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Car Black Box Accident Monitoring System

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Abstract

This demonstration elaborate the collection of the real time data after the detection of collision in an around the vehicle environment and analyze the collected data to have the conclusion regarding the collision while simultaneously transmitting the data over the wireless network. The Evidence Collection System is vehicle based device which collect the data like speed, engine temperature, acceleration, GPS position, wiper movement, and time. This data can be used to investigate the crime, rescue operation and insurance claims. This data then transmitted to the database server so that web application can be able to access this information at different places like Police station, Insurance Company. The operation can be detected by sensors such as temperature sensor, ultrasonic sensor, seatbelt sensor, IR sensor. Processing is done by ARM 7 and for speed controlling and visualize DC motor is used. For recording purpose video web camera and GPS and GSM is for location tracking and sending sms.

Index Terms:*Vehicle, IR Sensor, Ultrasonic sensor, GPS , speed etc.*

1.INTRODUCTION

In today's system it is very hard to detect if vehicle get stolen or get accident with vehicle. Because there is not any smart system in it, so police also face many problem in theft detection. Calling a police then observing situation and after detection also sometimes there is no result so that there is need of advanced system for security of vehicle which get complete by our project.

The Black Box will give us feedback about health of vehicle and crashes/accidents and   allow for accessibility to data involving the vehicle's mechanical and electrical status. The Black Box will give us instant feedback for any physical anomalies, and will also give the command center access to the data on the Black Box. Because the Black Box is designed to withstand a large impact, it will also secure the data in the Black Box.

2. Objective and scope of the project

When accident is tracking then intimate the condition of the victim who met with accident. If accident takes place, fast indication message will be sent to emergency care centers. For safety system will be check the status of critical car module and also Seatbelt testing. System will check temperature and indicate continuously. When ultrasonic sensor detect the obstacle then speed of the car will be control.

3. IMPLEMENTATION OF PROPOSED IDEA

3.1 ARM 7

The LPC2148 are based on a 16/32 bit ARM7TDMl-S CPU with real-time emulation and embedded trace support, together with 128/512

kilobytes of embedded high speed flash memory. A 128-bit wide memory interface and a unique accelerator architecture enable 32-bit code execution at maximum clock rate.

3.2 Collision Sensor

The term collision sensor is sometimes taken to mean a device that senses either an actual collision or an impending collision. If the possibility of a collision is sensed, the device may signal a warning in some way so that a collision is avoided. A device specifically designed to prevent a collision is sometimes called a collision avoidance sensor.
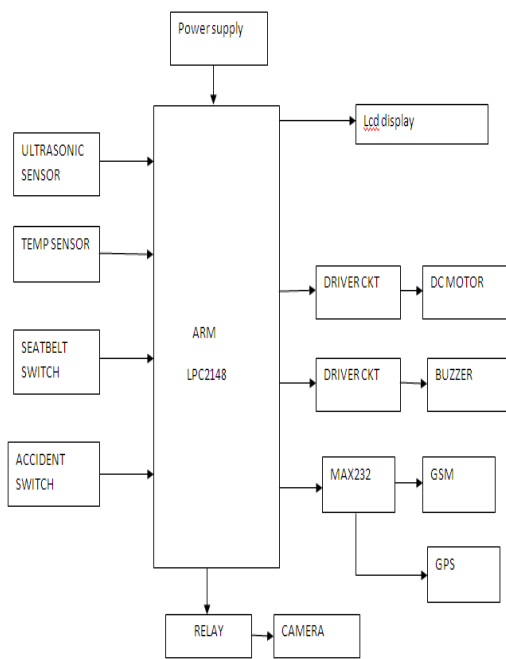

Fig 1: Block Diagram

3.3 Temprature Sensor

The LM35 series are precision integrated-circuit Calibrated Directly in Celsius (Centigrade) temperature devices with an output voltage linearly Linear + 10-mV/°C Scale Factor proportional to the Centigrade temperature. The 0.5°C Ensured Accuracy (at 25°C) LM35 device has an advantage over linear. Rated for Full −55°C to 150°C Range temperature sensors calibrated in Kelvin. The LM35 device is rated for to operate over a −55°C to HVAC 150°C temperature range.

3.4 Ultrasonic Sensor

Ultrasonictransducers are transducers that convert ultrasound waves to electrical signals or vice versa. Ultrasonic ranging module HC - SR04 provides 2cm - 400cm non-contact measurement function, the ranging accuracy can reach to 3mm. The modules includes ultrasonic transmitters, receiver and control circuit.[4] The basic principle of work:
(1) Using IO trigger for at least 10us high level signal,
(2) The Module automatically sends eight 40 kHz and detect whether there is a pulse signal back

Fig-2: Ultrasonic sensor

3.5 Power Supply

This project uses two power supplies, one is regulated 5V for modules and other one is 3.3V for microcontroller. 7805 three terminal voltage regulator is used for voltage regulation. Bridge type full Wave rectifier is used to rectify the ac out put of secondary of 230/12V step down transformer
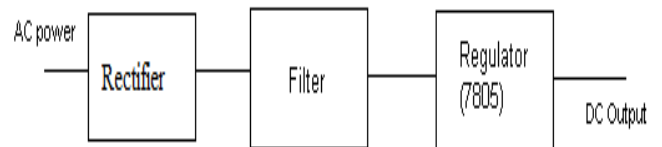

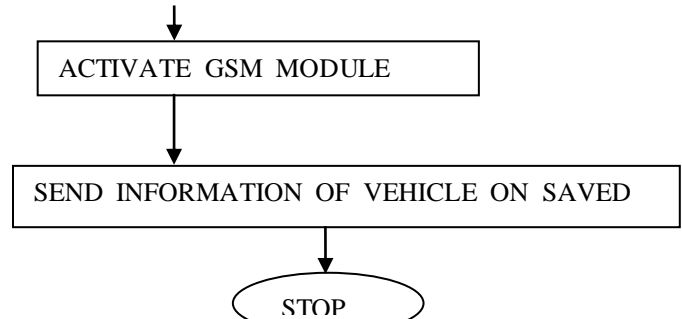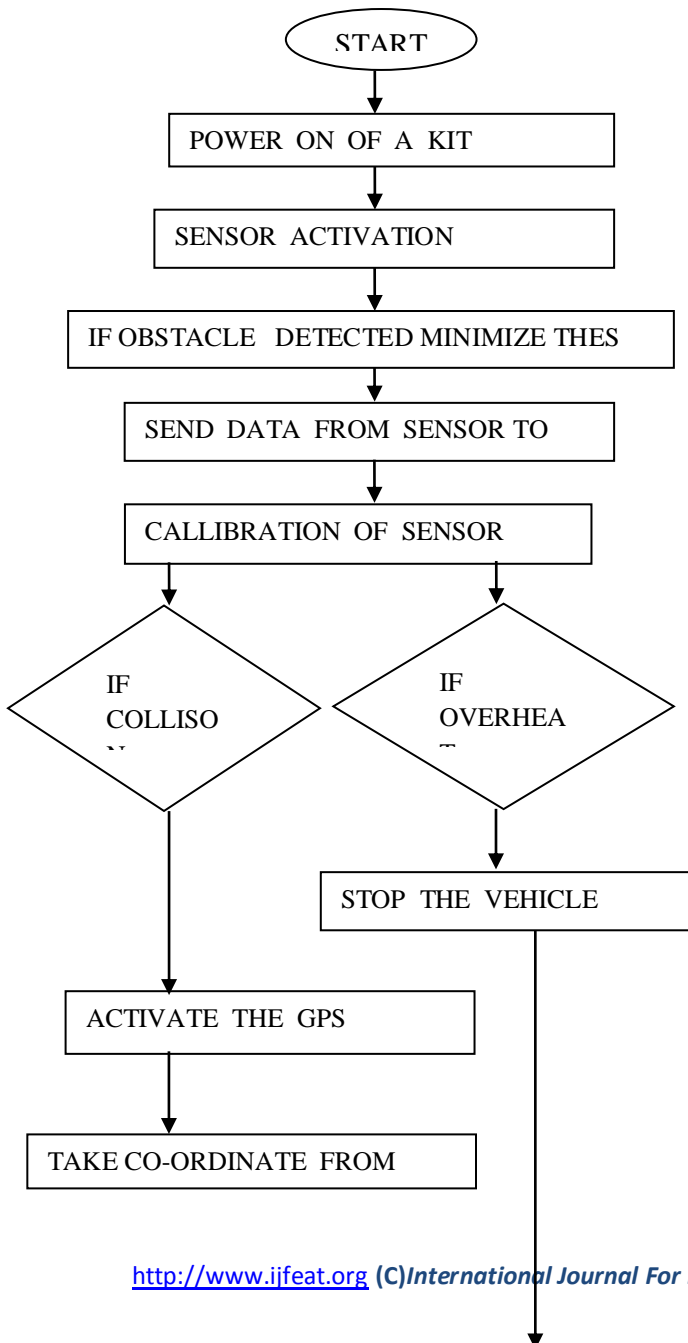
Fig-3: Power supply

3.6 MAX 232

The MAX232 is an IC, first created in 1987 by Maxim Integrated Products, that converts signals from an RS-232 serial port to signals suitable for use in TTL compatible digital logic circuits. The MAX232 is a dual driver/receiver and typically converts the RX, TX, CTS and RTS
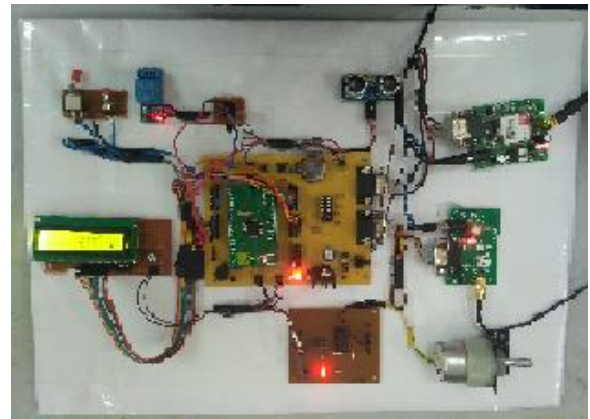
4. ALGORITHM

In the above section we have seen the detail description of indivisual block. the algorithm to implement are proposed idea can be given is below.

1. Start
2. Initialize the kit.
3. Activate the ultrasonic sensor.
4. If obstacle deteted then minimize the speed of car.
5. if engine overheated then stop the car.
6. Calibration of sensor activated when collision occur.

5. FLOWCHART

```
        ( START )
            │
   POWER ON OF A KIT
            │
   SENSOR ACTIVATION
            │
IF OBSTACLE DETECTED MINIMIZE THES
            │
  SEND DATA FROM SENSOR TO
            │
  CALLIBRATION OF SENSOR
       │           │
   IF COLLISON   IF OVERHEAT
       │           │
       │      STOP THE VEHICLE
       │           │
ACTIVATE THE GPS   │
       │
TAKE CO-ORDINATE FROM
```

```
            │
  ACTIVATE GSM MODULE
            │
SEND INFORMATION OF VEHICLE ON SAVED
            │
         ( STOP )
```

6. SNAPSHOT OF PROJECT

7.CONCLUSION

An innovative wireless system using microcontroller and GPS tracking system has been developed for vehicle accident detection and reporting. This vehicle accident detection and reporting systems provide crucial information to emergency responders in the earliest possible time. The crucial time between the accident and getting victim medical attention can often be the difference between life and death. This system provides better safety rather than no safety. In future we can interface with vehicle airbag system. This will optimize the proposed technology to the maximum extent and to deliver the best accident detection system.

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