Vehicle Controlled with Smart Traffic Image Processing System and Accident Detector

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ABSTRACT

Road traffic congestion conditions are getting worse day by day, it is due to rapid growth of vehicle volume on roads. Therefore, the road traffic management is a major concern. Vehicles mostly uses traffic congestion .This project main aim will be to make sure that vehicles will have an pi camera that will capture the signs from a traffic signs board at a distance of 5mts between the traffic sign board and the vehicles By doing this, if the traffic sign shows the STOP sign ,the vehicle will get slow down and will not move but the engine will be ON, now when the sign shows GO then the vehicle will be able to move. Most of the times when the person who met with an accident doesn't get any help from the surrounding hence auto-detection of accident and notifying the accident with the location to a victims relatives and emergency services plays a vital role in saving person's life. This paper describes the implementation of microcontroller based accident detection and notification system. The sensing unit contains accelerometer sensor which are used to detect accident of vehicle. When accident happens GPS sky trek s1315 is used to track real time location and GSM 900 is used to notify the accident via SMS. Software program developed using PYTHON coding. The proposed model is successfully implemented and tested with prototype model.

KEYWORDS: GPS MODULE, MICROCONTROLLER, LCD, IR SENSOR, MOTOR DRIVE, PI CAMERA, RASPBERRY PI

I. INTRODUCTION

This project is about the Vehicle Controlled with Smart Traffic Image Processing System and Accident Detector will be to make sure that vehicles will have an pi camera that will capture the signs from a traffic signs board at a distance of 5mts between the traffic sign board and the vehicles By doing this, if the traffic sign shows the STOP sign ,the vehicle will get slow down and will not move but the engine will be ON, now when the sign shows GO then the vehicle will be able to move. When the accident occur vibration sensor which we have installed in our device makes some vibrated signal this signal will pass to the GPS system ,the location further transmit the alert sms using GSM. LCD is used to display the location and status of the vehicle. The main software program which we have used is PYTHON coding. The proposed model is successfully implemented and tested with prototype model. This is a micro-controller device.

II. PROPOSED SYSTEM

The system acts as an accident avoidance and detection system that gathers all the information and sends it to the close person or anyone whose number the driver has assigned. In this task, Raspberry PI is utilized for controlling entire the procedure with a GPS Receiver and GSM module. GPS Receiver is utilized for identifying directions of the vehicle, GSM module is utilized for sending the ready SMS with the directions and the connection to Google Map. An accelerometer can be used in a car alarm application with the goal that risky driving can be distinguished. It can be utilized as a crash or rollover identifier of the vehicle amid and after a crash. With signals from an accelerometer, a severe accident can be recognized. According to this project when a vehicle meets with an accident immediately Vibration sensor will detect the signal or if a car rolls over and informs microprocessor. Now the microprocessor sends this change detection signal to a GSM module. The GSM module now intern begins transmitting this accident data along with the exact position of victim through google maps link. So, the concern person can immediately trace the location through the GPSMODEM. And the person can immediately help the victim who has met with the accident with getting exact location of victim and the traffic sign also detected using raspberry pi camera so depending on traffic sign picture motor engine will be operated. For example, if stop sign is detected from pi camera, the motor engine will stop and if forward sign detected from pi camera motor engine will start running. The proposed model is successfully implemented and tested with prototype model.
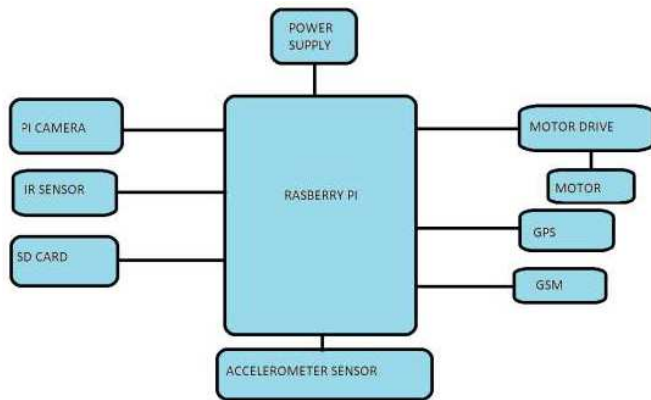
Fig1. Block Diagram

III. HARDWARE IMPLEMENTATION
A. RASPBERRY PI
Raspberry pi is a series of single board computers developed by the Raspberry Pi foundation for basic computer science in schools for developing countries. Originally intended for teaching computer science in schools in developing countries, it gained popularity due to its usage in robotics. The credit card sized form factor added to the Broadcom BCM2835 SoC in the first generation was only the beginning. Since then it has only gained in popularity among the developer community. Let's look at the Pi in detail to understand the basics. CPU speed ranges from 700 MHz to 1.2 GHz for the Pi 3 and on-board memory range from 256 MB to 1 GB RAM.

Fig2. Raspberry pi 3 model

B. POWER SUPPLY
Power supply for motor drive is 12 v battery and power supply for raspberry pi is normal power bank.

Fig3. 12 v Battery

C. GPS MODULE
Global Positioning System (GPS) makes use of signals sent by satellites in space and ground stations on Earth to accurately determine their position on Earth. Radio Frequency signals sent from satellites and ground stations are received by the GPS. GPS makes use of these signals to determine its exact position. The GPS itself does not need to transmit any information. The signals received from the satellites and ground stations contain time stamps of the time when the

signals were transmitted. By calculating the difference between the time when the signal was transmitted and The time when the signal was received. Using the speed of the signal, the distance between the satellites and the GPS receiver can be determined using a simple formula for distance using speed and time.

D. GMS MODULE
Most of the people are familiarized with the dial up modem as it a common device for land telephone network used in homes and offices. network which has got its own limitations in the embedded area. GSM modem is introduced to rectify the main limitation of the dial up modem based on acceptance of a sim card. It is almost equivalent to a mobile communication. system as operates over a subscription to a mobile operator. From the mobileoperator perspective, a GSM modem looks just like a mobile phone. Using the transmission and reception pins, a modem can receive and send the messages and it could be interfaced with the PC or to a microcontroller. This property makes themodem to exist in a relevant position on embedded applications.
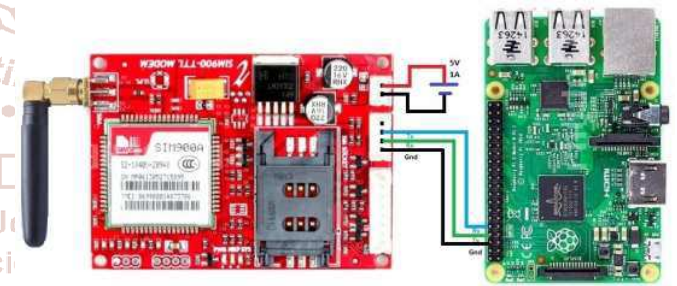

Fig4. GSM module

E. ACCELERO METER
This tutorial will walk you through the process of wiring the ADXL345 to your Raspberry Pi. It also goes through the steps on how to implement Adafruit's ADXL34x library to talk with the device. Both are relatively simple processes. The ADXL345 is a low power, 3-axis (It tracks both X, Y and Z accelerations) MEMS accelerometer that utilizes the I2C and SPI serial interfaces. The support of both I2C and SPI serial protocols makes it incredibly easy to use with our Raspberry Pi as we don't require any additional hardware to interpret the data coming from the accelerometer.

Fig5. Accelerometer

F. IR SENSOR
IR Sensor Module (Infrared sensor) are modules which detect the presence of objects before them. If the object is present it give 3.3V as output and if it is not present it gives 0 volt. This is made possible by using a pair of IR pair (transmitter and receiver), the transmitter (IR LED) will emit an IR ray which will get reflected if there is a object present before it. This IR ray will be receive back by the receiver (Photodiode) and the output will be made high after amplified using an op-amp link LM358. You can learn more about here.
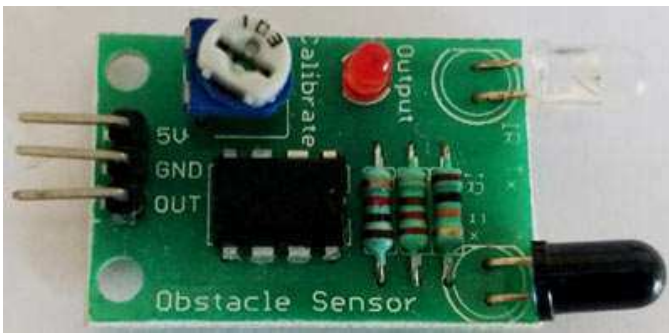
Fig7. IR sensor

IV. CONCLUTION

It detect the traffic light with the help of pi camera and act according to it, IR sensor is used to detect the obstacles and if any accident occur accelerometer sensor sense the vibration and the GPS will detect the exact location of the accident in order to get medical support to the victim as soon as possible.

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