

IOT based Real Time Active Safety System to Avoid Accidents

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Abstract: Real-time obstacles detection and status classification in vehicle active safety system helps to avoid accidents. The driver is alerted by Eye blink monitoring system when the driver is at drowsy state, Embedded system alerts the driver when he is in initial sleep cycle of drowsiness. An alcohol is detected using the MQ3 sensor if at all a person has boozed and driving a vehicle, automatic speed break is applied to the vehicle to prevent the further injury happening. If by chance an accident is occurred to the vehicle a message is sent to the guardian mobile, a photo is captured and emailed to the guardian smart phone and also the location is sent to the guardian through GSM. Due to the driver's drowsiness many of the road accidents take place during night times an Eye blink sensor is used in order to avoid accidents. An alarm is alerted for all the applications. Data acquired by the sensors over a network are transmitted by Internet of Things enabled sensors. Transmitted data is used for giving quick response under emergency conditions.

IndexTerms - IPv4, Eye blink sensor, Internet Of Things (IOT), Machine-to-Machine communication, IPv6, URL.

I. INTRODUCTION

The project IOT based real time active safety system for avoidance and finding directions by alerting driver's to avoid accidents through collision warning. Project is based on IOT Internet of Things which helps to avoid the accidents and causes taken place to be very less using advanced features and technology as IOT devices use could be wearable devices it has plethora of features and makes use of sensors in which the objects are detected at real time and will be very active systems. The embedded system gets included with an IOT where sensing of the devices and an automatic controlling could be done manually IPv4 has less storage device compared to IPv6 so IPv6 is used for vast storage purpose and helps the driver when drives a car manually. Most of the drivers usually booze (alcohol) during night times and drive a vehicle unknowingly which may lead to cause an accident.

Eye blinking detector is used in which IR (Infrared Sensor) sensor device helps to continuously keeps monitoring the driver eye blinks which will alerts the driver from drowsiness. Eye monitoring movement is used like an alarm to drivers if he falls asleep. Eye blink monitoring system keeps the track of eye blink, which will not affect the driver from their normal eye blink. The vibrator and speakers are kept to alert the driver's to avoid accidents.

Alcohol detection sensor is used to detect alcohol, sensors are moulded within vehicle so that automatically engine break is applied using gravity sensor and does not allow vehicle to move further. If the vehicle is over speeding automatic speed breakers are applied to vehicles. The device is fully automated in which the display, vibrator and a speaker is used so that the project is even more help full and life of the people is saved.

OBJECTIVES

- Enables emergency services during road accidents.
- Establishes the system with response, intelligent and automatic.
- The overall driving safety for driver framework.
- Varies varieties of application, domain and in prototype connectivity service applications which goes beyond machine-to-machine communication.

SOLUTIONS AND APPLICATIONS

To develop a standard specifications of the system which are portable electronic devices and easy to use by the people of the drivers in case of emergency. To establish the devices of the system which are automatic, intelligent, and responsive and provides a safety benefits estimating overall effect on driving safety.

- Solutions are provided for night drivers to wake them up from the drowsiness caused due to sleeplessness.
- Vehicle stability to maintain a better grip of a wheel through gravity sensor.
- Automatically controlling the speed of the vehicle a solution for the drivers.
- Prevents an accident caused by abuse such as alcohol and drugs etc.
- Location and tracking of the location of accidents using GPS and messaging the current location from the GOOGLE maps to the saver of the person.

II. PROPOSED SYSTEM

Proposed system for vehicle consists of an embedded controller which is used as an IOT using wireless sensors many sensors are used to automatically control the device of the vehicle. Also to caution the driver of the vehicle an LCD display, speaker and a vibrator is used for the driver to understand. Real time images are captures and stored in an android mobile device and an email is sent to the owner or the guardian of the diver is sent, and also voice image is alerted to the driver. Location of the victim is tracked using the help of GPS and GPRS an emergency message is sent owner of the device.

III. SYSTEM DESIGN

Microcontroller NXP RD25

The microcontroller AT89C51/52 is a low-power, high performance CMOS 8-bit microcontroller with 8K bytes of flash programmable and erasable read only memory (PEROM). On-chip flash memory allows the program memory to be reprogrammed in system or by a conventional non-volatile memory programmer. Each and every tasks are controlled by the embedded microcontroller.

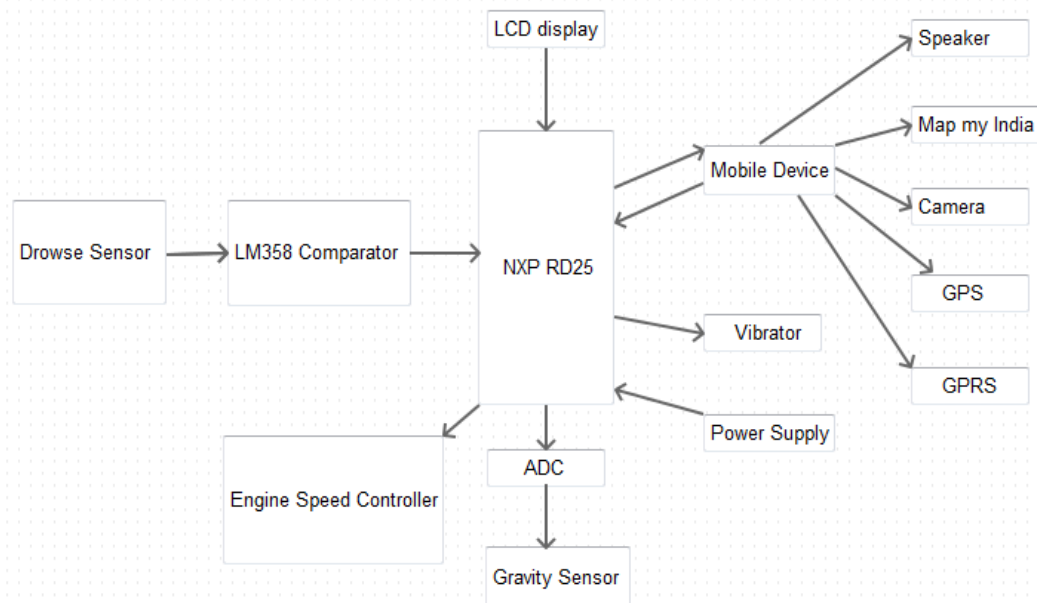


Fig 1 - System design

Drowse Sensor

Driver drowsiness detection is done in a car for safety purpose which helps prevent accidents caused by driver's getting from drowsy. The eye blink movement and the head movement is calculated with the normal eye blink and head movement with frequency if there is a dramatic change between both the movement then the system is alerted. Different types of drowsiness are: awake, non rapid eye movements and rapid eye movements.

Alcohol Sensor

MQ3 is a alcohol sensors that are used to detect alcohol concentration on a person with breath. Conductivity increases as the concentration of gas increases sensors provides an analog resistive output based on alcohol consumed when alcohol gas exist the sensors conductivity gets higher along with the gas concentration rising that are suitable for various applications for detecting alcohol at different levels of concentration. MQ3 sensors are widely used in domestic alcohol gas alarm, industrial alcohol gas alarm and portable alcohol detector. Digital out is high or low based on adjustable preset threshold detecting concentration 0.05-10mg/L alcohol.

Android Smart Phone

Android smart phone helps for mobile communication to communicate with the other end of the devices. Mobile camera helps in capturing a image of the present state, Map my India helps to find the location of the accidents with the help of GPS. GSM helps to communicate with other devices. GPRS help to transfer the messages to each device.

Vibrator

An electro-mechanical vibrator from the instrument is used as a part of a amplifier as input amplifier. Vibrator is essentially a relay using normally closed contacts to supply power. Vibrator is used in the project to indicate the accidents. A normal message is sent to the guardian, a photo is captured by android smartphone, location is trapped by the GPS where all these application information is sent immediately to the guardian mobile number and a photo to the email id so that they can rescue with no time life of the saver could be saved.

IV. SYSTEM WORKFLOW

FLOW DIAGRAM

The workflow below represents the functionality of the applications. As the power supply is switched on LCD displays a welcome message indicating the project module kit is ready to use if a vibrator gets detected then the accident is occurred and gets detected and indicates on the LCD display, the motor drive circuit (accelerometer) stops the vehicle moving further. Voice message is alerted using speaker saying accident occurred message, present accident location and a photo image is sent to the guardian mobile phone from the smart phone which is been kept at the dash board of the car.

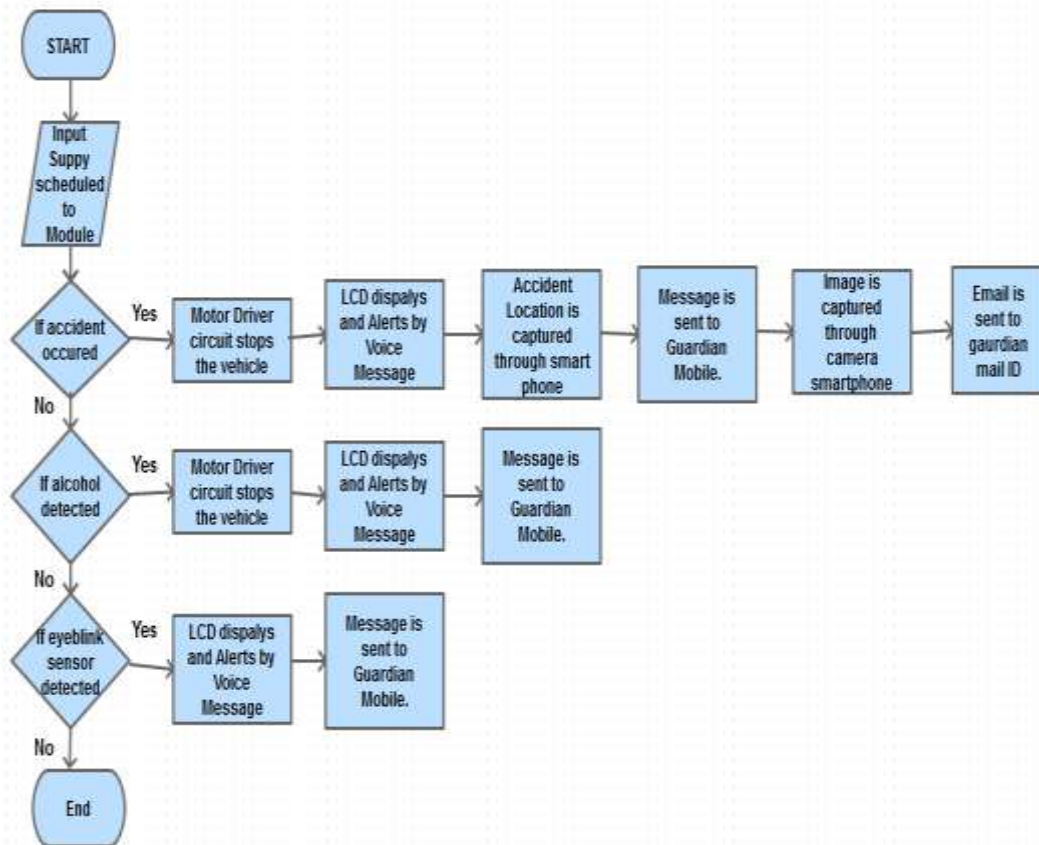


Fig 2 - Flow diagram

If a driver is drunk then alcohol sensor is detected and indicated on the LCD display, the motor drive circuit (accelerometer) stops the vehicle moving further. Voice message is alerted using speaker saying alcohol is detected and a message is sent to the guardian mobile phone from the smart phone which is been kept at the dash board of the car. If a driver from a car is in drowsiness (eye blink) sensor is detected and indicated on the LCD display. Voice message is alerted using speaker saying please be awake and a message is sent to the guardian mobile phone from the smartphone which is been kept at the dash board of the car. Two IOT smart phone applications are used to send the message, location and an image to the owner or the guardian to use the applications.

SALIENT FEATURES

- To prevent an accident caused due to abuse if a person has drunk the sensor senses the person breath and atomically stops the vehicle from moving.
- The speed of the vehicle is automatically controlled by applying speed breakers to the vehicle.
- GPS location and accidents are tracked using the Google maps at the accident location.

ADVANTAGES and DISADVANTAGES

- **Time Save:** Applications provides very simple steps to use the project module as it does not take time for a person to study and there is a fast response from the project module, life of the people can be saved as early.
- **Automatic response:** The module very automatic where there is not much to understand any logic a normal person can use the system. Both front end and back end of the module is maintained using a responsive design.
- **Visualization analytics:** As soon as the sensor is detected either it could be a alcohol detector, eye blink sensor, accident occurred, GPS, GPRS a message is displayed on the LCD display.
- **Responsive design:** Android applications used in smart phones are responsive and can handle all the datas regardless of screen size. Smart phone applications can also be used in tablets.
- **Internet connectivity:** Because of all the data and process logic of web applications software is stored on a system for the user to use i.e the smart phone must have some internet connectivity (internet) to the server to access the same.
- **Network availability:** Network availability of the SIM card must be there 24/7 so that a message can be sent to the guardian of the destination person so that the GSM can send the location through email and GPRS can communicate with other smart phone having availability of the network.

V. CONCLUSION

A cost-effective and efficient object detection and classification of real time active safety system for collision warning is very essential to ensure smooth running of the portable device to access internet services for data storage and to get synchronization with other remote devices, need for quick and active decision making to reduce the accidents like drunk and drive, alcohol detected, excess speed while driving a vehicle, excess shifts over duty for to cause a drowsy etc prevents accidents caused by drowsiness or drunk driving by leveraging eye blink monitoring system. Voice based alerts for drowsy, device to curtail excessive speeding and alcohol to be detected. Alive photo captured during the accidents is sent to the guardian of the person. For each and every causes to take happened a message is sent to the nearby or to the guardian by using a smartphone live alert to dear ones on occurrence of accident to android enabled device by means of an IOT.

VI. FUTURE SCOPE

Major portable devices are aimed at providing unlimited access to internet services for data storage synchronization with other remote mobile devices. The devices are with very fast acquisition with quick response of embedded microcontrollers system for real time application's making vehicle safety, automatic responsive and very intelligent. Interfacing IOT simple sensors to various microcontroller enables regulating embedded systems at higher levels of automation and the sensor information on the smart grids where large amount of data, acquisition for taking accurate decisions over the emergencies. Further communications can be made human to machine rather than machine to machine communication. . IOT of embedded systems interact to respond variety of applications epically during nights and to avoid accidents by monitoring the state of drowsiness for a quick, safe and effective response and a safer road travelling. Further, this project can be developed using image processing so that embedded, IOT and image processing comes into process where live images are captured from the places where accidents have caused with the help of images automatic action can be taken place it is also a solution for preventing accidents.

VII. RESULTS

Project Module

Project module consists of LCD display, Microcontroller port, Eye blink sensor, Vibrator, L293D (Motor Driver Circuit), Relay, Vibration, Analog to digital convertor, Alcohol Detected sensor, Accelerometer and a GSM module. As soon as the power supply is given WELCOME message is displayed on the LCD and the motor driver circuit starts rotating indicating the kit is ready to use.

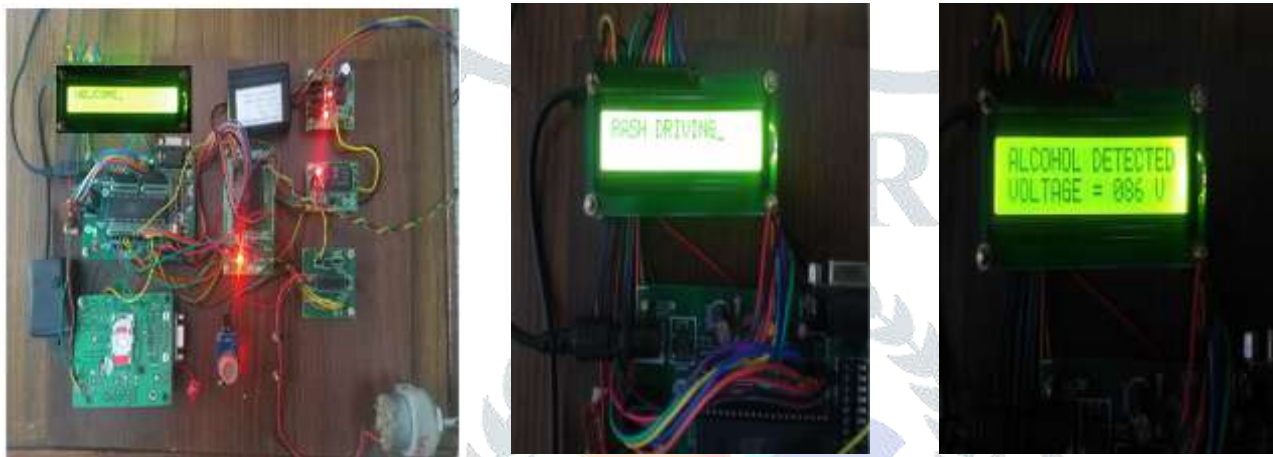


Fig 3 - Project module with display welcome, rash driving and alcohol detected.

If there is an indication of accident, i.e when the vibration of the device is tapped to indicate that the accidents have occurred RASH DRIVING message is displayed on the LCD screen and a message, location and a image captured is sent to the guardian through smart phone and also a voice loudspeaker is sounded through speaker stating accident occurred.

Alcohol is detected from the alcohol sensor by the breath of the driver when he breaths the sensor is detected and an indication of the message will be as alcohol detected and the vehicle stops from moving forward and also a voice loudspeaker is sounded through speaker stating alcohol is detected.



Fig 4 - LCD display sleeping and an guardian IOT applications

Eye blink sensor is detected if a driver person is in drowsy state when he blinks his eye while driving a car. Eye blink sensor gets activated displays a message sleeping and also a voice loudspeaker is sounded through speaker stating please be awake.

Guardian phone number has to be entered where the Location, Photo captured through a camera and a Complaint could be registered. All the three advantages simultaneously gets activated so the life of the people could be saved in just fraction of time.

IOT applications of the smart phone which will be placed in the dash board of the car, so that image could be captured and forwarded easily. Location of the accident and a message is sent to the guardian so that the person can rush to the spot or he/she can make some nearby contacts and could save the life of the people.

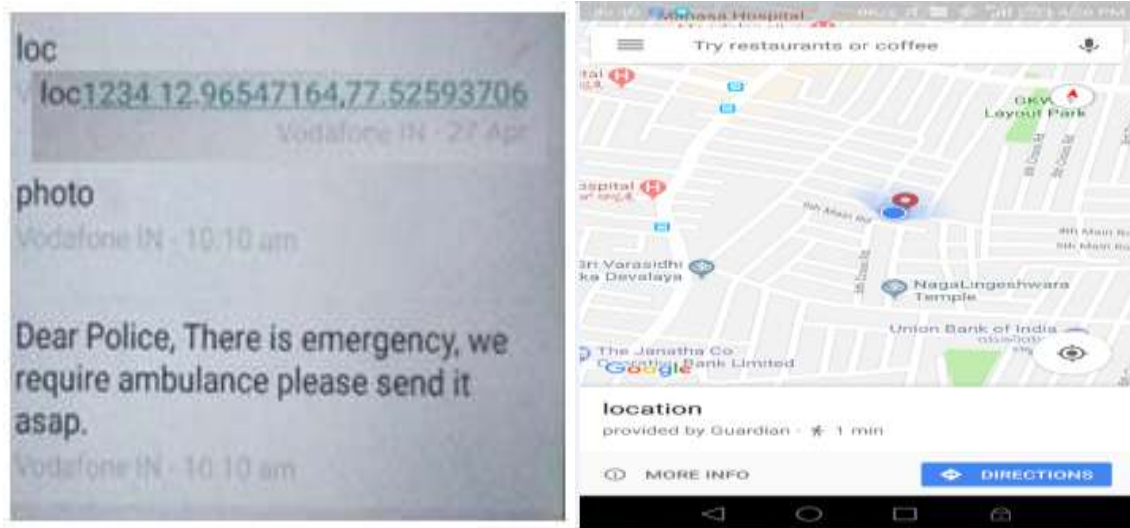


Fig 5 - Message display and location image

A normal message is sent to the guardian and also to the other nearby places could be like police station or it could be hospitals and also indicates the location, image and emergency message.

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