Vehicle Anti-Theft Tracking and Alarming System Based on Arm 11 Raspberry PI

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ABSTRACT:

This paper presents a design of vehicle monitoring, tracking and driver safety by using GSM (Global System for Mobile Communication) , GPS(Global Positioning System) for tracking the location of vehicle position and MEMS tri accelerometer to monitor accidents. At the time of accidents if the passenger is injured, immediately with the help of wireless network and SMS (Short Message Service) will be sending to the predefined numbers to save lives. The main objective of this project is to detect the accidents of vehicle with MEMS accelerometer, detect the fire accident with smoke sensor and alert the driver through speakers if driver takes aggressive turns. If the accident is detected the processor will turned on alerts and GPS system automatically get the location details then send to registered mobile number, thus situation can be handled accordingly. The system also monitors the driver fatigue by eye blinking sensors and with the help of proposed system we can also track the vehicle by sending request SMS with authorized details.

Key Words:

MEMS accelerometer, GSM, GPS, Raspberry Pi.

1. INTRODUCTION:

Generally, the black box will be used in airplanes to record the video of plane condition and update it to the control room. This information can be used to identify the problem simply by analyzing the video accurately. Same concept can be used in four wheelers to avoid accidents. Sometimes the driver may be in drunken state or unexpected speed breakers may appear, at that time vehicles becomes uncontrollable. In the present situation there is no automatic service available, if any accidents occur either driver or passengers may lose their lives due to the delay in communication for medical help.

To overcome this problem this paper presents a new system which itself intimates precautions to the driver in terms of voice signal if it finds any aggressive steering movements. And also this system is integrated with different sensors to monitor the driver safety system records sensor details and hence can be used in case of car accident or related crime problems. The sensor records are useful for investigating vehicle related accidents or crimes. The designed system uses MEMS accelerometer, Global System for Mobile (GSM-900A) and Global Positioning System (GPS) for monitoring or identifying the vehicle easily. This system also has congestive modules of an MMA7660-accelerometer, Raspberry Pi, GSM, and GPS. If any accident occurs this wireless device will send SMS (Short Message Service) to the mobile phones regarding condition of vehicle and the family members.

2. RELATED WORK :

N.Watthanawisuth, T.Lomasand and A.Tuantranont proposed wireless vehicle tracking system using the MEMS accelerometer, GSM, and GPS for monitoring accidental vehicles. Designed system can detect accident as small or high from the accelerometer and GPS. After which short message service information will sent via GSM network. The second one detects the change of driver's physiological characteristics such as brain waves, heart rate and pulse rate. In spite of the good accuracy it causes annoyance to the driver as some additional devices must be attached to the driver's body. The Third one detects the fatigue of a driver irrespective of their facial features, Accelerometer sensor is fixed on vehicle, steering abrupt movements are monitored and also the threshold limits of acceleration are compared. If the values exceed the threshold, warning message is displayed on the LCD and audio prompts are generated to warn the driver. In this method drowsiness and rash driving is also detected. An accelerometer measures speed variations of anything that it's mounted on it.

The tri-axis accelerometers measures acceleration in three directions perpendicular to each other. The Micro Electro Mechanical Sensor (MEMS) is a high sensitive sensor which is capable of detecting the tilt is used to detect the extreme right and extreme left turns to detect the accident. In India so many traffic accidents are reported and there are no means to monitor or control the speed of vehicles running on road. The proposed system is effective in detection of rash driving and accidents location and is also use to control the vehicle speed. If the driving is reckless the designed system will detect the vibrations from the vehicle and then automatically control the vehicles speed thus keeping people in safe mode and reducing accidents. Some peoples will participate in the races on the road and suddenly at some turning position they may get confused and it may turn into an accident. This system simply identifies and then passes the information to some predefined numbers thus saving human lives within short time.

3. PROPOSED METHOD:

This proposed system has another advantage of tracking or identifying vehicles location just by sending a SMS to the authorized person. In India day to day road accidents are increasing, many times they are helpless and need someone assistant all the times which is not possible and on a long trip unexpectedly the vehicles caught in critical condition. Another condition is that the vehicle is stolen. Now days the technology is improving to overcome many problems in real time scenario to provide some artificial intelligent based human assist. For example a car had an accident the vibration detected by sensors will activate automatically and start its surveillance activities. In that vehicle if all the peoples are in active state then they will stop the surveillance activities within time otherwise the system will start capturing the vehicle position and then send the snapshot through Wi-Fi network to mail and send message to the predefined numbers. In the critical care system having a camera captures the situation of vehicle and its position to pass or send image to the vehicle owner to reach at the location to save lives. International Journal of Science, Engineering and Technology Research (IJSE-TR), Volume 3, Issue 12, December 2014 3465 ISSN: 2278 – 7798 All Rights Reserved © 2014 IJSETR Figure1 shows the architecture of the designed system monitoring. This system includes mainly four modules Raspberry Pi (ARM11), MEMS (I2C-MMA7660) accelerometer sensor, GSM-900A, Web camera, and audio speaker, Wi-Fi router (net server).

This paper present a Raspberry Pi (ARM11) is to choose the complete system control and this MEMS accelerometer sensor is used to detect or measure the vibration values are calibrated to the driver fatigue state
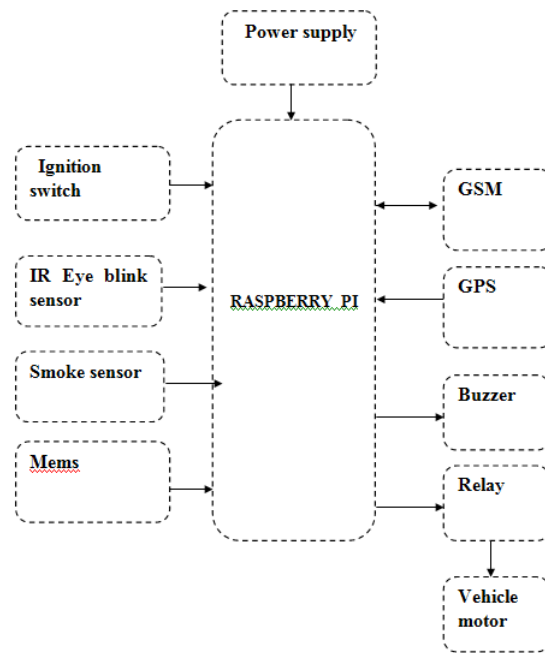
The GSM modem SIM900 will send message vehicle activity to authorized person. When the vibrations are detected by MEMS then the webcam will enable and captured car inside activity image then it will send email to the authorized peoples with the integration of Wi-Fi network server or through a message. measurement. And the speaker is used to deliver the audio prompts like warnings to the driver either drive slowly or about aggressive turns.

3.1 Block Diagram of Proposed system:

Fig2.Hard ware setup for Driver safety system

a. Raspberry Pi Processor:

Figure2 shows complete hard ware setup for Driver safety system. In this proposed driver safety system used Raspberry Pi is a credit card sized single board computer developed in UK by the Raspberry Pi foundation. This Raspberry Pi has a Broadcom BCM2835 system on chip, which includes an sARM1176JZF-S 700 MHz processor, video core IV GPU, and originally shipped with 512 megabytes of RAM. It used only SD card for booting and longtime storage.

b. GSM: GSM, which stands for Global System for Mobile communications, reigns (important) as the world's most widely used cell phone technology. Cell phones use a cell phone service carrier's GSM network by searching for cell phone towers in the nearby area. Global system for mobile communication (GSM) is a globally accepted standard for digital cellular communication.

GSM is the name of a standardization group established in 1982 to create a common European mobile telephone standard that would formulate specifications for a pan-European mobile cellular radio system operating at 900 MHZ. It is estimated that many countries outside of Europe will join the GSM partnership.

The Raspberry Pi processor reads the data from MEMS sensor continuously and depending on preset threshold limit it takes decision of action whether to take snapshot or to give warning to driver. This system uses Wi-Fi connectivity to get internet connection and to send snapshots to email. Also this system will take help of GSM module to send this accident message to some predefined number. The Raspberry Pi processor is programmed using embedded Linux.

4. FLOWCHART:
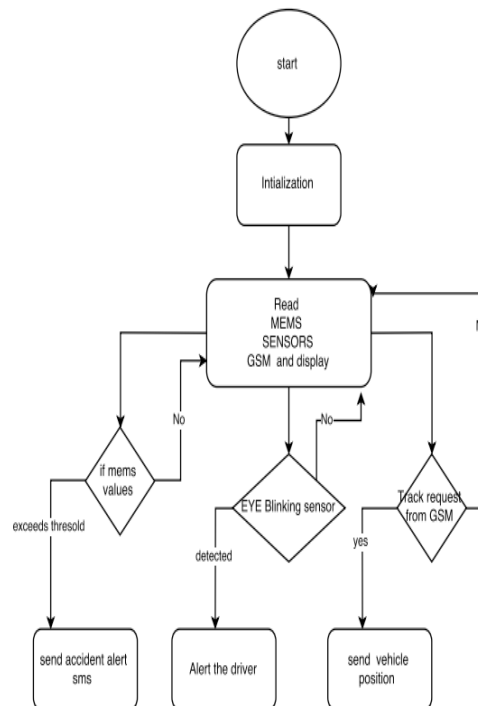
4. RESULTS:

When we designed this system into vehicle detected accelerometers values based to compare both X and Y axes value to the threshold value if the value is greater than the threshold value then send a sms to the predefined mobile number. And the system also send the sms to the authorized person whenever anyone trying to start vehicle, and also system provides the vehicle position details to authorized person on request. Here the proposed system also providing the driver safety by monitoring eye blinking and provides alert to driver. The result screen shots of the system are shown in fig.5 & 6.
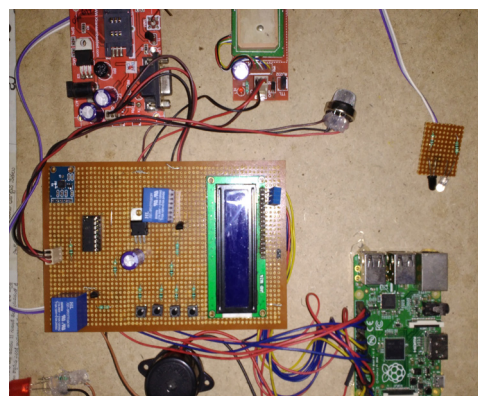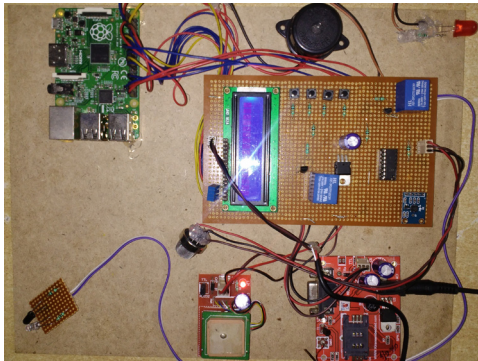

Fig5.

Fig6.

5. CONCLUSION AND FUTURE SCOPE :

This paper presents a new design of commodity hardware with cheap and it consumes very less power designed oriented product for getting information from accident location of driver drowsiness and indicating be alert to the driver to prevent the accidents. This system is designed by using Raspberry Pi (ARM11) for fast accessing to control and accelerometer for event detection. Is there any event is occurs the message sent to the authorized person so they can take immediate action to save the lives and reduce the damages. In future the system extend to send captured image email to the owner situation of vehicle and also it notice the accident types and at what time it happens. by using MEMS accelerometer, web-camera, and driving style detection by developing suitable algorithm on accelerometer data within single a system can simultaneously monitor driver activity and to provide best results.

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