International Journal of Research in Advent Technology (IJRAT) Special Issue
E-ISSN: 2321-9637
Available online at www.ijrat.org
National Conference on "Role of Information Technology in Social Innovations"
26th & 27th February 2019

Non-Intrusive Texting-while-Driving and Rash Driving Detection Using Smartphones

Mrs.Amita Jajoo[1], Piyush Bhalerao[2], Sumant Kumar[3], Rajkumar Ingale[4], Kiran Thorat[5]
[1]Assistant Professor
[2,3,4,5]Dept. Information Technology ,DYPCOE

Abstract — Texting while driving, also called texting and driving, is the act of composing, sending, reading text messages, email, or making similar use of the web on a mobile phone while operating a motor vehicle. We propose a method which is able to detect T&D automatically without using any extra devices. The idea is very simple: when a user is composing messages, the smartphone embedded sensors (i.e. gyroscopes, accelerometers, and GPS) collect the associated information and according reading system detect weather user is texting while driving. 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. In this, we propose a highly efficient system aimed at early detection and alert of dangerous vehicle maneuvers typically related to rash driving. The entire solution requires only a mobile phone placed in vehicle and with accelerometer sensor.

1. INTRODUCTION

primary task of driving. These types of activities include the usage of a mobile phone, eating and drinking, conversation with co-passengers, self-grooming, reading or watching videos, adjusting the radio or music player and even using a GPS system for navigating locations. Amongst these, mobile phone usage is said to be the most distracting factor.

2. LITERATURE SURVEY

A. *Sensing Vehicle Dynamics For Determining Driver Phone Use*

This paper utilizes smartphone sensing of vehicle dynamics to determine driver phone use, which can facilitate many traffic safety applications. Our system uses embedded sensors in smartphones, i.e., accelerometers and gyroscopes, to capture differences in cen- tripetal acceleration due to vehicle dynamics. These differences combined with angular speed can determine whether the phone is on the left or right side of the vehicle. Our low infrastructure approach is flexible with different turn sizes and driving speeds. Extensive experiments conducted with two vehicles in two different cities demonstrate that our system is robust to real driving environments. Despite noisy sensor readings from smartphones, our approach can achieve a classification accuracy of over 90% with a false positive rate of a few percent. We also find that by combining sensing results in a few turns, we can achieve better accuracy (e.g.95%) with a lower false positive rate.

Emerging as one of the top causes of death among the most productive age groups, road crashes have developed into a major public health crisis across the world. According to the World Health Organization (WHO), road crashes kill 1.2 million people and permanently disable another 50 million every year. Over the last decade, road crash has become the tenth leading cause of death in the world and is predicted to rise to the fifth position by 2030. India is the number one contributor to global road crash mortality and morbidity figures. Every hour, 16 lives are lost to road crashes in India. In the last decade alone, India lost 1.3 million people to road crashes and another 5.3 million were disabled for life. The WHO categorizes driver distraction as an important risk factor for road crash injuries. The United States Department of Transportation terms distracted driving as one of the most dangerous driver behaviors and an epidemic which has increased with the proliferation of mobile phones. Distracted driving is defined as any activity that diverts a person's attention from their

B. *The Effect Of Cellular Phone Use Upon Driver Attention*

In this study, 150 subjects observed a 25-minute video driving sequence containing45 highway traffic

E-ISSN: 2321-9637
Available online at www.ijrat.org
National Conference on "Role of Information Technology in Social Innovations"
26th & 27th February 2019

situations to which they were expected to respond by manipulation of simulated vehicle controls. Each situation occurred under five conditions of distraction: placing a cellular phone call, carrying on a casual cellular phone conversation, carrying on an intense cellular phone conversation, tuning a radio, and no distraction. All of the distractions led to significant increases in the proportion of situations to which subjects failed to respond. However,significant age differences of nonresponse appeared Among subjects over age 50, nonresponses increased by about one-third under all of the telephone distractions. The response rate of younger subjects increased by a lesser degree except under intense conversation. Results were not influenced by gender or prior experience with cellular phones. The authors conclude that older drivers might reduce their accident risk during attention-demanding traffic conditions by avoiding use of cellular phones and that other drivers might do so by refraining from calls involving intense conversation.

C. Detecting Drivers Using Personal Smart Phones by Leveraging Inertial Sensors

This paper addressed a fundamental and critical task of detecting the behavior of driving and texting using smartphones carried by users. It propose, design, and implement TEXIVE that leverages various sensors integrated in the smartphone and realizes our goal of distinguishing drivers and passengers and detecting texting using rich user micromovements and irregularities that can be detected by sensors in the phone before and during driving and texting. Without relying on external infrastructure, TEXIVE has an advantage of being readily implemented and adopted, while at the same time raising a number of challenges that need to be carefully addressed for achieving a successful detection with good sensitivity, specificity, accuracy, and precision.

3. FUTURE SCOPE

1. The data from sensors can also used to detect rash driving and report it to the nearest police station hence reducing road accidents.

2. By extracting data from the smartphone's inbuilt sensors we can develop a system which can detect distracted driving behaviors like texting-while-driving and prevent it without the need of additional external sensors.

3. The data can also be used in data mining to determine road conditions.

A. Proposed System

The existing systems, once activated, blindly block all the messages. Existing works on driving behaviors monitoring using smartphones only provide a coarse-grained result. Previous system uses infrared sensors monitoring the driver's head movement to detect drowsy driving. Captures the driver's facial images using a camera to detect whether the driver is drowsy driving by image processing. GPS, cameras, alcohol sensor and accelerometer sensor are used to detect driver's status of rash, fatigued, or reckless. However, the solutions all rely on pre-deployed infrastructures and additional hardware's that incur installation cost. We propose a system which uses only the embedded sensors in the smartphone.

B. System Architecture

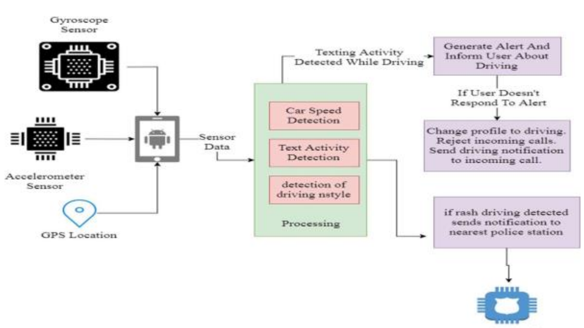

Figure : System Architecture of Proposed System

4. SYSTEM SPECIFICATION

Hardware Requirements

Processor	: Intel i3 Processor
Speed	: 1.1 GHz.
Hard Disk	: 40 Gb.
Monitor	:15VGA Colour.
Mouse	: Logitech.
Ram	: 4 Gb.

Software Requirements:

Operating system	: Windows 7.
Front End	: Java
Database	: SQLite
IDE	: Android Studio
Programming Language	: Java, Android.

5. PROPOSED SYSTEM

Propose system detect Texting-while-Driving automatically without using any extra devices.It will also be able to detect the rash driving. If someone is detected as a rash driver then system will notify to nearest police station. The idea is very simple: when a user is composing messages, the smartphone embedded sensors (i.e. gyroscopes, accelerometers, and GPS) collect the associated information and according to their reading the system detect weather user is texting while driving. If user is texting-while-driving then system will alert to user. Accelerometer provide value of X, Y, Z as per the motion of mobile. According to reading we are going to classify the driver is rash or not.

A. Mathematical Model

Let S be the Whole system which consist:

S = {IP, Pro, OP}

Where,

A. IP is the input of the system.

B. Pro is the procedure applied to the system to process the given input.

C. OP is the output of the system.

INPUT:

IP = {UR, UL, UEL, PM}

Where,

1. UR is user registration.
2. UL is user login.
3. UEL is emergency numbers which the users don't want to miss.

4. PM is a popup message when user gets and to reply/perform action on it.

PROCESS:

Pro = {CUI, CUD,
RP} Where,

1. CUI is to check login detail of the user.

2. CUD is to check whether the user is driving the vehicle. If user is driving the vehicle he/she will get the popup message.
3. RP is when user is driving he/she will get a popup message and depend on user he/she can reply/perform action on it. After it driving mode will be activated, phone will be in silent mode and incoming calls are rejected.

OUTPUT:

OP = {DM,
EC} Where,

1. DM is driving mode is activated. Phone gets in silent mode.

2. EC is when a number is calling more than 3 times automatically it will treated as emergency call and phone will ring.

ACKNOWLEDGMENT

We have taken efforts in this project; however, it would not have been possible without the kind support and help of many individuals and organizations. We would like to extend our sincere thanks to all of them. We are highly indebted to Mrs. Amita Jajoo for her guidance and constant supervision as well as for providing necessary information regarding the project & also for her support in completing the project. We would like to express our gratitude towards our parents & our Head of I.T. Department Dr. Preeti Patil for their kind co-operation and encouragement which helped us in completion of this project. Furthermore, I would also like to acknowledge with much appreciation the crucial role of the staff of DYPCOE Akurdi, who gave the permission to use all required equipment and the necessary materials to complete my project stage I. We are also deeply grateful to the Principal of DYPCOE, Dr. Vijay Wadhai and my parents for their financial and logistical support and for

providing necessary guidance concerning project's implementation.

REFERENCES

[1] Cheng Bo, Xuesi Jian, Taeho Jung, Junze Han, Xiang-Yang Li, Xufei Mao and Yu Wang. " Detecting Driver's Smartphone Usage via Non-intrusively Sensing Driving Dynamics", IEEE Internet of Things Journal, vol. 4, no. 2, 340-350, April 2107

[2] Xuefeng Liu, Jiannong Cao, Shaojie Tang, Zongjian He, Jiaqi Wen. "Drive Now, Text Later: Nonintrusive Texting-while-Driving Detection using Smartphones", IEEE Transactions on Mobile Computing, vol. 16, no. 1, January 2017.

[3] Robert Rosenberger. (13 March 2013). An Argument against "No-Look Texting" While Driving. IEEE Technology and Society Magazine, vol. 32, issue. 1, 53-59.

[4] V. T. T. Institute. Press release cell phones and driver distraction. 2009.

[5] C. Jennison and B. W. Turnbull. Group Sequential Methods. CRC Press, 2010.

[6] I. Jolliffe. Principal component analysis. Wiley Online Library, 2005.

[7] F. Pukelsheim. The three sigma rule. The American Statistician, 48(2):88–91, 1994.

[8] G. A. Seber. Multivariate observations, volume 252. Wiley. com, 2009.

[9] Y. Wang, J. Yang, H. Liu, Y. Chen, M. Gruteser, and R. P. Martin. Sensing vehicle dynamics for determining driver phone use. 2013.

[10] J. Yang, S. Sidhom, G. Chandrasekaran, T. Vu, H. Liu, N. Cecan, Y. Chen, M. Gruteser, and R. P. Martin. Detecting driver phone use leveraging car speakers. In MobiSys, pages 97–108. ACM, 2011.