Scientific Journal of Impact Factor (SJIF): 4.72

e-ISSN (O): 2348-4470
p-ISSN (P): 2348-6406

International Journal of Advance Engineering and Research Development

Volume 4, Issue 10, October -2017

Survey on Detection and Identification of Abnormal Driving Behaviors

[1]Upendra Borkar, [2]Pooja Mhetre, [3]Pooja Pawar, [4]Rohit Patil, [5]Umesh Thakare

[1,2,3,4] *BE, Student, SKNSITS Lonavala, Pune, Maharashtra, India*
[5]*Professor, Guide, SKNSITS Lonavala, Pune, Maharashtra, India*

Abstract — *Real-time abnormal driving behaviors monitoring is a corner stone to improving driving safety. Existing works on driving behaviors monitoring using smart phones only provide a coarse-grained result, i.e. distinguishing abnormal driving behaviors from normal ones. To improve drivers' awareness of their driving habits so as to prevent potential car accidents, we need to consider a fine-grained monitoring approach, which not only detects abnormal driving behaviors but also identifies specific types of abnormal driving behaviors, i.e. Weaving, Swerving, Side slipping, Fast U-turn, Turning with a wide radius and Sudden braking. Through empirical studies of the 6-month driving traces collected from real driving environments, we find that all of the six types of driving behaviors have their unique patterns on acceleration and orientation. Recognizing this observation, we further propose a fine-grained abnormal Driving behavior Detection and identification system to perform real-time high-accurate abnormal driving behaviors monitoring using smart phone sensors. We extract effective features to capture the patterns of abnormal driving behaviors [2]. After that, two machine learning methods, rash driving, or officially driving under the Influence (DUI) of alcohol, is a major cause of traffic accidents throughout the world. In this, we propose a highly efficient system aimed at early detection and alert of dangerous vehicle maneuvers typically related to rash driving. The whole solution requires only a mobile placed in vehicle and with accelerometer sensor. A program installed on the mobile automatically computes accelerations based on sensor readings, and compares them with typical rash driving patterns extracted from real driving tests. Once any evidence of rash driving is present, the mobile phone will automatically alert the driver or sends a message to predefined number in application for help well before accident actually happens.*

Keywords- *Sensing, Smartphone, IMU, Data, Behavior, Insurance, SenSpeed, VANET.*

I. INTRODUCTION

According to the statistics from World Health Organization (WHO), traffic accidents have become one of the top 10leading causes of death in the world. Specifically, traffic accidents claimed nearly 3500 lives each day in 2014.Studies show that most traffic accidents are caused by human factors, e.g. drivers' abnormal driving behaviors [7]. Therefore, it is necessary to detect drivers' abnormal driving behaviors to inform the drivers or report Transportation authority to record them. Although there has been works on abnormal driving behaviors detection, the focus is on detecting driver's status based on pre-deployed infrastructure, such as alcohol sensor, infrared sensor and cameras, which incur high installation cost. Since smart phones have received increasing popularity over the recent years and blended into our daily lives, more and more smartphone-based vehicular applications are developed in Intelligent Transportation System [3]. Driving behavior analysis is also a popular direction of smartphone-based vehicular applications. However, existing works on driving behaviors detection using smartphones can only provide a coarse-grained result using thresholds, i.e. distinguishing abnormal driving behaviors from normal ones. Since thresholds may be affected by car type and sensors' sensitivity they can't accurately distinguish the differences in various driving behavioral patterns. Those solutions cannot provide fine-grained identification, i.e. identifying specific types of driving behaviors. Moving along this direction, we need to consider a fine grained abnormal driving behaviors monitoring approach, which uses smart phone sensors to not only detect abnormal driving behaviors but also identify specific types of the driving behaviors without requiring any additional hardware's. The fine-grained abnormal driving behaviors monitoring is able to improve drivers' awareness of their driving habits as most of the drivers are over-confident and not aware of their reckless driving habits. Additionally, some abnormal driving behaviors are unapparent and easy to be ignored by drivers. If we can identify drivers' abnormal driving behaviors automatically, the drivers can be aware of their bad driving habits, so that they can correct them, helping to prevent potential car accidents. Furthermore, if the results of the monitoring could be passed back to a central server, they could be used by the police to detect rash-driving automatically or Vehicle Insurance Company to analyze the policyholders' driving habits.

II. LITERATURE SURVEY

According to literature survey after studying different IEEE paper, collected some related papers and documents some of the point discussed here:

1. Mobile Phone Based Rash Driving Detection[9] :

Author: Jiangpeng Dai, Jin Teng, Xiaole Bai, Zhaohui Shen,and Dong Xuan

Description: Drunk driving, or formally driving under the Influence (DUI) of alcohol, may be a major reason for traffic accidents throughout the planet. During this paper, we have a tendency to propose a extremely economical system geared toward early detection and alert of dangerous vehicle maneuvers generally associated with drunk driving. The complete resolution needs solely a portable placed in vehicle and with measuring device and orientation device. A program put in on the portable computers accelerations supported device readings, and compares them with typical drunk driving patterns extracted from real driving tests. Once any proof of drunk driving is gift, the portable can mechanically alert the driving force or decision the police for facilitate well before accident really happens. We have a tendency to implement the detection system on humanoid G1 phone and have it tested with totally different sorts of driving behaviors. The results show that the system achieves high accuracy and energy potency.

2. Context Aware Driver Behaviour Detection System in Intelligent Transportation Systems (ITS)[4] :

Authors: Saif Al-Sultan, Ali H. Al-Bayatti and Hussien Zedan

Description: Vehicle accidental Networks (VANET) emerged as Associate in Nursing application of Mobile accidental Networks (MANET), that use Dedicated Short range Communication (DSRC) to permit vehicles in shut proximity to speak with one another, or to speak with edge instrumentation. Applying wireless access technology in conveyance environments has LED to the development of road safety and a discount within the range of fatalities caused by road accidents, through the event of road safety applications and facilitating info sharing between moving vehicles relating to the road. This paper focuses on developing a completely unique and non-intrusive driver behavior noticeion system employing a context-aware system in VANET to detect abnormal behaviors exhibited by drivers, and to warn alternative vehicles on the road thus on stop accidents from happening. A five-layer context- aware design is planned that is ready to gather discourse data regarding the driving setting, perform reasoning regarding sure and unsure discourse data and react upon that data. A probabilistic model supported Dynamic Bayesian Networks (DBN) for real time inferring four sorts of driving behavior (normal, drunk, reckless and fatigue) by combining discourse data regarding the driving force, vehicle and therefore the setting is conferred. The dynamic behavior model will capture the static and therefore the temporal aspects associated with the behavior of the driving force, thus, resulting in strong and correct behavior detection. The analysis of behavior detection victimization artificial knowledge proves the validity of our model and therefore the importance of as well as discourse data regarding the driving force, the vehicle and therefore the setting

3. SenSpeed: Sensing Driving Conditions to Estimate Vehicle Speed in Urban Environments[7]

Authors: Haofu Han, Jiadi Yu, Hongzi Zhu , Yingying Chen , Jie Yang, Yanmin Zhu, Guangtao Xue and Minglu Li

Description: Acquiring instant vehicle speed is fascinating and a corner stone to several necessary transport applications. This paper utilizes good phone sensors to estimate the vehicle speed, particularly once GPS is out of stock or inaccurate in urban environments. Specifically, we have a tendency to estimate the vehicle speed by group action the accelerometer's readings over time and notice the acceleration errors will cause massive deviations between the calculable speed and therefore the real one. Any analysis shows that the changes of acceleration errors square measure terribly tiny over time which might be corrected at some points, referred to as reference points, wherever actuality vehicle speed is understood. Recognizing this observation, we have a tendency to propose associate correct vehicle speed estimation system, SenSpeed, that senses natural driving conditions in urban environments as well as creating turns stopping and spending through uneven road surfaces, to derive reference points and any eliminates the speed estimation deviations caused by acceleration errors.

4. Driving Behavior Analysis with Smart phones: Insights from a Controlled Field Study[5] :

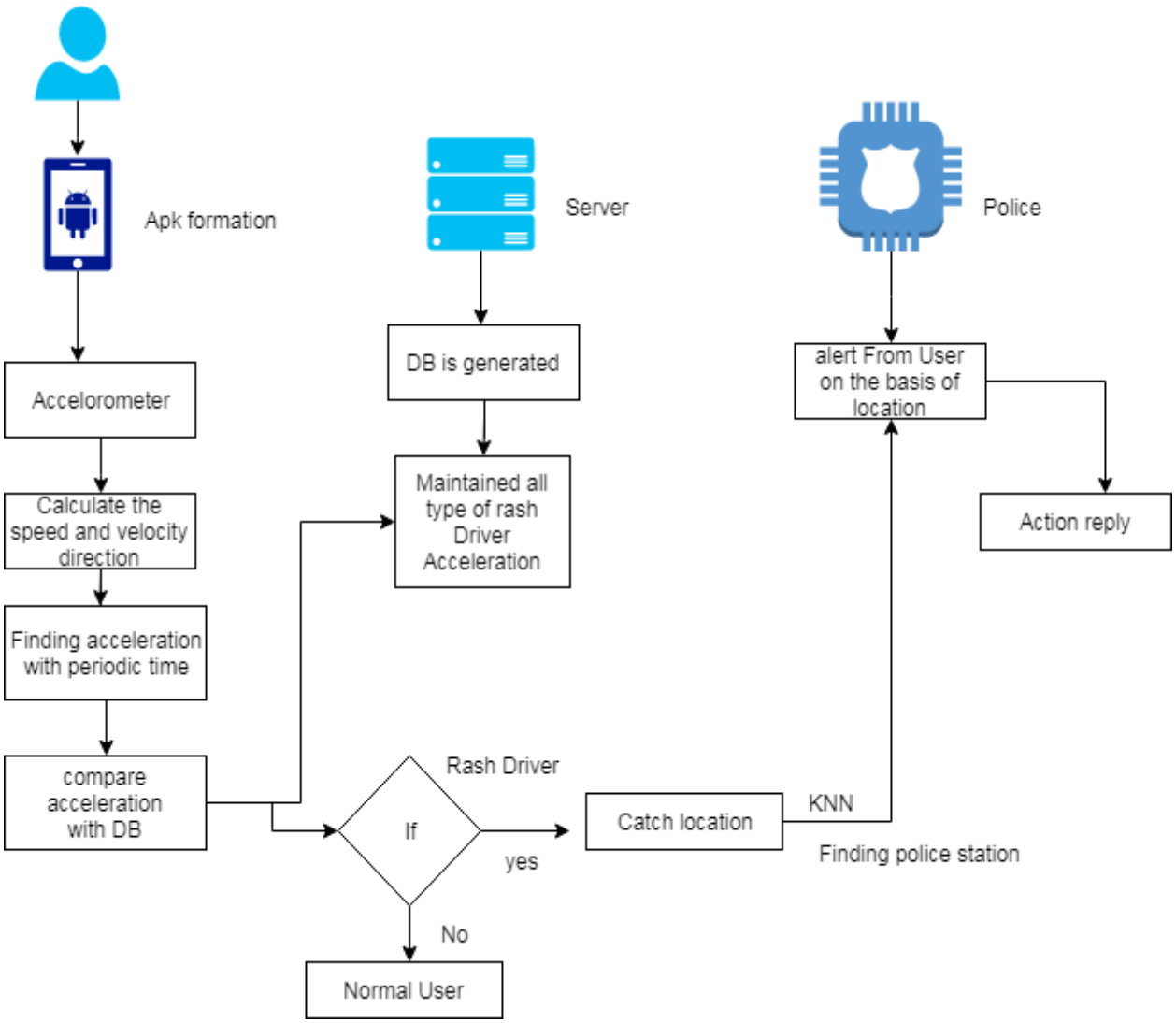
Author: Johannes Paefgen, Flavius Kehr, Yudan Zhai, Florian Michahelles.

Description: We measure a mobile application that assesses driving behavior supported in vehicle acceleration measurements and offers corresponding feedback to drivers. Within the insurance business, such applications have recently gained traction as a viable various to the watching of drivers via "black boxes" put in in vehicles, which lacks interaction opportunities and is perceived as privacy intrusive by policy holders. However, cause uncertainty and different Noise causing factors build good phones probably less reliable as sensing element platforms. we have a tendency to so compare important driving events generated by a Smartphone with reference measurements from a vehicle mounted foreign terrorist organization in a very controlled field study. The study was designed to capture driver variability below universe conditions, whereas minimizing the influence of external factors. We discover that the mobile measurements tend to overestimate important driving events, probably because of deviation from the tag initial device cause. Whereas weather and daytime don't seem to influence event counts, road sort could be a vital issue that's not thought-about in most current state of-the art implementations

III. PROPOSED SYSTEM

We proposing system to detect the rash driving if someone detected as rash driver then system will notify to nearest police station about driver. We are going to use accelerometer to get the reading. Accelerometer provides value of X, Y, Z as per the motion of mobile. According to reading we are going to classify the driver is rash driver or not.

IV. SYSTEM DESIGN



System design contains the Android application which should enable the **Car Mode** so that the accelerometer sensor can sense the velocity and help to detect whether the vehicle is in normal mode or rash mode. For that, ideal entries are stored in the database. Current entries will be compared with ideal database. If it is found that the current entry is matching with the ideal entries then the result will be generated. Then the particular entry will be send to the nearest Police Station and to the user also so that it can be helpful for him to slow down the vehicle.

V. ADVANTAGES

- Our system is built on fully automated system
- Uses the accelerometer sensors from Android mobile to match the rash driving and drive pattern.
- Automatically sends a message for Help.
- Displays on the Screen a message.

VI. CONCLUSION

In this paper, we present a highly efficient mobile based rash driving detection system. The mobile phone, which is placed in the vehicle, collects and analyzes the data from its accelerometer sensors to detect any abnormal or dangerous driving maneuvers typically related to driving under alcohol influence and sends a message for help. We address the problem of performing abnormal driving behaviors detection (coarse-grained) and identification (fine-grained) to improve driving safety. In particular, we propose a system, to detect and identify specific types of abnormal driving behaviors by sensing the vehicle's acceleration and orientation using Smartphone sensors. Compared with existing abnormal driving detection systems, not only implements coarse-grained detections but also conducts fine-grained identifications

REFRENCES

[1] Jiadi Yu,Zhongyang Chen, Yanmin Zhu, Yingying Chen, Linghe Kong and Minglu Li, "Fine-grained Abnormal Driving Behaviors Detection and Identification with Smartphones", DOI 10.1109/TMC.2016.2618873, IEEE , 2016.
[2] C. Saiprasert and W. Pattara-Atikom, "Smartphone enabled danger- ous driving report system," in Proc. HICSS, 2013, pp. 1231–1237.
[3] M. V. Yeo, X. Li, K. Shen, and E. P. Wilder-Smith, "Can svm be used for automatic eeg detection of drowsiness during car driving?" Elsevier Safety Science vol. 47, pp. 115–124, 2009.
[4] S. Al-Sultan, A. H.Al-Bayatti, and H. Zedan, "Context-aware driver behavior detection system in intelligent transportaion system," IEEE Trans. on Vehicular Technology, vol. 62, pp. 4264–4275, 2013.
[5] J. Paefgen, F. Kehr, Y. Zhai, and F. Michahelles, "Driving behavior analysis with smartphones: insights from a controlled field study."
[6] Y. Wang, J. Yang, H. Liu, Y. Chen, M. Gruteser, and R. P. Martin, "Sensing vehicle dynamics for determining driver phone use," in Proc. ACM MobiSys, 2013.
[7] H. Han, J. Yu, H. Zhu, Y. Chen, J. Yang, Y. Zhu, G. Xue, and M. Li, "Senspeed: Sensing driving conditions to estimate vehicle speed in urban environments," inProc. IEEE INFOCOM , 2014.
[8] S. Reddy, M. Mun, J. Burke, D. Estrin, M. Hansen, and M. Sri-vastava, "Using mobile phones to determine transportation modes,"ACM Trans. on Sensor Networks vol. 6, no. 13, 2010.
[9] J. Dai, J. Teng, X. Bai, and Z. Shen, "Mobile phone based drunkdriving detection," in Proc. PervasiveHealth, 2010, pp. 1–8.
[10] M. Fazeen, B. Gozick, R. Dantu, M. Bhukuiya, and M. C.Gonzalez, "Safe driving using mobile phones," IEEE Trans. on Intelligent Transportation Systems vol. 13, pp. 1462–1468, 2012.
[11] U.S.NHTSA. The visual detection of dwi motorists. [Online]. Available: http:// www.shippd.org/Alcohol / dwibooklet.pdf
[12] D. Lee, S. Oh, S. Heo, and M. Hahn, "Drowsy driving detectionbased on the driver's head movement using infrared sensors," in Proc. IEEE ISUC , 2008, pp. 231–236.
[13] M. Kaneda, H. Obara, and T. Nasu, "Adaptability to ambient light changes for drowsy driving detection using image processing," in JSAE Review , 1999, pp. 133–136.

