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Accident prevention and detection using internet of Things (IOT)

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ABSTRACT:

This paper focuses on the enhancement of safety and security of the vehicle user. In the present scenario, the rate of occurrence of accidents and its death ratio is rapidly increasing due to violation and inattention towards rules and regulation. This system consists of many Internet of things (IOT) modules. Initially RFID is used as the key to trigger the engine, along with the startup of the camera system to identify the driver's face using face recognition technique and is compared with the image in the license stored in the server which contains the details about the license holder to check the originality. The next module consists of alcohol detector to prevent excessive drunk and drive. Then the analysis result is shared to the server. If any discrepancies are found, then the information is transmitted to the nearby police service along with the GPS location. Along with the accident prevention technique, a new system of accident detection technique has been proposed to overcome the problem of rescuing people from accident. The proposed system uses a vibration sensor to detect the accident occurrence and ZIGBEE to intimate the accident occurrence to the nearby rescue team.

Index Terms: PIC microcontroller, vibration sensor, GPS, ZIGBEE, Alcohol sensor MQ3, RFID card, RFID reader, Camera.

INTRODUCTION:

An accident is an unpleasant event that no one ever wants to occur in their life. It ruins the life of many people causing tremendous losing the life of people. Preventing accident (accident prevention) refers to activities designed to

foresee and avoid accidents. This percentage has raised eyebrows and caught the attention of many to curb the growing rate. It is found that 80% of the times it is the fault of the driver. Though number of prevention system has been so far suggested only few were successful. But unfortunately still the accident rate remains a mysterious and very serious problem yet to be solved. So a technique is suggesting to prevent accident by alcohol sensor since most of the accident occurring today is mainly because of drunk and drive. In this proposed system, RFID is used as the key to trigger the engine, along with the startup of camera system to identify the driver's face using face recognition technique and is compared with the image in the license stored in the server which contains the details about the license holder to check the originality

.In order to solve the problem of death caused by accident which occur because of the delay in help provided by rescue, can be solved by a new system of accident detection technique which finds out the occurrence of accident through various sensors and intimate the occurrence of accident to the nearest rescue teams or patrol services by the use of ZIGBEE and GPS system. In the proposed system Accident Detection and Reporting System using GPS and ZIGBEE Technology, which contains a major advantage in case of accident detection by speed monitoring since this case may fail to provide the required throughput as it is difficult to monitor the speed of the vehicle continuously as it may and also the efficiency of the system is very low when compared to the proposed system.

MICROCONTROLLER:

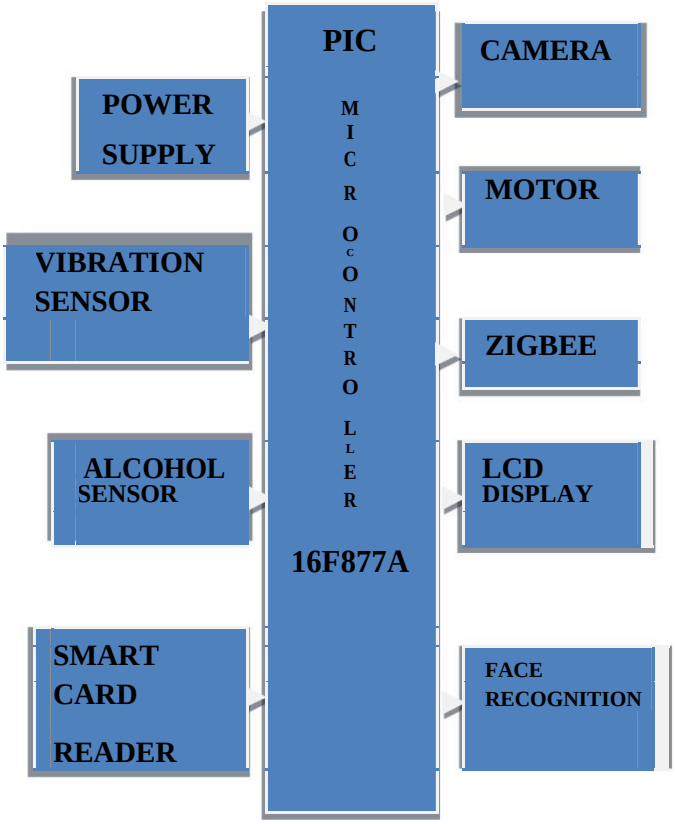
The Microcontroller Unit (MCU) is the heart of the system. In this system, PIC16F877A is interfaced with an alcohol sensor, RFID reader, camera, vibration sensor, ZIBEE. It receives the input data from RFID reader, alcohol sensor and camera and transmits this information to the server for accident prevention. It also receives data from the GPS, processes all data and detects the accident from the processed data. The location of the accident is also sent by the microcontroller. PIC16F877A is proposed for the system. The Large amounts of RAM for buffering, Enhanced Flash program memory and low power consumption make it ideal for the proposed system.

VIBRATION SENSOR:

The Vibration sensor IC3202 with certain range of acceleration is fixed in the vehicle which operates at the frequency range of 315MHz.When the vehicle met with an accident, this sensor detects the frequency of vibration is within the range or not. If the range exceeds it activate the timer for 30seconds.If the person inside the vehicle is conscious, they can

press the switch and stop the alert switch otherwise the information about the accident will be transferred to the ambulance and police station through ZIGBEE.

BLOCK DIAGRAM:



ALCOHOL SENSOR:

This alcohol sensor (MQ3-gas sensor) is suitable for detecting alcohol concentration on your breath, just like your common breathalyzer. It has a high sensitivity and fast response time. Sensor provides an analog resistive output based on alcohol concentration. The drive circuit is very simple all it needs is one resistor. A simple interface could be a 0-3.3V ADC.

RADIO FREQUENCY IDENTITY CARD (RFID):

Radio Frequency Identity Card is used as a key to ignite the vehicle. RFID tags represent the unique identity which is electronically stored and easily retrieved. RFID Frequency Band uses 13.553-13.567 MHz for high frequency HF, 26.957-27.283 MHz for medium frequency and 433 MHz for UHF. Passive RFID devices have no power supply built in. Electrical current transmitted by the RFID reader inductively powers the device, which allows it to transmit its information back. Since the tag has a limited power supply, its transmission is much more limited than an active tag, typically no more than simply an ID number.

FACE DETECTION SYSTEM:

A face recognition system is a computer application capable of identifying or verifying a person from a digital image or a video frame from a video source. One of the ways to do this is by comparing selected facial features from the image and a face database.

CAMERA:

The WIFI-EN95610 wireless security camera system is a point to multipoint system that can

transmit image. It detects the face of the driver and it transmits the digital image to the server. It operates at the frequency range of 5MHz to avoid interference from 2.4GHz network devices.

ZIGBEE AND GPS:

ZIGBEE is an IEEE 802.15.4 standard based wireless technology used for high level communication protocol. It operates at a frequency range of 2.4 GHz over 1km surrounding. It can automatically establish networks and use small number of packets compared with Wi-Fi and Bluetooth Global Positioning System (GPS)Is a popular technology which was developed by American Department of Defense (DoD) for military use. Later on it was available for civilian use. It is utilized for wide range of applications such as location, direction, speed, timing, surveying, logistics, traffic management, security etc.

PROPOSED SYSTEM

PREVENTION MODULE:

In this module, RFID is used as the key to trigger the engine, along with the startup of the camera system to identify the driver's face using face recognition technique and is compared with the image in the license stored in the server which contains the details about the license holder to check the originality. Here contains an alcohol sensor fitted near the driver seat in such a way it can sense the alcohol content in the breath of the driver. If the driver as consumed alcohol and it has been detected by the sensor automatically the lock gets jammed so the driver can't even able to start his vehicle.

DETECTION MODULE

The module is designed with a main motive to reduce the death rate caused because of delay in rescue of those who got seriously injured in the accident. In order to overcome the disadvantages proposed in the existing system thus go for new systems which include the use of vibration sensor. When the vehicle met with an accident, this sensor detects the frequency of vibration is within the range or not. If the range exceeds it activate the timer for 30seconds.If the person inside the vehicle is conscious, they can press the switch and stop the alert switch otherwise the information about the accident will be transferred to the ambulance and police station through ZIGBEE.

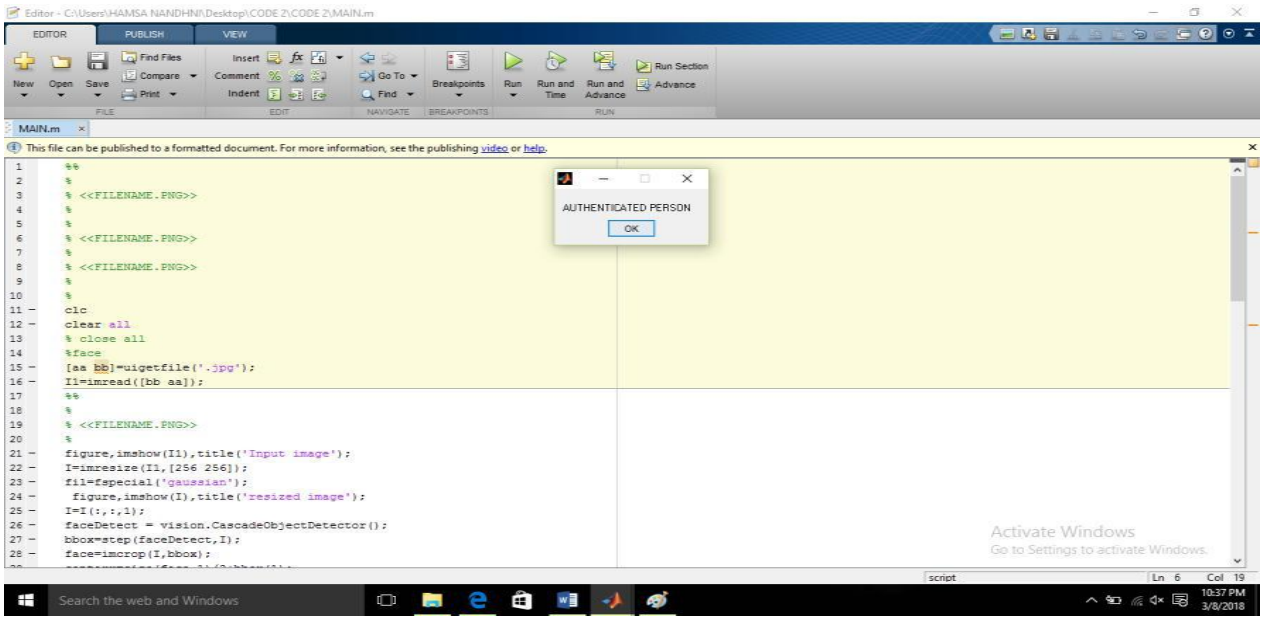
CONCLUSION:

The proposed system is very helpful to traffic police department. If the vehicle is met with any accidents, it automatically sends the data to ambulance service and police. Hence it reduces the death due to delay of accident information with the location details. Presence of all the integrating features of all the hardware components has been resonated out and placed carefully thus contributing to the best working

of it. The wireless network with growing technology has made this system a successful one by resolving security of vehicle and life safety measures while driving. Steps are being taken to implement as a real time system.

RESULT:

FACE RECOGNITION RESULT:



EMBEDDED CIRCUIT FOR ACCIDENT PREVENTION AND DETECTION

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