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VASSIST- Vehicle Assistance System

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Abstract - *Road accidents have been and will continue to be one of the greatest health hazards. Statistically, it has been shown that the number of deaths and injuries due to road accidents has been steadily increasing in the past five years. There is one death that takes place in every four minutes due to a road accident in India. Among the vehicle categories, two wheelers accounted for the highest share in total number of road accidents, followed by cars, jeeps and other motor vehicles. Drunken driving is one of the leading causes of road fatalities. And hence road safety has become the at-most concern in the country.*

1. INTRODUCTION

Advanced driver-assistance systems, or ADAS, are systems to help the driver in the driving process. When designed with a safe human-machine interface, they should increase car safety and more generally road safety. ADAS are systems developed to automate/adapt/enhance vehicle systems for safety and better driving. Safety features are designed to avoid collisions and accidents by offering technologies that alert the driver to potential problems, or to avoid collisions by implementing safeguards and taking over control of the vehicle. Adaptive features may automate lighting, provide adaptive cruise control, automate braking, incorporate GPS/ traffic warnings, connect to smartphones, alert driver to other cars or dangers, keep the driver in the correct lane, or show what is in blind spots.

The traffic is on hike day-to-day and equally accidents are. Even Though India is a country where more number of accidents occur the aftermath of accident is what responsible for the death of people. Most of the time people remain unnoticed when an accident occurs. We thought of providing an solution by providing an device which immediately reports to the nearby hospitals and police station when an accident occurs with a little more fun in it. Therefore VASSIST is a device used to handle and ease such situations.

2. ADAS

Advanced driver-assistance systems is one of the fastest-growing segments in automotive electronics, with steadily increasing rates of adoption of industry-wide quality standards, in vehicular safety systems ISO 26262, developing technology specific standards, such as IEEE 2020 for Image Sensor quality[4] and communications protocols.

Next-generation ADAS will increasingly leverage wireless network connectivity to offer improved value by using car-to-car and car-to-infrastructure data.

There are many forms of ADAS available; some features are built into cars where as others are available as an add-on package. ADAS relies on inputs from multiple data sources, including imaging, LiDAR, radar, image processing, computer vision, and in-car networking. Additional inputs are possible from other sources separate from the primary vehicle platform.

3. POST CRASH ALERT SYSTEM

In the event of a severe crash where an airbag is deployed or the fuel pump is shut off, the post-crash system is activated. Through this system, an emergency message is initiated automatically to paired devices, the nearest emergency operator and police station. Also, through the 360° Surround View Camera System, the impact and the crash type can be ascertained. The Post-Crash Alert System architecture consists the below components:

Fig -1: Image processing

4. IMAGE ACQUISITION

Through the 360° Surround View Camera System, images are acquired using sensors mounted on the vehicle. Video capturing is enabled using onboard cameras and still pictures are captured from the video which is recorded. This system helps ascertain data such as impact velocity, crash type, whether multiple impacts were sustained and whether airbags were deployed. Such information could help emergency responders understand the severity of the incident and dispatch the most appropriate response. This technique is also used to analyse and report a detailed view of the crash.

Fig-2: Real-time Acquisition

5. CRASH ALERT- MOBILE APPLICATION

"CRASH ALERT" is a specialised mobile application that can be installed on both Android and IOS devices. CRASH ALERT acts as Post-Crash Alert System and has its own unique methodologies to help get immediate response in case of emergency. In an adverse event of an accident occurring, it alerts the nearest emergency operators (hospitals) and Police Stations using the Global Positioning System which helps get immediate assistance.

6. IMPACT ALERTNESS USING GSM

When the Post-Crash Alert System is installed on a vehicle, a specified number of mobile devices can be paired with this system by keying in the required particulars. In event of a severe crash, an emergency message is initiated automatically to paired devices, reading the fact that an accident has occurred and also with details of the exact location.

Fig-3: Intimation through GSM

7. VASSIST DEVICE

VAssist is an smart device and application for monitoring your vehicle and travelling experience. VAssist helps you to keep track of your both vehicles performance and your memories in your trips ensuring your safety and security. Think of going to a trip while you can get the route suggestion, events occurring while your location and vehicles health and saving a bunch of pictures on your trip. It ensures your safety by continuously monitoring for any occurrence of accidents and notifying the nearby hospitals based on your location.

It is an vehicle assistant system for helping drivers during a journey. Road accidents have been and will continue to be one of the greatest health hazards. Statistically, it has been shown that the number of deaths and injuries due to road accidents has been steadily increasing in the past five years. This device can detect the environment in and out of the vehicle and prevent accidents. It uses sensors like infrared sensors and camera to identify the wearing of seatbelts and driver's consciousness, and it also alerts the user when he/she is sleepy. By alerting the driver incase if he/she is drowsy, accidents can be prevented. In the event of accident the device can alert the nearby hospitals and police stations instantly and it generates accident report as well as drivers status, which can be later analyzed to prevent further similar type of accidents. In addition to that it acts as a smart assistant by interacting with driver and suggesting trip plans and events in that route. It also suggests new paths in case of any setback in current path. It is useful for all types of vehicles particularly for heavy vehicles where drivers travel mostly alone.

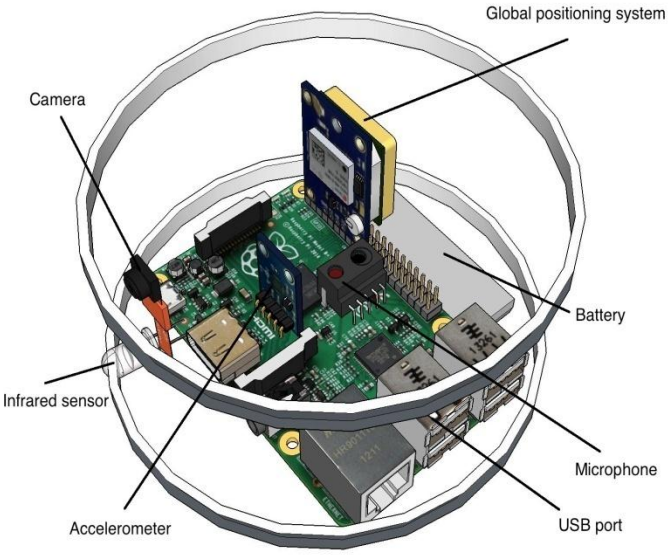

Fig-4: Engineering diagram of Instrument/ VASSIST Device

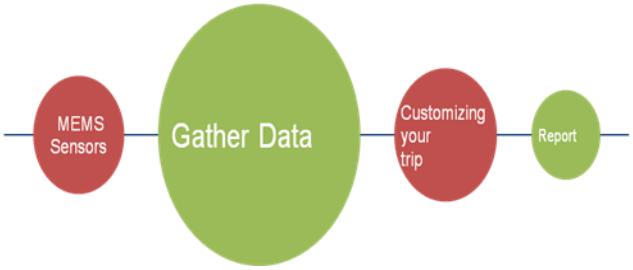

Fig-5: Processing of Data

8. OBJECTIVE OF VASSIST

The main objective of the project is to have an vehicle assistant system (VASSIST) which ensures safety of the driver and provide an joyful experience throughout their journey. It can prevent accidents by monitoring the user and suggesting for safety. When an accident occurs it analyze the situation and generates an accident report and notifies

nearest hospitals and police station instantly. It acts as a companion while travelling by suggesting places and routes based on your preference. It can give the driver full environmental awareness around him. It will be very helpful for drivers who travel alone most of the time (heavy Vehicle drivers).Since all these features are available only in luxury vehicles, our aim is to take it to the hands of ordinary people with low cost especially for truck drivers who travel alone most of the time.

9. SUB- SYSTEMS IN VASSIST DEVICE

Description of various sub-systems are as follows:

Raspberry Pi- Used for processing various data collected by the sensor in the device.

Microphone- Used for detecting sound variation during an accident

Global Positioning System - Used for getting exact location for suggesting routes and generating report.

Camera with IR- Used for monitoring the seatbelt and consciousness of the driver and also for getting status after accident.

Stereo - Used for communicating with driver.

Accelerometer- Used for detecting speed variation in vehicle.

Display - Used to display routes

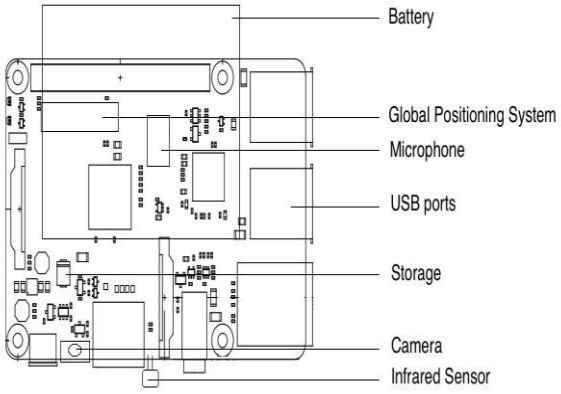

Fig-6: Circuit diagram of VASSIST

The device can be calibrated by involving it in constant testing and giving more real scenarios. We can use it in a vehicles and try to stimulate all the conditions for the device. We can use a model for testing an accident scenario and test how it works during an emergency. Standardization is achieved through constant testing under controlled lab conditions.

10. PRINTING FALSE POSITIVES IN VASSIST IS SOLVED AND PROCESSED

Since we are using ultrasonic sensors as a main component for detecting accidents. We have been working on different sound decibels in which common accident occurs to get an accurate precession. In addition to that various events like sudden acceleration decrease and airbag sensors were also taken.

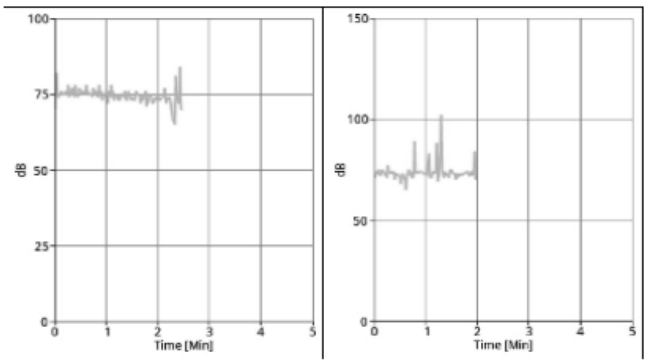

Chart-1: Detection of any false calling

Hypothesis- Benign noisy activities, such as phone drops, shouting, laughing, loud music and driving with windows down would produce insufficient noise levels to trigger accident detection. We hypothesized that none of these noises would reach the 160dB range of an air bag deployment. If this was the case, it would be possible to tune the accident detection model to more heavily rely on acoustic signatures.

11. LOCATION PREFERENCES AND WORKING

Get events and locations deatils such as weather condition and parks and images. Take Pictures and save it with the location and event and have it in your vehicle.

Image Recognition- It is taken for ensuring that the user is in consciousness. This technique is preferred because we can also use this image recognition to find the status of people inside the car after an accident and can be able to get accurate results than with infrared sensors alone.

Voice Recognition- It is used for interaction between user and the device. It is preferred because it keeps the driver less distracted while driving than using an display.

Sensor Fusion- We have used this technique so that we can ensure accurate results. Instead of depending on only one sensor to predict the result, sensor fusion enables to get results from multiple device then analyze them for an event.

GPS- We have used GPS for getting location of the vehicle and it also used for predicting vehicles speed since it is more accurate than accelerometer.

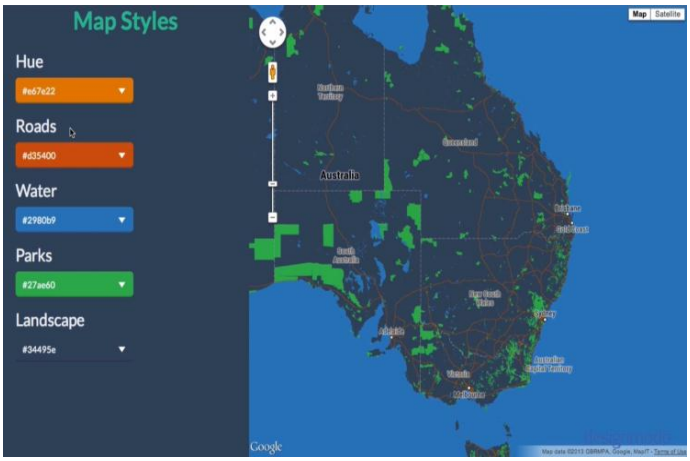

Fig-7: Location Tracking

12. CONCLUSION

Building support is a long-term process. Similarly, road safety in a country like India has and will continue to have a long history of evolutionary development and learning through experience. The happening of an accident is not in ones hands, but one can always take precautionary measures to rescue oneself.

REFERENCES

(1)"UK: AutoSens 2016 conference bring together ADAS specialists". Sense Media Group. 2016-03-01. Retrieved2016-03-01.

(2)"UK: IEEE 2020 - Automotive System Image Quality Working Group". Sense Media Group. 2016-06-08. Retrieved 2016-06-08.

(3) Karthik Elangovan and Dr. Sethukarasi. T ., Knowledge Enrichment of prediction Using Machine Learning Algorithms for Data Mining and Big Data: a Survey. Advances in Natural and Applied Sciences.

(4)Chittibabu K , Dr. Sethukarasi T, "QBSCS: Query Based Source Code Summarization" International Journal of Engineering Science and Computing, April 2016, Volume 6 Issue No. 4, pp.3398-3401

(5)Sethukkarasi, R. and Kannan, A. "An Intelligent System for Mining Temporal Rules in Clinical Databases using Fuzzy Neural Networks" , European Journal of Scientific Research ,ISSN 1450-216X ,Vol. 70, No.3, pp. 386-395, 2012.

(6)Sethukkarasi, R. and Kannan, A. "A Dynamic Temporal Neuro Fuzzy Inference System for Mining Medical Databases", Journal of Computer Science, Vol. 8, No. 11, pp.1924-1931, 2012.

(7)Keerthika, U., Sethukkarasi, R. and Kannan, A. "A Rough Set Based Fuzzy Inference System for Mining Temporal Medical Databases", International Journal on Soft Computing (IJSC) Vol. 3, No. 3, pp. 41-54, 2012.