INTELLIGENT PILOT BEHAVIOUR MONITORING SYSTEM FOR LOGISTICS

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Abstract: - Driving behavior is a complex concept that provides a description of human's decision while driving and how pilots control the vehicle includes a drowsiness prevention device since current safety measures are followed to increase the pilot's awareness which includes the use of standard rumble strips on roads reference, installation of GSM, IOT, sensors and other studies uses signal processing embedded of an expensive vehicle. The technology uses internet of things so that the vehicle owner can monitor the pilot's drowsiness everywhere during work hours. The study focuses at the eyelid movement that is not yet mentioned to the previous study. This proposed system continuously scans the eyelid movements of the pilot and once drowsiness is detected the device automatically alerts him using a random-typed alarm. It automatically forwards the report to the vehicle owner from the web page through internet access.

Key Words— Pilot style, pilot drowsiness, pilot distraction, pilot behaviour, pilot identification, survey.

I. INTRODUCTION

Pilot behaviour is a complex concept that provides a description of the humans' decision while driving and how drivers control the vehicle in various conditions. Pilot Behaviour Analysis (PBA) can be considered as characterizing the human driving behaviour to

ensure a specific purpose such as identifying unsafe driving events, eco-friendly driving style recognition, authentication of drivers, risk assessments, etc. In recent years, PBA has been receiving plenty of attention from both academia and industry due to its potential capabilities for cutting-edge automated driving innovations, intelligent transportation systems, advanced driver-assistance systems (ADAS), vehicle energy management, helpful insights for automotive manufacturers, environmental concerns, and traffic safety. This paper aims to provide a comprehensive literature overview of the fundamental characteristics of PBA, its existing challenges, and future trends to form the basis for potential progress in this direction. To the best of the authors' knowledge, this work is the first one devoted to categorizing, organizing, and presenting a review of every aspect of PBA, providing researchers with opportunities to gain a proper understanding of this research direction and its existing challenges.

II. LITERATURE SURVEY

2.1 REAL-TIME DRIVER'S HYPOVIGILANCE DETECTION USING FACIAL LANDMARKS

A driver's condition can be estimated not only by basic characteristics such as gender, age, and driving experience, but also by a driver's facial expressions, bio-signals, and driving behaviours. Recent developments in video processing using machine learning have enabled images obtained from analysed with high accuracy. Therefore, based on the

Author: Aliae Squalti Houssaini, Abdelouahed Sabri, Hassan Q jidaa, Abdellah Aarab

Recently, driver hypovigilance (drowsiness and fatigue) becomes one of the principal causes of traffic crashes. It can prompt many deaths, wounds and many economic losses. Therefore, the use of a system that takes into account the driver's level of vigilance can play an important role in preventing accidents and saving human lives. In this work, we propose a non-intrusive driver hypervigilance detection system in real-time.

2.2 A STUDY ON FEATURE EXTRACTION METHODS USED TO ESTIMATE A DRIVER'S LEVEL OF DROWSINESS

Author: Kyong Hee Lee, Whui Kim, Hyun Kyun Choi, Byung Tae

Recently, in addition to autonomous vehicle technology research and development. Machine learning methods have been used to predict a driver's condition and emotions in order to provide information that will improve road safety.

relationship between facial features and drowsy state.

2.3 A MICROCONTROLLER BASED REAL TIME HEART RATE MONITORING SYSTEM

Author: Md Rysul Kibria Badhon, Fatematuz Zhara

Heart rate is a very vital health parameter that is directly related to the soundness of the human cardiovascular system. But high blood pressure, high cholesterol level or diabetes mellitus can lead to blockade of coronary arteries and result into heart palpitation. In other words, frequent of these heart palpitations led to heart attack. Timely updates can save a potential victim of heart attack. This paper describes a technique of a developed mobile device that can monitor heart rate. Detect missing heart beats due to premature ventricular contractions (PVC) and send the heart rate and missing beat information via website to a remote person or physician. Heartrate is measured through a pulse sensor and microcontroller which is based on the photoplethysmography (PPG) process. The device continues to take real time values after placing heart beat rate sensor or fingertip, ear lobe or wrist enabling anyone to monitor heart rate on the move.

2.4 SENSING HEART BEAT AND BODY TEMPERATURE DIGITALLY USING ARDUINO

Author: Ch Sai Manasa

In this project, we can digitally sensing body temperature and heart rate using Arduino. Mainly Arduino is used because it can sense the environment by receiving input from variety of sensors and effect its surroundings by controlling lights, motors, and other actuators. The microcontroller on the board is programmed using the Arduino programming language. LM35 is used for the sense body temperature. Body temperature is a basic parameter for monitoring and diagnosing human health. Heart beat sensor was used for sensing heart rate. The system can be used to measure physiological parameters.

2.5 AN IMPROVED ALGORITHM FOR DROWSINESS DETECTION FOR NON-INTRUSIVE DRIVING

Author: Ratnarup Dey, Joy paulos

To address issues related to unsafe driving leading to road accidents, a car-integrated system which observes the driver's behaviour based on varied stimuli is discussed in this paper. Sensor parameters are used for detecting head movement. Steering grasping and driving under influence of alcohol. A system, which identifies driver drowsiness by assessing any one, two or all three parameters viz., head movement. Alcohol influence and steering grasping is proposed as part of this work. It is deducted that the driver is in a state of drowsiness. A simulated environment was setup for the testing and the results have been compared to normal driving scenarios. Analysis results demonstrate that, driver drowsiness can be detected by the proposed system. A range of sensors are used to read and send data to the processing unit and a proposed algorithm would analyse and detect the drowsiness of the driver.

III   MACHINE LEARNING ALGORITHM

Three algorithms have been implemented to check a PILOT behaviour

Bayesian algorithm work based on Bayes theorem for probability computation. Bayesian networks, a type of probabilistic graphical model, represent conditional dependence between random variables by edges in a graph and are suitable for

predicting the probability of different classes/events. These networks have been used for driver's stress detection, manoeuvre detection and recognition of driving.

Decision tree[9,10,11,12,13] are used as a well-known classification technique. A decision tree is a flowchart-like tree structure where an internal node represents a feature or attribute, the branch represents a decision rule, and each leaf node represents the outcome. The topmost node in a decision tree is known as the root node. It learns to partition based on the attribute value. It partitions the tree in a recursive manner called recursive partitioning.

Regression algorithms are concerned with predictive modelling of the correlation between variables. Regression algorithms investigate the causal relationship between the targets and predictors, which makes them suitable for time series classification. These algorithms are used for detecting drunk drivers, classifying driving styles, or measuring the drowsiness level of drivers.
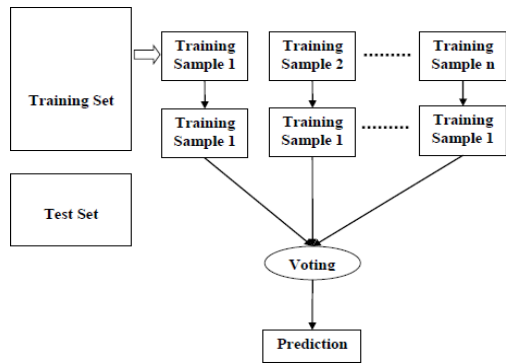
Fig 1 Decision Tree classification

Fig 2 logistic regression

IV SYSTEM ARCHITECTURE

Driving speed and vehicle movement are important factors in the model. Abnormal pilot generally drives above speed limit, changes speed suddenly or changes vehicle lateral position. In order to tackle this problem, they developed an automated instrument for detecting abnormal pilots and also Global Position System (GPS) provides special features which can be

utilized for this application as it could supplies location, time, and speed . Arduino MEGA microcontroller is used to interface with the sensors and to the communication devices. The ultrasonic sensor is used to identify distance among the vehicle. The Eye-blink sensor is used to monitor the pilot drowsiness status. The LCD is used to update the latest information in the LCD. The **vibration sensor** is used to monitor the damage level of vehicle, all the information's are updated in the cloud using IoT. The **GSM** is used to send the alert message to the owner or to the rescue team.

V PROJECT DESCRIPTION

In this method the driver health status, drowsiness is monitored and the information is continuously monitored using cloud. Characterizing driving behaviour plays a key role in a variety of research areas such as traffic safety, the development of automated vehicles, energy and fuel management, risk assessment, and driver identification and pro-filing. Advances in PBA-based driver inattention or drunk driver detection can help reduce fatal car crashes, and understanding the driving style of drivers can contribute to fuel management and risk assessment of the
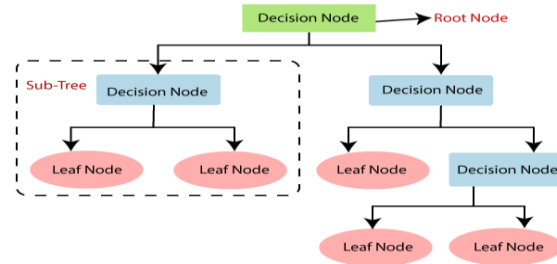
drivers. These facts have led to a growing interest in addressing PBA challenge. Arduino is an open-source electronics platform based on easy-to-use hardware and software. Arduino boards are able to read inputs - light on a sensor, a finger on a button, or a Twitter message - and turn it into an output - activating a motor, turning on an LED, publishing something online. You can tell your board what to do by sending a set of instructions to the microcontroller on the board.

The vibration sensor is used to determine the damage of the vehicle. Ultrasonic sensor is used to monitor the distance among vehicle.

Eye blink sensor is used to monitor the driver drowsiness status. Gas sensor is used to monitor any harmful gases present inside the vehicle. The GSM is used to send the alert message to the owner or to the rescue team. All the sensor values are updated to cloud.

V ADVANTAGES

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Pilot status is monitored along with the vehicle parameters. Realtime tracking of pilot status by the owner. In case of any emergency, the pilot drowsiness is automatically detected by the sensor. The GSM sends message to nearby hospitality to rescue pilot and passenger.

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