident rate. This is achieved by a mobile application as well as trending technology; IoT. One can track, examine and monitor the speed of a car, and faulty banking of roads. The Grip sensor detects the drowsy state of the driver and alarms the driver by vibration. The Tilt sensor detects the faulty banking angle of roads and alarms the driver by a voice message. Data transmitted from the sensors used in the Accident Avoider are displayed on ThingSpeak too.

Keywords: drowsiness, IoT (Internet of Things), Grip sensor, Tilt sensor, ThingSpeak.

I. INTRODUCTION

Vehicle accidents are most common if driving on roads is inadequate. These happen on most factors if the driver is drowsy or if road banking is faulty. Driver drowsiness is recognized as an important factor in vehicle accidents. It was demonstrated that driving performance deteriorates with increased drowsiness, resulting in crashes constituting more than 20% of all vehicle accidents. This project is focused on the grip of the driver's hand on the steering wheel of a car, which involves information of grip between the hands of the driver and the steering wheel and determines whether the driver is conscious or not. Tilt angle is measured by a tilt sensor for faulty banking of roads. As the inclination angle of the road increases, the output voltage increases, generating a voice message of warning that the road construction is improper. Hardware of the Accident Avoider contains a grip sensor, tilt sensor, microcontroller, LED display, relays, batteries, diodes, motor driver IC, voltage regulator, and Wi-Fi module. Most importantly, this whole system is based on the Internet of Things. This system will be used in cars, which will be built on the steering of the car. This system will not let the driver fall asleep and will alert the driver about the faulty banking of roads. As the driver loses contact from the steering, the designed system will sense it and a signal will be generated that will produce vibrations to wake up the driver. A vibrating system will be mounted on the seat belt. For faulty banking of roads, as the angle between the road and the car increases, the tilt sensor will produce a voltage giving a voice message informing the driver about the faulty banking of the road. Our method is based on a PIC microcontroller and several sensors that will work in real time to acquire the information from the surrounding environment and pass this information to the

microcontroller for processing and decision making and thus will guide the driver in any emergency condition.

In section II, the technology used is discussed. In section III, hardware and software implementation is described. In section IV, lane departure warning is described. In section V, obstacle detection and blind spot monitoring is discussed. The conclusion is presented in section VI.

II. TECHNOLOGY USED

In our system, we have used ThingSpeak to collect, analyze, and act; PIC microcontroller to connect computer to microcontroller circuit. ThingSpeak is an open source Internet of Things (IoT) application and API to store and retrieve data from things using the HTTP protocol over the Internet or via a local area network. ThingSpeak enables the creation of sensor logging applications, location tracking applications, and a social network of things with status updates. The data on the ThingSpeak website is used for further analysis. We can graphically represent the data which is changing over time. The same data will be displayed on the mobile application. PIC microcontroller (programmable interface controllers) are electronic circuits that can be programmed to carry out a vast range of tasks. They can be programmed to be timers or to control a production line and much more. Here, we have used PIC16F877A microcontroller as it finds application in a huge number of devices. It is used in remote sensors, security and safety devices, home automation, and in many industrial instruments.

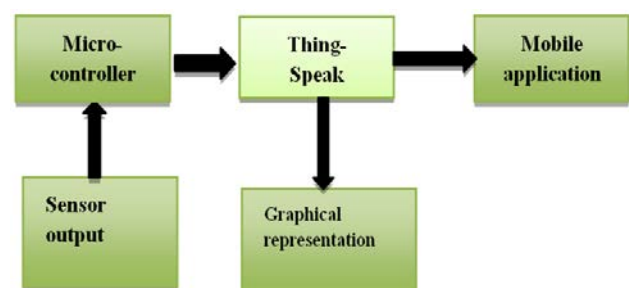


Fig-1: Thing Speak interfacing with Microcontroller

An EEPROM is also featured in it, which makes it possible to store some of the information permanently, like transmitter codes and receiver frequencies and some other related data. The cost of this controller is low, and its handling is also easy. The signals transmitted from the

sensor will be revived by the PIC microcontroller. These signals will be displayed on the LCD of 16*2 displays, configured with the PIC microcontroller IC. The same signals are given to the ThingSpeak. Fig-1 shows interfacing of ThingSpeak with PIC microcontroller.

III. PREVIOUS WORK

For reduction of accidents caused by rash and fast driving or may be due to drowsiness many automobile companies doing facilities. For example Air bags, Alcohol Detector, Detection of drowsiness by using head motion detection and image processing. In UAE every car has a chip with processor and many sensor which can monitor the way driver driving the car and many other parameters of the accident prevention.

IV. PROPOSED METHODOLOGY

Accident AVOIDER is combination of both hardware and software. Hardware contains following components:

- 12 V Battery
- Diodes 1n4007
- Lm7805
- PIC microcontroller 16f877a
- 16*2 LCD
- Tilt sensor Adxl335
- ESP8266 Wi-Fi module

Software within this project is simply includes programming languages and ThingSpeak. MICRO C and MC programing language i.e. C are used respectively.

12 V Battery:

An electrical battery is a device consisting of one or more electrochemical cell which consists of external connection provided to power electrical devices such as flashlights, smart phones and electric cars. When a battery is supplying electric power, positive terminal, cathode and negative terminal, anode. The terminal marked negative is the source of electrons that when connected to an external circuit will flow and deliver energy to external device.

Diodes 1n4007:

It is general purpose plastic rectifier. It will give low forward voltage drop, low leakage current, high forward surge capability.

Lm7805 voltage regulator:

Voltage regulator IC maintains the output voltage at constant value. 7805 IC, a voltage regulator integrated circuit (IC) is member of 78xx series of fixed linier voltage regulator ICs used to maintain fluctuations. The xx in 78xx indicated fixed output voltage

PIC microcontroller 16f877a:

PIC microcontroller (programmable interface controllers), are electronic circuit that can be programmed to carry vast

range of tasks. They can be programed to be timers or to control a production line and much more. It is 40 pin IC. It consists of two 8 bit and one 16 bit timer. Capture and compare module, serial ports, parallel ports and five input/output ports are also present in it.

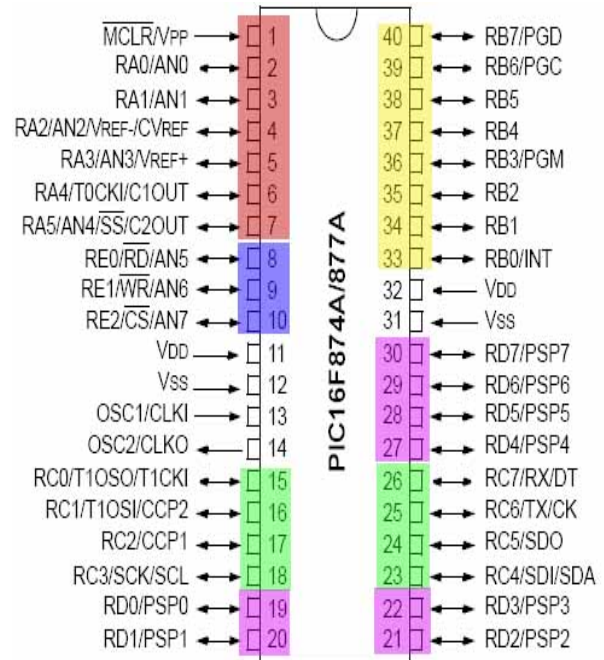


Fig-2: PIC Microcontroller 16f877a

16*2 LCD display:

It is character LCD display which is having 5*8 dots includes cursor. It has built in controller. It has 1/16 duty cycle and has +5V input power supply

Adxl335 tilt sensor:

This sensor also called as accelerometer which can sense in 3 axis i.e X Y Z. Whatever the analog output we get is proportional to the tilt angle. Which can be used gaming application.

ESP8266 Wi-Fi Module

ESP 8266 is small chip having on-board processor .Which can be the best solution for wireless communication using internet. ESP8266 does not need any additional processor.

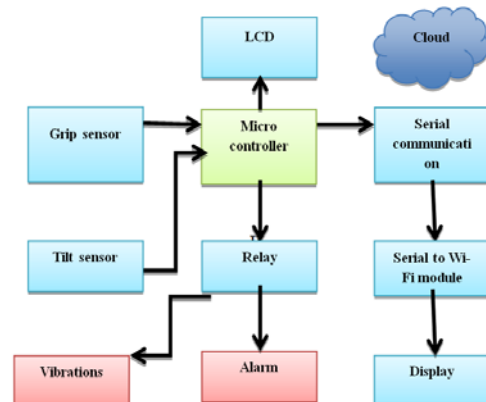


Fig-3: Block diagram of Accident AVOIDER

IV. SIMULATION/EXPERIMENTAL RESULTS

In this section author need to describe experimental/simulation results with graphs and appropriate tables.

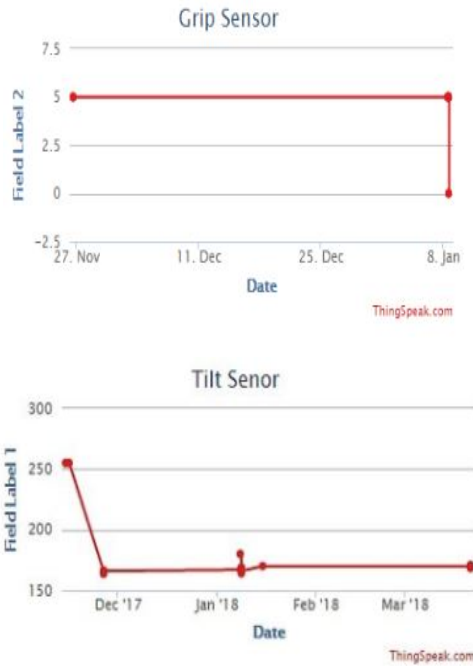


Fig-4: ThingSpeak graphs for grip sensor and tilt sensor respectively.

Table1. Tilt sensor output

Sr.No	Tilt angle (degrees)	Measured Output(mv)
1.	10	100
2.	12	120
3.	14	140
4.	16	160
5.	18	180

V. CONCLUSION

Accident avoider system is very effective on prevention of accident caused by faulty banking of roads and driver drowsiness. It also informs the relative, police and hospital about the accident details. The live status of parameters is sent to ThingSpeak cloud and they are available on android applications. Mostly accident avoider is designed to reduce the rate of accident caused due to sleepiness of driver and faulty road banking. In this system, PIC microcontroller along with ThingSpeak, tilt sensor Adxl335 and grip sensor. Grip sensor is not readily available in market; we have designed the sensor for Accident Avoider. This sensor is mounted on car staring. This system will not let driver to sleep while driving. We have interfaced PIC microcontroller with ThingSpeak account and result of same is shown in fig-4.

VI. FUTURE SCOPES

Accident Avoider is an idea that can be implemented in cars for avoiding worst cases of accidents. It can alert/wakeup driver if he is sleepy and loses contact between hand and staring by vibrations. In case of faulty banking of roads it will give a voice message alerting about faults and hence driver can handle the situation.

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