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Advanced Driver Assistance System with Accident Detection

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ABSTRACT: Nowadays the mortality ratio has been increasing due to accidents and delay in rescue system. The main goal of this project is to increase the road safety by reducing the number of accidents by predetermining the cause and avoiding it. The key work of this project is to detect the buffer zones and control the speed of the vehicles automatically using RF transceiver by using RFID. This project also detects the obstacles and controls the speed of the vehicle. We use eye blink sensor to detect the drowsiness and drunken drive by comparing the blinking rate with the assigned threshold value. In our work, we use a triple axis accelerometer to detect the occurrence of accident event and track the location. The GPS and GSM module is used for such an action and sends notification to the rescue system and the preconfigured mobile numbers. A pressure sensor is used in order to avoid damage to the tyres. This work is very simple, less expensive and a compactive one which can be applied to our real time systems.

KEYWORDS: RFID, Pressure sensor, Accident detection, rescue system.

I. INTRODUCTION

Modern vehicles equipped with driver assistance system can “feel” (by sensors), “see” (by cameras) and in future – “speak” (by communication systems). Services subjected to improved road safety by avoiding accidents and reducing injury severity. The efficiency of our project is to support a foresighted driving and enhanced driving comfort. The primary objective of this project is to provide innovative services relating to transport which enables users to be better informed and make safer and ‘smarter’ use of transport system. Road side unit provide information to the vehicle unit which helps the driver to control the vehicle.

The use of image processing techniques has a main drawback of requiring a large memory to store the processed image, inaccuracy and the image cannot be captured in all the axes [1]. The use of Raspberry Pi will make the programming complex. The memory space of Raspberry Pi is very limited we cannot expand the memory externally it also does not support the Windows OS with is user friendly. These drawbacks are overcome by our proposed system by using RFID which does not need large memory space and provide accurate results. The Existing system contains Individual modules which have their own advantages but an integrated system would provide to be much more effective. This paper proposes the TADD technology of the new possibilities for enhancing for active safety and driver assistance system such as integrated system along with an Intelligent Driver Assistance System that uses RFID. The memory of this system can be expanded externally. It is superior to existing technologies.

Using this system we can detect the Obstacles that may not be noticed by the user leading to crash and the vehicle speed is reduced gradually. In case if the Accident occurs that is sensed and intimated to the rescue services in order to save the user’s life. This system also detects the pressure load in the wheel of the vehicle and intimated to the user and the vehicle speed is reduced slowly. If the user in the drowsy mode that is intimated via signal transmission thereby the speed of the vehicle is reduced stage by stage. When the vehicle enters into the Zone region that is detected by the controller and it controls the speed of the vehicle automatically.

The main objectives of this work are,
1. To Reduce the Human Death Ratio due to Road Accident in India.

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2. If accident takes place, quick transmission of message to preconfigured contacts to intimate the victims.
3. To provide maximum assistance even in unpopulated area.

II. SYSTEM ARCHITECTURE

The proposed system primarily consists of two units namely:
- Vehicle unit
- Road side unit

Vehicle unit:

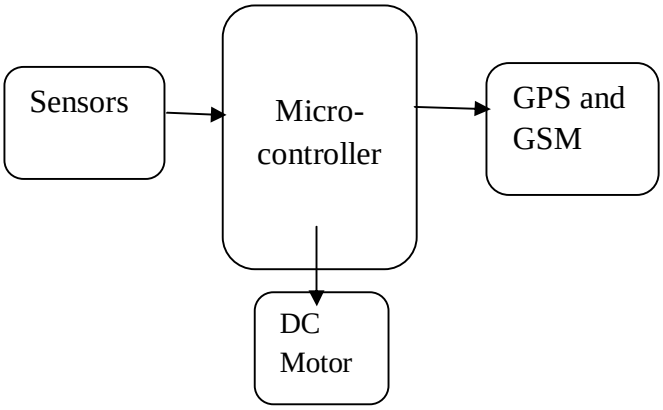

Fig.1. Vehicle Unit

Road side unit:

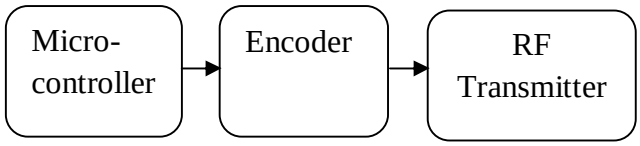

Fig.2. Road Side Unit

III. SYSTEM DESCRIPTION

3.1 Vehicle Unit:

In this unit , information is acquired using sensors mounted on the vehicle. These values are analyzed using the pre assigned threshold value of each sensor. If the obtained values exceed the threshold value then the necessary operation are done which are show in Fig: 3. This unit contains the following modules:

- Module 1: Accident detection module.
- Module 2: Obstacle detection module.
- Module 3: Pressure detection module.
- Module 4: Zone detection module.
- Module 5: Drowsiness detection module.

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3.1.1 Working Principle

All the sensor values are stored in the Micro-controller which has been sensed by the sensors that are attached to the vehicle unit. Then these sensor values are used for further processing. Once the sensor detects the accident then microcontroller will make the GPS to locate the accident spot and an SMS is sent to the preconfigured mobile numbers and rescue system via GSM. Once the obstacle is detected which may not be noticed by the driver, the controller will slow down the vehicle slowly. When the user is found to be in drowsy mode by the sensor, the controller will slow down the vehicle automatically. If the pressures of the tyres are found to be overloaded the vehicle is slow down by the controller. This system can also be implemented in the two wheelers to save the life of the user by slowing down the vehicle stage by stage.

Flow Chart:

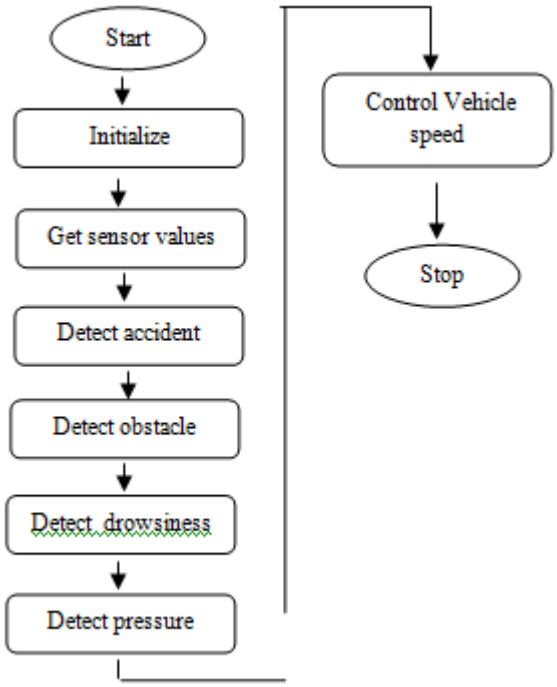

Fig.3. Flow Chart of Operation

3.2 Road side unit:

This unit contains a microcontroller, an encoder and a RF transmitter. The microcontroller will monitor the roads regularly. Once the entry of the vehicle is detected with more speed then the controller will control the vehicle speed by stage by stage.

IV. RESULTS

- When an obstacle is detected by the obstacle detector the speed of the motor is slow down gradually.

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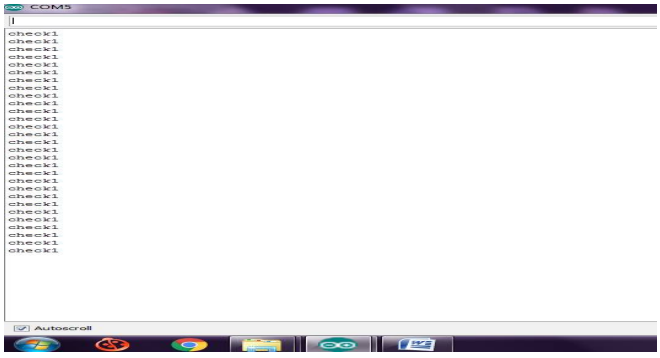

Fig.4. Obstacle detection

- When vibration is occurred is detected by the accident detection sensor it give indication to the controller then thereby reduced the vehicle speed stage by stage gradually and it give intimation to the nearby rescue team or preconfigured mobile number via GSM .

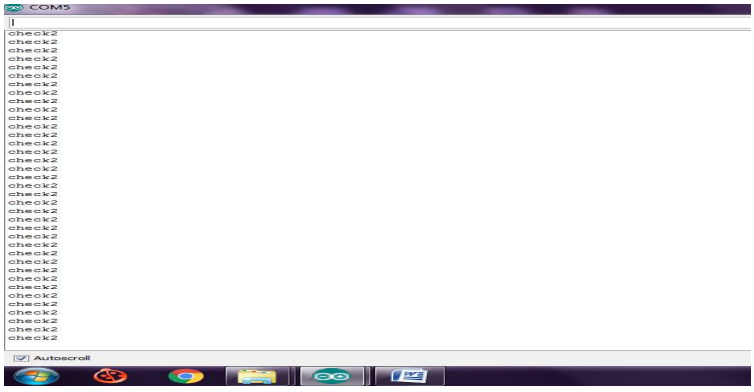

Fig.5. Accident detection

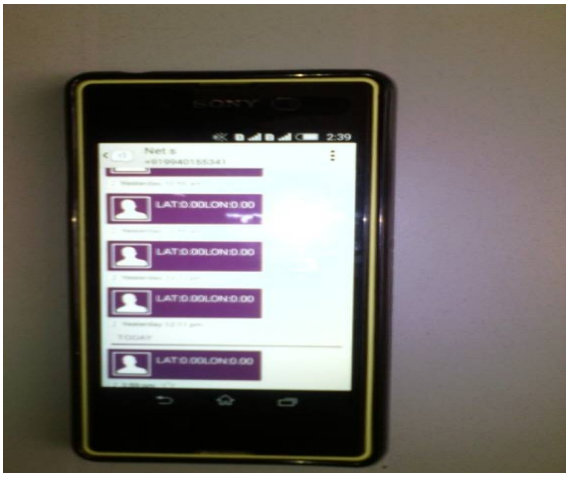

Fig.6. Alert sent

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- When the vehicle is detected at the zones the signal is transmitted to indicate the entrance of the vehicle thereby the vehicle speed is reduced gradually.

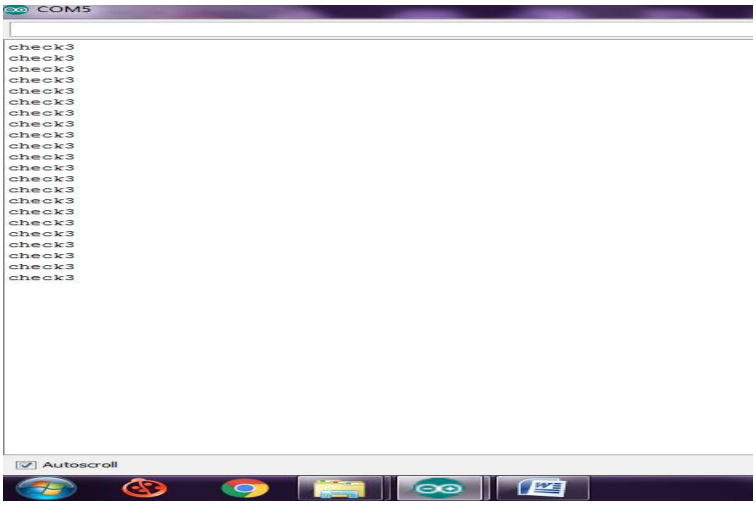

Fig.7. Zone detection

- When the driver is detected in the drowsy mode that is indicated via signal transmission thus the speed is controlled slowly.

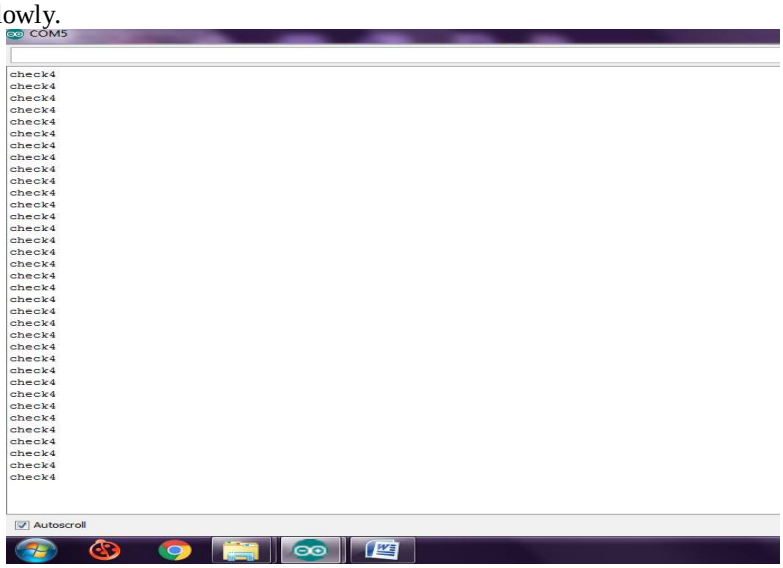

Fig.8. Drowsiness detection

- When the wheel of the vehicle is detected to be overloaded with pressure an alert is generated to intimated the user as well as the speed of the vehicle is reduced.

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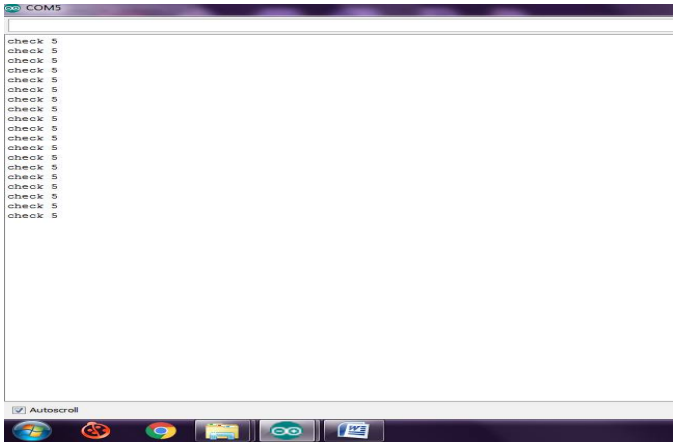

Fig.9. Pressure detection

V. CONCLUSIONS AND FUTURE SCOPE

This system detects the Obstacles, Accident, Pressure, Drowsiness of the user and the vehicle speed is reduced gradually. On the occurrence of the accident a notification is sent via GPS and GSM to the rescue services. This enhances the safety of drivers and saves human life. This system can also be enhanced with IOT in order to monitor the vehicle from wherever we present. The driver receives the information through voice. This system can also be implemented in two wheelers as well as four wheelers for better vehicular systems.

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