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A Novel System to Sense the Road Traffic in Highway and Alert System for Accident in A Vehicle

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Abstract: Nowadays there is people met huge amount of accidents on road while their driving, this is an automobile world, so here there is large number of vehicles there on the road at the same time there is huge number of accidents occurring day by day. We can't stop it or restrict it before it happens, but we can give assistance after the accident happens and can alert the drivers if there is possibility of accident occurrence. We are going to apply the technology called Internet of things in automobiles, it will provide assistance to drivers before the accident occurrence and provide alert message to hospitals and police station, friends and family. We are going to apply different sensing methods using sensor these parameters will give assistance to drivers before the accident detection by the intimation or alert messages. The other sensor units will sense the environmental parameters and transmit the intimation to relevant people after it happens. So by those methods which comes under the Internet of things will prevent the accident, can give better assistance. The surrounding parameters can be sensed by various sensors such as temperature sensor, gas sensor, vibrator sensor, and heart beat sensor. and also the system is implemented to alert the drivers who drives in the highway if any accident occur in the highway Vehicle electronics plays a major role in the application of auto motives and it is highly applicable in preserving the human lives. Enormous technologies are involved in the field of vehicle applications by electronics. Many kind of sensors are implemented in the vehicle and it is used in the real time applications effectively. The project focuses on building an infrastructure which vehicle safety authorities and accident intimation system can enhance the crash reports post-crash analysis, record of the event and reduces the time to arrive at the crash location. Technological approaches for detecting and monitoring fatigue levels of driver fatigue continue to emerge and many are now in the development, validation testing, or early implementation stages. Previous studies have reviewed available fatigue detection and prediction technologies and methodologies. As the name indicates this project is about advanced technologies in cars for making it more intelligent and interactive for avoiding accidents on roads. By using ARM7 this system becomes more efficient, reliable & effective. There are very less number of systems implemented on human behavior detection in or with cars. We describe a real-time online safety prototype that controls the vehicle speed under driver fatigue. The purpose of such a model is to advance a system to detect fatigue symptoms in drivers and control the speed of vehicle to avoid accidents. The main components of the system consist of number of real time sensors like IR, Temperature, Vibrate, impact sensors and a software interface with GPS and Google Maps APIs for location.

I. INTRODUCTION

Road Accident is collision between any vehicles (for example car, truck, motorcycle etsectra) or it can be with any pedestrian, animal or the hindrance placed in the middle of the road. The accident occurred could result in many injuries or damage to the property. There are various factors which come into account which can be the reason of accident that is design of the road, driver's impairment and vehicle design which can cause serious and most dangerous types of accidents. This essay is based on the prevention of car accidents on the roads mainly on the streets of Dubai.

A. Defining the Problem

The provision of highways are resulting in convenience for the peoples but the main problem which is faced by the government of any country is that the more frequent road accidents which are happening on the highways which results in severe damage in form of man power or infrastructure and mainly it is happening in big cities like UAE or Dubai which are having large road transport. The problem is basically small which is to be handled very carefully by the government; they have taken many measures to stop these huge accidents..

Whenever a road accident takes place there is various types of damage which takes place which could be in the form of human beings which is also a victim, infrastructure which is damage to the government and other administration damages which occurs during accident. There is heavy cost to all above types of damages which has to be paid during accident which increase the complication if every day there will hundreds of accidents across the country which would directly affect the economy of the country such as UAE.

There is a cost which has to be paid by the victim's family which cause great problem financially, the property is damaged due to the accident which also affect government financially indirectly. There is also some administration cost which will undergo due to the accident.

B. Poor Roadway Maintenance

Poor roadway maintenance also contributes to some of the car accidents. There could be debris in the way of the road which could create problems for the traveler which is responsibility of local highway department, faded road sign and potholes could be another cause for the major road accident.

II. OBJECTIVE

To build an integrated system for emergency rescue services and accident intimation in highways in the event of road accidents by an automation system

III. LITERATURE SURVEY

A. A Survey on IoT based Road Traffic Surveillance and Accident Detection System

(A smart way to handle traffic and concerned problems) RickinPatel Student, Masters of technology Department of Information Technology Dharmsinh Desai University, DDU Nadiad, India rickinpatel7@gmail.com Vipul K. Dabhi Department of Information Technology Dharmsinh Desai University, DDU Nadiad, India vipul.k.dabhi@gmail.com Harshadkumar B. Prajapati Department of Information Technology Dharmsinh Desai University, DDU Nadiad, India harshad.b.prajapati@gmail.com Road Traffic is one of the most vital problem in our hastily developing world.

This paper presents of study of different aspects and issues related to the problem. This paper emphasizes on using prominent technology -Internet of Things (IoT) for developing smart system to monitor various parameters related to road traffic and using it for effective solution.

The survey of the existing systems and concerned techniques related to the problem area are discussed. Different issues like vehicle detection, occlusion detection, lane projectile detection, accident detection and related methods to solve these issues are explored. We propose our "IoT based traffic monitoring and accident detection system" consisting of Raspberry pi, and pi camera as hardware which will use live video as input and process it for gathering information about the live traffic. The system generates information regarding the traffic such as number of vehicles, emergency accident situations, and improper projectile of vehicle. The generated information can be used to handle and divert the live traffic as needed to avoid the problems related to road traffic.

B. An IoT Enabled Real-Time Communication and Location Tracking System for Vehicular Emergency

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Internet of Things is an emerging technology having the ability to change the way we live. In IoT vision, each and every 'thing' has the ability of talking to each other that brings the idea of Internet of Everything in reality. Numerous IoT services can make our daily life easier, smarter, and even safer.

Using IoT in designing some special services can make a lifesaver system. In this paper, we have presented an IoT enabled approach that can provide emergency communication and location tracking services in a remote car that meets an unfortunate accident or any other emergency situation. Immediately after an accident or an emergency, the system either starts automatically or may be triggered manually.

Depending upon type of emergency (police and security, fire and rescue, medical, or civil) it initiates communication and shares critical information e.g. location information, a set of relevant images taken from prefixed angles etc. with appropriate server / authority. Provision of interactive real-time multimedia communication, real-time location tracking etc. have also been integrated to the proposed system to monitor the exact condition in real-time basis. The system prototype has been designed with Raspberry Pi 3 Model B and UMTS-HSDPA communication protocol.

IV. EXISTING SYSTEM

We all know speed is a major factor in many accidents. However, not all accidents are caused by speed and not all accidents are preventable. Yet there are steps you can take to help prevent accidents. Many accidents can be prevented and in those that are not preventable, the damage could be lessened. Here are some tips to help you prevent traffic accidents.

- 1) Drive according to road conditions. Drive slower when the weather is bad. Road surfaces deteriorate in rain, ice or snow. The ability to stop quickly greatly reduces when the roads are not dry.
- 2) Keep your vehicle in good mechanical order. Replace worn tires and brakes as needed. Keep windshield washer fluid full and change out windshield wipers on a regular basis.
- 3) Wear your seatbelt. Not only do seatbelts keep you safe in an accident, it will help you avoid accidents as well. Seatbelts will hold you in place during an aggressive maneuver. If you make an abrupt maneuver, you may find yourself thrown to the passenger side of the vehicle. Remember to make your passengers buckle up, too.
- 4) Avoid other vehicles. Back off and don't tailgate or allow others to tailgate you. Try to avoid driving next to another vehicle in case it has to swerve to avoid an animal or debris that may be in the road.
- 5) Watch out at intersections as many accidents happen here. Always slow down and look both ways at intersections. Don't assume the other vehicles will stop just because the light is red. There is always someone trying to get through the intersection during a yellow light.
- 6) Stay away from 18-wheelers. These large tractor trailer rigs require extra space when making wide right turns. Therefore, avoid the right side of one, especially if you think the driver will turn right. Don't drive behind an 18-wheeler on the highway. A blown tire can cause an accident.
- 7) Turn your head to check for traffic before changing lanes. Do not rely on your mirrors when making a lane change. All vehicles have "blind spots" in which your mirrors cannot see. Do not ride in the blind spots of other vehicles.
- 8) Look extra carefully in parking lots or parking areas. Many fender-benders happen in these areas. Follow the rules set up in parking areas. These rules are for the safety of all drivers.

A. *Slow Down*

Obey the speed limit even if every other car is surpassing it. Remember that police officers often stay hidden from view while looking for speeders. If you're caught driving too fast, they won't hesitate to give you a ticket.

B. *Let Others Pass You*

Defensive driving means letting others go ahead-not defending your position in traffic. Avoid the urge to be a vigilante ("Oh yeah? Let me show you what it's like to be cut off like that!") Accept the fact that someone is always going to think they're in more of a hurry than you. These are the drivers you want to move far away from, not to 'teach them a lesson.

V. PROPOSED SYSTEM

To build an integrated system for emergency rescue services in the event of road accidents by black box system. The project focuses on building an infrastructure which vehicle safety authorities can enhance the crash reports post-crash analysis, record of the event and reduces the time to arrive at the crash location

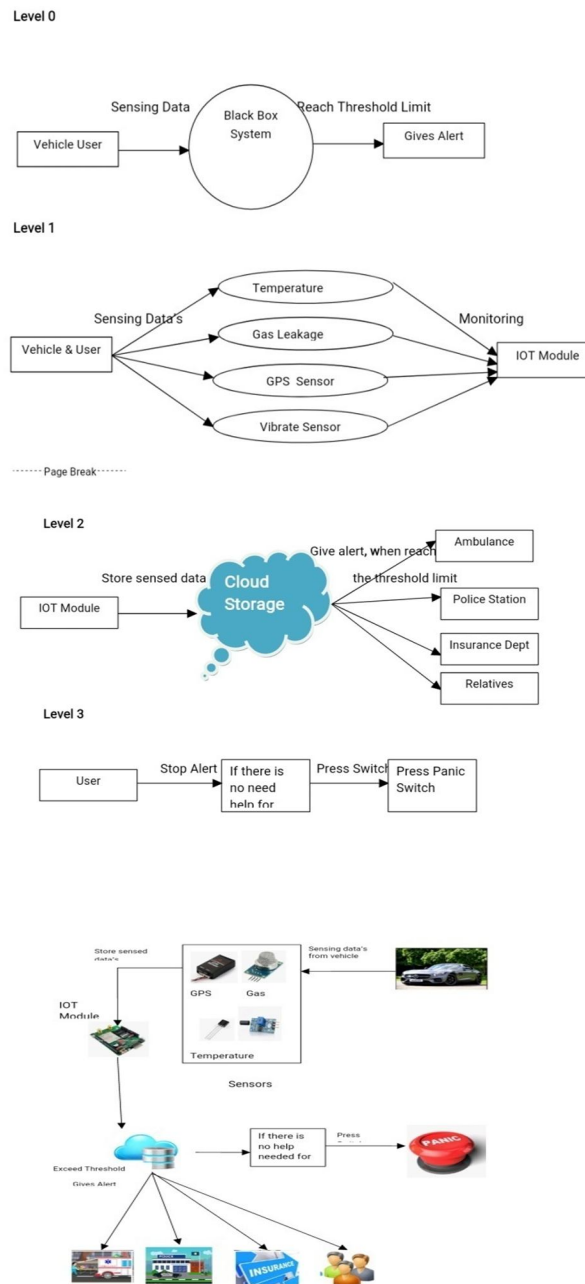
.In the event of an accident it is reported to the police or a hospital by the locals in the area if they have discovered the wreckage or the incident happened on sight. Usually the caller is uncertain of the injuries and according to a research in delay of ambulance to crash location reveals that even with emergency services in place it can take up to 5 minutes or more in the developed countries for an ambulance to arrive

A. *Techniques*

- 1) Vehicle to vehicle communication has been implemented instead of GSM.
- 2) Panic switch use to control the sending information.
- 3) The information sent from one vehicle to another network station.
- 4) The information has been sent to nearby base station or police station or hospital or home.
- 5) Radiation jammer use to control the incoming calls when driving.

VI. IMPLEMENTATION AND RELATED WORK

A. Flow Diagram



B. Architecture

In any vehicle the system is interfaced and the system consists of several sensors like temperature sensor, gas sensor, heart beat sensor, vibrator sensor for accident detection. We use several sensors to manage the accident detection. The sensors are temperature sensor, Tilt sensor, Gas sensor, vibration sensor. Temperature sensor senses the temperature of the user. The tilt sensor senses the falling position of the user. Vibration sensor senses the accident occurrence. Gas sensor senses the fuel leakage from the vehicle. These parameters are monitored by the Arduino micro controller. It sends the alert to the web page through IOT module if the values reach above the threshold level. The data will be carryout by the control room and hospital management. The location of the patient will be traced out by the GPS.

- 1) *Pulse Sensor*: Heartbeat sensor (SEN11574) is nothing but the pulse sensor. This pulse sensor fits over a fingertip and uses the amount of infrared light reflected by the blood circulating inside. It is a long life piezoelectric pulse sensor with signal filtering, conditioning and temperature compensation circuit. The high integration makes it very stable, reliable and extremely easy to use. It outputs the pulse wave which is voltage analog signal. Working voltage: 5V Working current: 4mA .
- 2) *Gas Sensors*: As detectors measure a specified gas concentration, the sensor response serves as the reference point or scale. Electrochemical sensors or cells are most commonly used in the detection of toxic gases like carbon monoxide, chlorine and nitrogen oxides. They function via electrodes signals when a gas is detected. Gas detectors can be used to detect combustible, flammable and toxic gases, and oxygen depletion.
- 3) *IR Sensors*: An infrared sensor is an electronic device, that emits in order to sense some aspects of the surroundings. An IR sensor can measure the heat of an object as well as detects the motion. These types of sensors measure only infrared radiation, rather than emitting it that is called as a passive IR sensor. An infrared sensor is an electronic device, that emits in order to sense some aspects of the surroundings. An IR sensor can measure the heat of an object as well as detects the motion. These types of sensors measure only infrared radiation, rather than emitting it that is called as a passive IR sensor.
- 4) *Temperature Sensors*: Temperature sensors are vital to a variety of everyday products. For example, household ovens, refrigerators, and thermostats all rely on temperature maintenance and control in order to function properly. Temperature control also has applications in chemical engineering. Examples of this include maintaining the temperature of a chemical reactor at the ideal set-point, monitoring the temperature of a possible runaway reaction to ensure the safety of employees, and maintaining the temperature of streams released to the environment to minimize harmful environmental impact.
- 5) *Thermometers*: Thermometers are the most common temperature sensors encountered in simple, everyday measurements of temperature. Two examples of thermometers are the Filled System and Bimetal thermometers.
- 6) *Arduino IDE*: The microcontrollers are mainly programmed using a dialect of features from the programming languages C and C++. The Arduino project provides an integrated development environment (IDE) based on the Processing language project. The open-source Arduino Software (IDE) makes it easy to write code and upload it to the board. It runs on Windows, Mac OS X, and Linux. The environment is written in Java and based on Processing and other open-source software.

VII. CONCLUSION

Overall such devices and systems can be the changing factor in road safety. Life is priceless and we should be doing whatever possible to make roads safer. WHO has already predicted 1.9 million casualties by the year 2020. Bangladesh is especially at risk as the country is being reformed by building more bridges, roads and better transportation networks and new areas emerge to develop. Gradually with assistance from both the vehicle owners and the Government assisting in deployment of such devices in vehicles, we can reduce the impact from the ever so concerning issue of road accidents. In addition it will help save lives, aid in better data collection and build an infrastructure solution using Emergency Crash Reporting Software to support the rescue services of the country.

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