

REALTIME ACCIDENT DETECTION AND PREVENTION USING EMBEDDED SYSTEM

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ABSTRACT:

With population growth, the demand for vehicles has increased tremendously, which has created an alarming situation in terms of traffic hazards and road accidents. The road accidents percentage is growing exponentially and so are the fatalities caused due to accidents. However, the primary cause of the increased rate of fatalities is due to the delay in emergency services. Many lives could be saved with efficient rescue services. The delay happens due to traffic congestion or unstable communication to the medical units. The implementation of automatic road accident detection systems to provide timely aid is crucial. Many solutions have been proposed in the literature for automatic accident detection. The techniques include crash prediction using smartphones, vehicular ad-hoc networks, GPS/GSM based systems, and various machine learning techniques. With such high rates of deaths associated with road accidents, road safety is the most critical sector that demands significant exploration. In this paper, we present a critical analysis of various existing methodologies used for predicting and preventing road accidents, highlighting their strengths, limitations, and challenges that need to be addressed to ensure road safety and save valuable

Keywords: alcohol sensor, vibration sensor, IR sensor, wifi ic

1. INTRODUCTION

As population around the whole world is increasing very rapidly, for public transportation as well as industrialization, there is a growing need for large number of vehicles on roads and highways. Again, with the increasing number of vehicles, traffic-jams, and road accidents etc. problems are also rising gradually. As a result, a lot of work has already been done on the field of traffic control, automatic driving monitoring and control, road accident prevention. With the passing year the number of people dying in accidents has increased. The number suggests that at

least 413 people die every day in 1,317 road accidents. Most of these accidents are a result of negligence during driving/riding and lack of importance given to safety while driving/riding. Despite the stringent rules to curb such occurrences the individuals lack a responsibility towards following the rules laid out in the interest of their safety. In fact drunken driving is one of the leading causes of road fatalities.

Out of which around half million people suffer from non-fatal injuries with many sustaining a disability as a result of their injury. There are two major reasons that leads to an accident. The first main reason is the dangerous road conditions. These are major distractions for safe and comfortable transportation. Keeping our roadways in good condition is a challenging problem because of harsh weather, unexpected traffic load, and normal wear and tear, degradation of even well-laid roads. The second main reason is being driver distraction. In this paper we have explained about how we can prevent accidents in this congested traffic conditions as well as in the dangerous road conditions. We have used a camera which can continuously send signals on changes in the road. We have used a microcontroller which does a continuous image processing of the road and compute the results and prevents from vehicular accidents this operation are done by an Image processing technique.

Vehicle accidents are most common if the driving is inadequate. These happen on most factors if the driver is drowsy or if he is alcoholic. Driver drowsiness is recognized as an important factor in the vehicle accidents. It was demonstrated that driving performance deteriorates with increased drowsiness with resulting crashes constituting more than 20% of all vehicle accidents. The

analysis of face images is a popular research area with applications such as face recognition, virtual tools, and human identification security systems. This project is focused on the localization of the eyes, which involves looking at the entire image of the face, and determining the position of the eyes by a self developed image-processing algorithm. Once the position of the eyes is located, the system is designed to determine whether the eyes are opened or closed, and detect fatigue. By monitoring the eyes, it is believed that the symptoms of driver fatigue can be detected early enough to avoid a car accident. Detection of fatigue involves a sequence of images of a face, and the observation of eye movements and blink patterns.

Reduction of the number of accidents and mitigation available in commercial vehicles today and future of their consequences are a big concern for traffic authorities, the automotive industry and transport research groups. Road accidents are human tragedy. High human suffering and monetary cost is involved in terms of untimely deaths injuries and potential income loss. In the proposed system a dynamic system is designed which avoids all the five reasons of accident. In case of over speeding in a speed limit zone area speed is going to limit to a certain cut-off value. If a driver is drunk then vehicle won't start until he or she is not able to drive, the system restricts driving without seatbelt also alarm a buzzer if driver suffer drowsiness, and when the vehicle will turn suddenly an indicator message will be sent to surrounding vehicles.

2.LITERATURE SURVEY

2.1 Bilal Khalid Dar, Munam Ali Shah, HuniyaShahid, Adnan Naseem; In [1] fog based accident detection system handles the emergency timely and it has minimum delay.

2.2 R.M. Sahu, VivekPatilGouravHomkar, SachinPalve; In [2] RF based Accident Prevention system handles losses in a highly efficient manner.

2.3 C.Vidya Lakshmi, J.R.Balakrishnan; In [3] GSM based sensor technology provides high performance using simple assigned process.

2.4 NiravThakor, TanmayVyas, Divyang Shah; In [4] MEMS sensors,GPS and GSM helps in reducing serious problem by alarm time greatly and locate the

2.5 NimishaChaturvedi, PallikaSrivastava; In [5] GPS and GSM modem is a interest method that can be utilized to save human lives using accurate process .

2.6 Md. Syedul Amin, JubayerJalil, M. B. I. Reaz; In [6] Accident Detection and Reporting system are proposed to reach rescue service in time and save lives.

2.7 VarshaGoud, V.Padmaja; In [7] MEMS sensor, it is useful in improving lifespan by providing driver's assistance.

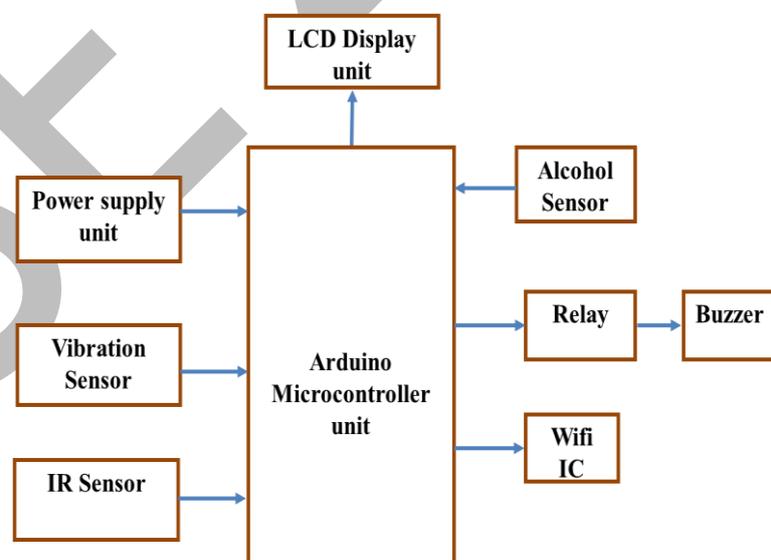
2.8 ShabnamKazemlou, Steve HranilK. N. V. Satyanarayana , G. Yaswanthini, P. L. Kartheeka, N. Rajkumar, A. BhimaRaju; In [8] RFID module, this module proposed to limit the speed of vehicle and is much more cost efficient.

2.9 ArifShaik, Natalie Bowen, Jennifer Bole, Gary Kunzi, Daniel Bruce; In [9] This paper presents a sort of new model of IOT framework that can be tuned to maximize profit and thus improve the speed and accuracy of communication.

2.10 UlyaSabeel, Nidhi Chandra, ShivrajDagadi; In [10] Attack Detection and Localisation Scheme(ADLS), proposed a highly increased security system and has gained popularity in the field of wireless sensors.

2. PROPOSED METHOD:

The block diagram of the proposed method is given below



A. Drowsiness detection mechanism

IR measure the heat of an object, as well as detect motion. Many of these types of sensors only measure infrared radiation, rather than emitting it, and thus are known as passive infrared (PIR) sensors. Since the human eye cannot see the infrared radiations, it is not possible for a person to identify whether the IR LED is working or not, unlike a common LED. An object's emitted energy reaches the IR sensor via the device's optic system, which in turn focuses the energy onto its photosensitive detectors. The detectors convert the IR energy into an electrical signal, which then is converted into a temperature value based on the object's

emissivity. This value may be displayed on the IR sensor or converted as digital input and sent to a computer terminal for display.

B. Alcohol detection

MQ gas sensors are widely used now days to detect alcohol content where each of MQ gas sensors detects specific gas molecules. we are using MQ3 gas sensors in this project. It can detect the presence of alcohol gases at concentrations from 0.05 mg/L to 10 mg/L. The sensitive material used for this sensor is SnO₂, whose conductivity is lower in clean air. It's conductivity increases as the concentration of alcohol gases increases. It has high sensitivity to alcohol and has a good resistance to disturbances due to smoke, vapor and gasoline. This module provides both digital and analog outputs.

C. Vibration sensor

The last module after module after alcohol detection and drowsiness detection is vehicle accident detection. Piezoelectric sensor also known as vibration sensor is used in this module. Three parameters representing motion detected by vibration monitors are displacement, velocity, and acceleration. These parameters are mathematically related and can be derived from a variety of motion sensors.

D. WiFi module

The ESP8266 WI-FI module is basically, a complete WI-FI solution, which have self-contained operating system and integrated TCP/IP protocol stack that can be easily connect to the microcontroller for gaining the access to any Wi-Fi network This module has the capability of either to give or gain the applications and functions from other module or processor, mean's that this also have the facility of hosting or uploading the functions and applications. For connecting this module to any WI-FI network, just up load the pre-programmed program which is set in this module as firmware. This is very cost effective module with an ever growing and huge communication community

4. CONCLUSION:

.The primary motive of the work is to ensure the safety and security of driver and passengers travelling

in the vehicle. Accidents .Due to over speed, drowsy and drunken conditions of the driver are prevented. In heavy traffic zone, speed is controlled automatically without the interference of the driver. Thus, we can reduce alcohol and drowsy related road accidents. Thus, we can bring down the alarming rate of road accidents.

5. REFERENCE:

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