Ilkogretim Online - Elementary Education Online, 2020; Vol 19 (Issue 3): pp. 4506-4512
http://ilkogretim-online.org
doi: 10.17051/ilkonline.2020.03.735602

Machine Learning In Driver Surveillance

Sharmila.P , Sai Kaavya Sree.M , T.P.Rani

Department Of Information Technology Sri Sairam
Engineering College

Abstract—Road accidents are often caused by drunken driving and drowsiness. This paper detects the drowsiness of the driver. In addition the system also detects alcohol consumption by the driver. The main goal of this proposed system is to reduce the number of accidents due to driver's Drowsiness and alcohol intake. This increases the transportation safety. This system also makes use of a USB camera and Alcohol sensor (MQ-135)by which alcohol intake is detected and drowsiness of the driver is also monitored. Open CV, a machine learning software examines vision-based applications. It is the one which detects the driver's drowsiness. The idea comes with an application which helps to track the drowsiness and also alert the passenger and the owner if the driver is drunk. This will perform tasks like notifying and the customer with alarm by a mobile application. The ultimate aim of this system is to design a feasible system that decreases the fatal accidents caused by the drowsiness of the driver and can also display the percentage of alcohol consumed by the driver.

Index Terms—Fatigue Detection, Alcohol intoxication, Arduino, UNO, Open Cv Application

1. INTRODUCTION

In today's life, every occupation needs at most concentrations. Drivers must keep a constant focus on the road so that they can react to sudden instances. Drowsiness and alcohol intake of the driver causes more road accidents predominantly. People who work for the transportation business and drive for long hours can have fatigue which in turn decreases their response time. As a cause to full fill this type of action, we have proposed this system. Eye detection is the crucial part of this system which is detected by Open CV software and the web camera. Alcohol intake of the driver is detected by MO-135 Sensor which shows that the driver is drunk and the alert signal is provided by a beep sound. Arduino is used along with the sensor to detect samples of the drunken driver. The sensor which is placed in front of the driver serves to check if the driver is drunk and also the camera suspended in the location of the driver serves to movements is the Open source software

.This software is used for creating computer vision. Open CV is available in languages like C,C++,Python , Java and many other programming languages . Open CV is used for creating

user defined object classifiers. The object classifier that is being created is stored in detect.py file extension. On the other hand, Arduino Uno is used for detecting alcohol consumption by the person. Alcohol sensor MQ-135 is an interface. Arduino is a prototyping platform which varies from all the preceding boards. The main distinguishing feature is that it uses the FTDI USB-to-serial driver chip which the preceding boards fail to use. It supports interfacing of various low and high level peripherals including USB camera. Perhaps, the driver feels sleepy or fatigue the alert message will be sent to the owner and the passengers regarding the state of the driver. If the driver is drunk, the alcohol content as well as the percentage consumed will be sent to the driver in the instance to get rid of accidents. recognize the drowsiness of the driver.

3. 3.SYSTEM HARDWARE AND

Perhaps, the driver is drunk or he/she dozes off, the alert message will be sent via the mobile app to the owner.

2. METHODOLOGY

In this part the entire routine of the system is delivered by the software and hardware platforms. As a cause of detectinga person's eye and head movement a simple technique to capture his/her eye/head

SOFTWARE CONFIGURATION

A. HARDWARE MODULES

1. Arduino Uno: Arduino Uno is a microcontroller which is used to make electronic projects. It is based on ATmega328. It has fourteen pins which is digital and six pins which are used as pulse width modulation output. The pins operate

   at volts. The other parts of Arduino are crystal oscillator, a connection with USB, analog inputs, power jack and Reset button. This is achieved by the connection of the USB with the system. It also has some other versions The specialty of the reset button on the Arduino is that it is designed in such a way that it does not require the physical press instead it allows it to rest in the computer where software runs. The programming on microcontrollers is done by programming language.
2. GSM Modem: The GSM modem used in this system for message delivery. It estimates GSM performance for voice and also Faxes which consumes low power. This modem has a design which gives some space storage requirements in the application. The GSM SIM900 is modeled with a single-chip processor integrating AMR926EJ core. The modem is in Auto baud modem initially. It also has an inte mal TCP/IP stack via GPRS.

   There are also three wires TxGx, GND. The modem also consists of a built-in voltage regulator. The other features which make the modem efficient are 3 pin male headers which connects with a microcontroller, onboard power ON Work indicator LED onboard PWM and ADC channels, built-in MAX3232, built-in Network Status LED, built-in SIM Card Holder. The other data specifications include Non transparent mode, USSE PPP-stack, PBCCH support, CSD up to 1404 kbps. The specifications for SMS via

GSM/GPRS include SMS cell broadcast Text and ODU mode. One can read and send SMS using simple AT commands.

Camera Module: The system uses the camera module to monitor the driver while driving the vehicle. It is placed in front of the driver. As soon as the driver closes his eyes for more than 3 seconds, a beep sound rings and also reports the drowsiness of the driver to the owner and passengers through the GPRS and GSM modules as a message. This will help the owner or the passengers toreplace the driver.

4. MQ3 Sensor: Our system also uses the Mq-

135 Alcohol sensor which is a semiconductor, a sensor that detects the alcohol content in the driver. This sensor uses a sensitive material called stannic oxide. The alcohol concentration increasesas the conductivity increases. This module has the advantage of providing both digital and analog outputs. This has better resistance for disturbances which is because of smoke. It has also got a fast response time making it suitable for the system. This sensor is easily interfaced with Arduino boards.

5. Mobile Application: The application linked with the vehicle notifies the passenger as well as the owner about the drowsiness of the driver by sending an alert message saying "The Driver is Sleepy". This message will be generated only whenthe driver closes his eyes for more than 10-15 seconds. Secondly, if the driver is drunk there will be another message displayed on the application saying "The Driver is Drunken" along with the amount of alcohol consumed by him.

In both the scenarios machine learning techniques are used to sense thedrowsiness and alcohol consumption of the driver. With this notification, the owner and the passenger can find an alternative or replace the driver.

4. LITERATURE SURVEY

5. EXPERIMENTAL RESULT

This proposed system has a mobile application in addition to the existing system and this only one sensor is used instead of using many sensors. The sensor used is MQ-135, an alcohol sensor to detect whetherthe driver has drunk or not along with the intake of alcohol quantity. The camera is placed before the driver to identify whether the driver is feeling sleepy. If the driver feels sleepy and if he closes his eyes,then a beep sound will be alarmed as a warning bell and in addition to this, a message will be sent to the passengers as well as the owner of the respective transports. For this purpose of sending a message, a mobile application is developed. The mobile application is developed not only for the above purpose, but it also includes the use of sending information to the owner of the transport of the passengers to feel any wrong with the driver, so the owner can warn the driver or change the driver. For example, if the passengers feel that the driver has been drunk, then they can inform the owner about him to the owner and change the driver if they wish.

Year	Author	Title	Approach	Result
2013	Rachid Aliradi, Naima Bouzera, Dr Abdelkrim Meziane	Detection of facial components based on SVM classification and invariant feature	Support vector machines (SVM) has been adapted	Succeeds in locating facial features in the facial region exactly
2012	Chaoyang Zhang, Zhaoxian Zhou, Hua Sun, and Fan Dong,	Comparison of Three Face Recognition	Principal Component Analysis (PCA), Linear Discriminate Analysis (LDA), and Elastic Bunch Graph Matching (EBGM)	Performance benchmarking are compared for each of the algorithms in terms of recognition accuracy, computational cost, and recognition tolerance
2012	Chen Da-jin/Chen Si-yu/Su Yun-huan, Peng Min-jing	A Fast Detection Model for Omni-directional Faces	Technique of HSI based skin detection combined with eye-core detection	Detection accuracy was 95% proved
2012	Salem Alelyani, Huan Liu	Ensemble Feature Selection in Face Recognition ICMLA 2012 Challenge	Filter-based feature selection	Achieve very high accuracy, 99% distinguish human faces
2012	Emir Kremic, Abdulhamit Subasi, and Kemal Hajdarevic	Face Recognition Implementation for Client Server Mobile Application using PCA	Client— server model and GPG infrastructure	Detection accuracy was improved

Drunken Level	0%-20%	21%-40 %	41%-60 %	61%-99 %
Beep sound	Off	Off	On	Yes
Message send	No	No	On	Yes

Table 1 For the experimental result of the alcohol consumed by the person and the alarm sound detected if the person has consumed alcohol.

Fig: 1. Sample Alert messages about drowsiness of driver.

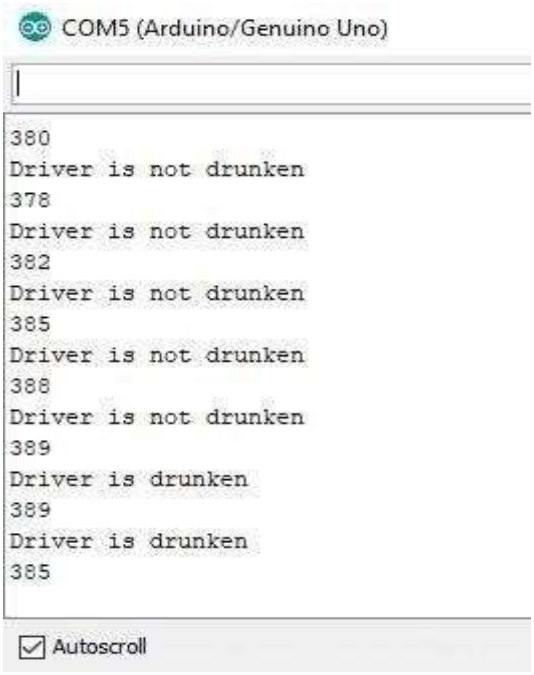

Fig. 2. Sample alert messages about drunkenness of driver.

For these above purposes, the mobile application is developed. The camera is connected to Arduino and is loaded using Python with OpenCV installed in the system. This camera detects the image of the driver and sends the information to the Arduino UNO. In case of the MQ3 sensor, the arduino programming gives the testing and observations alcohol sensor. The alcohol intoxication will be displayed and if the intoxication level is higher than the given input, then the LED will be displayed denoting the drunkenness of the driver. The intoxication level is displayed as we programmed with conditions. So finally our proposed system results in the drowsiness and alerts the driver with a beep sound as well as the detection of intoxication of alcohol by the driver along with the mobile application.

6. REFERENCES

1. M. R. Pawar and I. Rizvi, "IoT Based Embedded System for Vehicle Security and Driver Surveillance," 2018 Second International Conference on Inventive Communication and Computational Technologies (ICICCT), Coimbatore, 2018, pp. 466-470, doi: 10.1109/ICICCT.2018.8472984.
2. Ming-cong Weng, Chia-tseng Chen and Hsiang-chun Kao, "Remote surveillance system for driver drowsiness in real-time using low-cost embedded platform," 2008 IEEE International Conference on Vehicular Electronics and Safety, Columbus, OH, 2008, pp. 288-292, doi: 10.1109/ICVES.2008.4640862.
3. Huabiao Qin, Yongpin Gao and Honglin Gan, "Precise eye location in driver fatigue state surveillance system," 2007 IEEE International Conference on Vehicular Electronics and Safety, Beijing, 2007, pp. 1-6, doi:10.1109/ICVES.2007.4456401.
4. F. Naghiu and D. Pescaru, "Influence of driver behavior patterns in correcting video sensing errors in traffic surveillance applications," 2009 IEEE 5th International Conference on Intelligent Computer Communication and Processing, Cluj-Napoca, 2009, pp. 173-176, doi: 10.1109/ICCP.2009.5284764.
5. Keyou Guo, Guizhen Yu and Zhenhua Li, "An new algorithm for analyzing driver's attention state," 2009 IEEE Intelligent Vehicles Symposium, Xi'an, 2009, pp.21-23,doi: 10.1109/IVS.2009.5164246.
6. Q. Yi, M. Shi and Y. Chen, "The Design of Surveillance SystemBased on Hi3520D," 2017 5thInternational Conference onMechanical, Automotive and Materials Engineering (CMAME), Guangzhou, 2017, pp. 305-309, doi: 10.1109/CMAME.2017.8540186.
7. F. Matsubara, M. Itoh and T. Inagaki, "Effectiveness of a blind spot visualization system with a video camera for safe lane changes," 2012 Proceedings of SICE Annual Conference (SICE), Akita, 2012, pp. 640-645.
8. P. Chaisiriprasert and K. Yongsiriwit, "Surveillance System for Abnormal Driving Behavior Detection," 2019 4th International Conference on Information Technology (InCIT), Bangkok,Thailand, 2019, pp. 155-158, doi: 10.1109/INCIT.2019.8912135.
9. G. Monteiro, M. Ribeiro, J. Marcos and J. Batista, "Wrongway Drivers Detection Based on Optical Flow," 2007 IEEE International Conference on Image Processing, San Antonio, TX, 2007, pp. V - 141-V - 144, doi: 10.1109/ICIP.2007.4379785.
10. R. Aliradi, N. Bouzera, A. Meziane and A. Belkhir,"Detection of Facial Components Based on SVM Classification and Invariant Feature," in 2013 IEEE/WIC/ACM International Joint Conferences on Web Intelligence (WI) and Intelligent Agent Technologies (IAT),Atlanta, GA, USA, 2013 pp. 30- 36. doi: 10.1109/WI-IAT.2013.212
11. C. Zhang, Z. Zhou, H. Sun and F. Dong, "Comparison of three face recognition algorithms," 2012International Conference on Systems and Informatics (ICSAI2012), Yantai, 2012, pp. 1896-1900, doi: 10.1109/ICSAI.2012.6223418.

12. C. Da-jin, C. Si-yu, S. Yun-huan and P. Min-jing, "A fast detection model for Omni-directional faces," 2012 7th International Conference on Computer Science & Education (ICCSE), Melbourne, VIC, 2012, pp. 767-770