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Implementation of Smart Black Box System for Gathering the Safety Information in Vehicles

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Abstract - *This paper presents Smart blackbox system is to collect the accident or safety information means when information is needed after an accident or crime happened, investigators or police can find possible clues by hand. A vehicle accident is one of the most important issues around the world due to the increase of traffic and also due to rash driving of the drivers. This information is helpful for to check the car status and also useful for to investigate the accident and inform to family member. Blackbox system is used to record and store vehicle location and time, temperature, obstacle present or not in real time and store the collected information in history. We can analyze, monitor the driving conditions of vehicle and accident. The objectives of the project are made zero accident level in real time all over world and if accidents occur to recover fast very short time.*

Key Words: car accident detection; temperature sensor; blackbox; web camera, Location.

1. INTRODUCTION

Used for the detection and notification real time smart blackbox system to help the reducing time and recognizing instant information when it required urgently. Aircraft data recorders on a plane, "black box" technology now plays a major role in motor vehicle accident investigation. The black box is defined as an electronic device, which is used to record and store information in particular. We used the same concept in implementing a black box in the car for help. Here the black box is used to record and store vehicle temperature, interruption values in real time and store the vehicle's driving history. We can analyze and monitor the driving conditions of the vehicle and the accident. Collect analog values collected by the sensors and convert them into a digital value to feed into the raspberry pi. The main focus of the project is made zero accident level in real time all over the globe and if accidents occur to recover fast very short time. Automatically deployed the actions required, thereby reducing the time to assist the injured person. If any car loss or steal then we find location of car using map history. Web camera continuously captured the image of front area and that image stored in memory card, send location detailed in text file through email.

2. LITERATURE SURVEY

Smart blackbox system is help to find out the cause of the accident is needed information related with those accidents and that information useful for to investigate the accident and inform to family member.

In this paper, system proposes an intelligent safety information gathering system using the widespread black box system. We add several additional functionalities to the existing ordinary blackbox system. The first functionality is analyzing and extracting the key information of the surrounding vehicles while driving. For this purpose we add the recognition engine which extracts the license plate number and color of the passing by vehicles. Secondly we add the communication engine to receive the information request from the server and upload the stored information. GPS engine is also added to record the time and driving route information, which are used to match the stored information with that requested. When the server broadcasts information of some specific time and place, our intelligent blackbox system receives that request message from the server, matches the time and place tag and then send the matching information to the server [5].

In this paper consists of a developed smartphone based accident detection and notification system. In this system, a prototype smartphone based client/server application was developed and called WreckWatch that implements a mechanism to provide accident detection and notification by using the embedded smartphone sensors and communication interfaces. The main issue related with WreckWatch system is the deactivation of the system when the speed is below speed threshold since the detection process of WreckWatch begins to recording the accelerometer information and looking for potential accidents only if the speed of the vehicle (as well as the smartphone) is greater than speed threshold and thus, this filtering will shut off the detection process in case of low speed condition and cannot detect the accident in low speed [2].

In this paper, Intelligent Vehicle Control Using Wireless Embedded System in Transportation System Based On GSM and GPS Technology is to provide security to the vehicles by engine locking system which prevents the vehicle from unauthorized access. This technique helps to find out the exact location of the accident and with the help of server an emergency vehicle can be sent to the exact location to reduce the human life loss. It also detects the behavior of the driver through sensors whether he/she is drowsy or drunk, so that occurrence of accident can be prevented. The place of the

vehicle identified using Global Positioning system (GPS) and Global system mobile communication (GSM).This is more secured, reliable and low cost[12].

In this paper, introduces a Intelligent Transport System(ITS) is introduced to identify the accident with the location which is immediately sent to the server, so that nearby hospital is found and emergency vehicle is sent to the accident zone[11].

3. OVERVIEW OF PROPOSED SYSTEM

3.1 Block Diagram

Overview of the proposed system is as shown in figure 1.

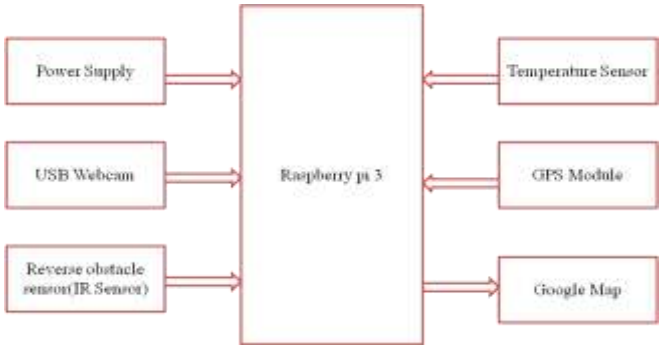

Fig -1: Overview of proposed system

In our proposed system, black box contains the Raspberry pi 3, DC motor, Temperature sensor, and Reverse obstacle sensor, GSM, USB Webcam, Power supply. It detects the engine temperature, obstacle presences check. The outputs of these parameters are displayed on the email. This collected information's along are send to the email. GPS tracking system developed in this paper helps to track the vehicle in case of an accident and enables authorities to extend immediate emergency medical service. When an accident occurs the raspberry pi already activated and starts collected the information such as temperature, the presence of obstacle check respectively from the sensors. This collected information is displayed on the screen and is sent to the user through the mail. The GPS in the mobile communication helps to know the exact location of the accident spot. By using this information police can easily know the accident spot and they get the correct proofs of the accident to provide justice.

Gps is interfacing raspberry pi through GPIO pins. Gps received the location and time of car and transmitted to the raspberry pi.USB webcam interfacing to the raspberry pi using USB port. Reverse obstacle sensor i.e. IR sensor is use for check the present obstacle. IR sensors (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 received back by the receiver (Photodiode) and the output will be made high after amplified using an op-amp link LM358.If temperature value goes abnormal, the engine temperature is the key of the control unit when some unnecessary gases get out of vehicles due to unnecessary combustion. In this paper, to obtain the vehicle engine temperature, we used LM35 as a temperature sensor. It constantly senses engine temperatures and is given to the raspberry pi. It is rated to operate over a -55 to +150°C temperature range. Location and all collected information send to the user email. If any car accident occurred or car loss then using capture images we can take action on it.

3.2 Flowchart

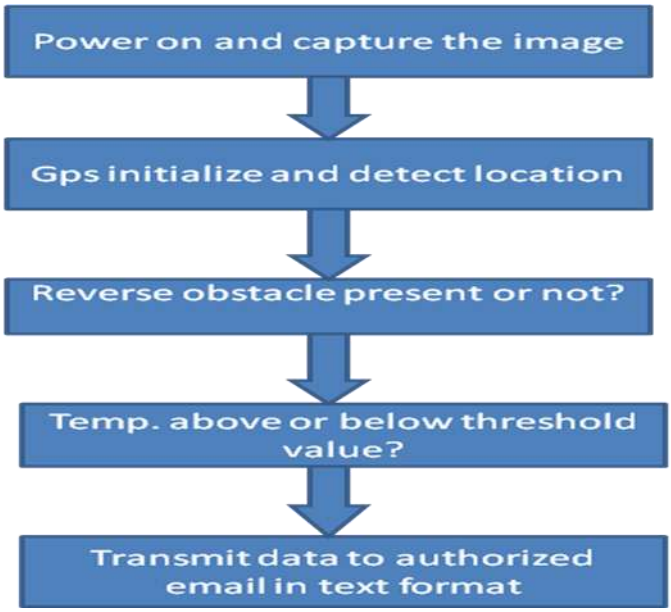

Fig -2: Flowchart of proposed system

4. EXPERIMENTAL RESULT

The paper has both software and hardware implementation. The results for both are explained in this paper.

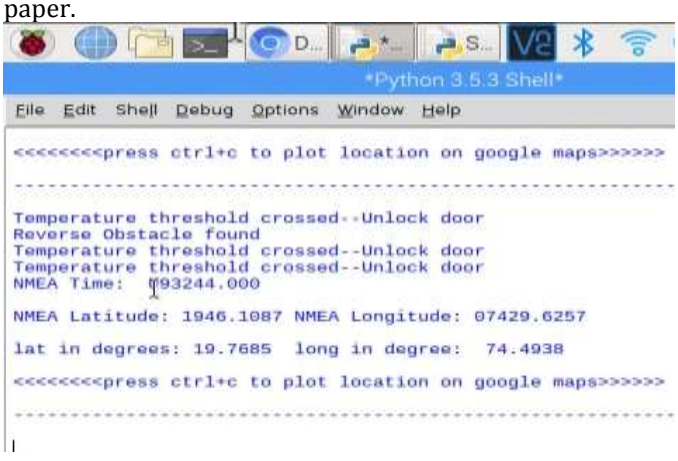

Fig -3: Output of python shell

In this project, when there is no object in front of IR sensor then the Red LED remains turned off and soon as we put something in front of IR sensor then red LED turns on and massage shows the like that reverse obstacle found. This circuit can also serve as Security Alarm Circuit. A

temperature sensor constantly senses engine temperatures and if temperature value goes above threshold value it indicates and message shows and also motor started for removing heats inside the vehicle.

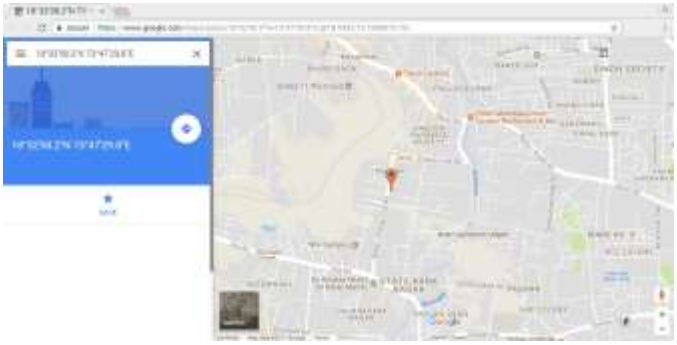

Fig -4: Location on Google Map

By using these latitude and longitude, locate the current position on Google map. Location of car shows in above fig. 4. Email received from the smart black box system. As per traveler's safety concern , the system also gives alert massage to authorized email so that authorized person also knows about their traveler's safety.

Fig -5: Snapshot of email received from smart blackbox system

5. CONCLUSION

In this paper, we proposed smart blackbox system based on safety information gathering system. We also show the simulation and implementation detailed of the proposed system. The proposed system makes good use of GPS and raspberry pi by providing safe and secure traveling to the Travelers. This is done using wrong path alert mechanism. It helps to find the current location of the vehicle. Traveler's safety mechanism is also provided using temperature, IR sensor. As per traveler's safety concern, the proposed system also gives alert massage to authorized email so that authorized person also knows about their traveler's safety.

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