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SAFETY INFORMATION FOR DRIVING USING REAL TIME ANALYSIS

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Abstract: As vehicle manufacturers continue to increase their emphasis on safety with advanced driver-assistance systems (ADASs), we propose a device that is not only already in abundance but portable enough as well to be one of the most effective multipurpose devices that are able to analyze and advise on safety conditions. Mobile smart phones today are equipped with numerous sensors that can help to aid in safety enhancements for drivers on the road. In this paper, we use the three-axis accelerometer of an Android-based smart phone to record and analyze various driver behaviors and external road conditions that could potentially be hazardous to the health of the driver, the neigh- boring public, and the automobile. Effective use of these data can educate a potentially dangerous driver on how to safely and efficiently operate a vehicle. With real time analysis and auditory alerts of these factors, we can increase a drivers overall awareness to maximize safety.

Keywords: Advanced driver-assistance systems (ADASs), Global Positioning System (GPS), Acidometer, Smart City, Road Conditions

1. Introduction

The causes of accident on the highway in any countries come from vehicle condition, human error, and highway physical conditions he major cause of highway traffic accidents is from driving behaviour such as excessive speeding, improper following, erratic lane changing and making improper turns, which is approximately 75 of total accident Hence there is a need of system which will detect predict accident. Use of HW and Software sensor to make our algorithm strong enough to detect driving behaviour robust with zero tolerances can be customizing the algorithm according to the drivers. The algorithm has difference of accuracy of the prediction driving events depends on sensors usage.

Using a mobile phone for these purposes creates numerous variables that must be accounted for as measurements can be misleading in certain situations. Phone location and orientation inside the car should be configured to achieve accurate measurements. Likewise, driving behaviors vary from driver to driver, and performance may be exhibited as unsafe to some while safe for others. Providing quantitative data can help define a baseline in these instances. All data recognized by the mobile is stored on the phone that the user has full control over. Any uploads are kept anonymous and used only for mapping and machine learning techniques. For the driver to recognize these safety factors, we utilize audio feedback. This feature is easily implemented using Android application programming interfaces, with specification options ranging from audio level, speech rate, and language selection. We factor in all of these ideas during our measurement analysis to provide a secure and accurate technique that is most applicable for a wide range of drivers and vehicles on the road.

2. Literature survey

- Analysis of external sensors data for vehicle performance is a large area of study.
- Some work has been done in the form of theoretical research and development in a practical design.
- The main ideas of our work focus on mapping anomalies of a road's surface and classifying different driving behaviors

3. Research Elaborations

The vehicle can obtain nearby road conditions information via the data shared by nearby vehicles. As a result, the drives can change their driving behaviors for improving driving safety, comfort and efficiency. A Road conditions detection system appeared in the literature and also provides the areas which can be further modified to develop a more robust system.

While in some cases uses Raspberry pi hardware where there No integration with google map and less practical in experimental setup, Analyses the road and can upload this information of that road on central server so every application user can use this information during travelling.

In some cases use of smart phone and server to map road conditions. Algorithm suggested. Only for bumps and potholes detection while in that Image processing techniques is used to detect potholes and it Need of good camera to capture images and it's not real time. No Voice output is recognized in this paper and recognizes only potholes for automated assessment.

The image measurements are compared with the traditional measurements. It shows that image measurements are close to those obtained by using the traditional methods.

As doing the study of these reference papers we get to know that we have to use a system which is user friendly for user, which have a good GUI, and most important it will overcome all these issues and provide all real time data to users.

4. Result and Discussion

The device used was an Android-based smart phone: Nexus One. This HTC/Google phone made it relatively easy to acquire data to be thoroughly analyzed. Given its mobility and rise in popularity the past few years, a smart phone based measuring device makes these findings unique and applicable for future implementations. The phone contains a Bosch BMA150 three-axis accelerometer that is capable of detecting multiple motions triggered by a vehicle. It has a sensitivity range of 2g/4g/8g with a max axial refresh rate of 3300Hz.

The limitations of the refresh rate and software integration yield a usable refresh rate around 2530 Hz. Motions captured by the phone can be induced by a number of occurrences. For example, acceleration, braking, un- even road conditions, or any degree of change in direction performed by the automobile such as lane changes can be numerically distinguishable. Fig. 1 shows the Nexus One and its relevant axes. If any movement is detected, it is numerically analyzed and expressed in these directions. Different driving maneuvers are found and differentiated by using each individual axis of the accelerometer. Table I refers to each axis of the accelerometer of the phone, as well as the direction and relevant driving maneuver performed.

Examples of possible causes of these axial movements are shown, such as movement in the y-axis, which may signify a sudden change in acceleration or a jerk experienced when shifting gears. We test the accuracy of the device by experimental comparison of calculated data and observed data recorded by the phone. For the test, we utilized dynamics equations such as centripetal acceleration and compared that with the measurements recorded by the Nexus One. Comparison results show the accelerometer to be very accurate and sensitive at 25 Hz, making it a reliable device to be used in these manners. This experiment was performed multiple times for different time lengths, conveying similar results each time. To compensate for any initial existing error in the sensor, we have implemented a high-pass frequency filter and a sensor reset mechanism every 20 ms. This combination has proven to be effective for utilizing mobile phone sensors in a vehicle environment(fig 1).

Fig 1 Three-axis diagram of the accelerometer.

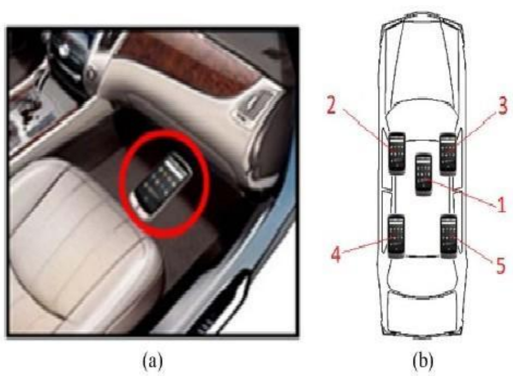

Fig 2. Phone placement locations in a vehicle.

Orientation and Location of Phone:

The orientation of the phone is a variable that may be constantly changing with the movement of the vehicle, and so might be arbitrarily placed inside the vehicle when the driver enters. The phones orientation for each experiment remained the same, with the y-axis pointing toward the front of the vehicle and the screen (z-axis) facing the roof. A holster that was provided with the phone was used along with Velcro to secure the phone to the vehicles surface. To obtain appropriate data, the phone was tested in multiple locations for each experiment before a final decision was declared. These lo- cations are shown in Fig. 2(b) as locations 15. The specific surface used was dependent on which experiment was being performed. For the road condition analysis, it was firmly secured to the floorboard of the front passenger section shown in Fig. 2(a). For analyzing driver behavior, the phone was fastened on the center console, i.e., loc. 1 in Fig. 2(b). The driving behavior experiments each had a time duration of less than 2 min, which incorporated multiple maneuvers, whereas road condition measurements varied, lasting for the length of the road being measured.2(a) Vehicle floorboard with the y-axis parallel to the forward motion of the vehicle used for road anomaly identification. 2(b) Locations in which the phone was tested to measure driving maneuvers.

We utilized the x-axis and y-axis data from the accelerometer to measure the driver's direct control of the vehicle as they steer, accelerate, and apply the brakes. With the phone located on the center console, we recorded driving behaviors of acceleration and deceleration under safe and extreme conditions from all the vehicles. To detect lateral movements or lane changes performed by the driver, we look at the x-axis of the accelerometer. Using the previous phone orientation from the acceleration/deceleration patterns, it is possible to recognize lateral movements created by an automobile and differentiate a left-lane change from a right-lane change.

Scope Of The Project:

- Client server application:
- We identify
  - Potholes
  - Bumps
  - Rough surface
  - Uneven
  - smooth roads

  using multiple axes of the accelerometer

CONCLUSIONS

Using a mobile smart phone, we have demonstrated some innovative applications that are integrated inside an automobile to evaluate a vehicles condition, such as gear shifts and overall road conditions, including bumps, potholes, rough road, uneven road, and smooth road. Our road classification system resulted in high accuracy, making it possible to conclude on the state of a particular road. Along with these findings, an analysis of a driver behavior for safe and sudden maneuvers, such as vehicle accelerations and lane changes, has been identified, which can advise drivers who are unaware of the risks they are potentially creating for themselves and neighboring vehicles.

The direction of lane change, as well as safe acceleration, compared with sudden acceleration, was easily distinguishable. Using a multiple-axis classification method for bumps increased the bump and pothole classification accuracy, resulting in a better road anomaly detection system. Being fueled by demand, future advancements in embedded hardware will yield the smartphone and its sensors to be more powerful devices in terms of processing, sensitivity, and accuracy, paving the way for many more innovative applications. Unlocking its potential in intelligent 0transportation systems seems only logical as there are conceivably numerous of applications that can help reduce safety concerns on the road.

References

[1] Md.Mahmud Hasan, Beibut Amirgaliyev,Dastan Rakhatov,Almas Tuyakbev and Chingiz Kenshimov "Real time road mapping for the driving safety purposes",IEEE, 2015

[2] G. Chugh, D. Bansal and S. Sofat. "Road Condition Detection Using Smartphone Sensors: A Survey", International Journal of Electronic and Electrical Engineering, 2014 .

[3] R. Bhoraskar, N. Vankadhara, B. Raman and P. Kulkarni."Wolverine: Trac and road condition estimation using smartphone sensors",Proc. of the 2012 COMSNETS, pp.1-6.

[4] V. Douangphachanh and H. Oneyama. "A Study on the Use of Smart- phones for Road Roughness Condition Estimation",Proc. of the Eastern Asia Society for Transportation Studies, vol. 9.

[5] A. Ghose, P. Biswas, C. Bhaumik, M. Sharma, A. Pal and A. Jha. "Road condition monitoring and alert application: Using in-vehicle Smartphone as Internet-connected sensor", Proc. of the 2012 IEEE PERCOM Workshops,pp. 489-491.

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