

REAL TIME DETECTION SYSTEM IN VEHICULAR NETWORK MODEL

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Abstract- A transport Ad-Hoc Network may be a sort of Mobile ad-hoc network, to supply communication among close vehicles. Large no. of automobile accidents is caused as a result of driver fatigue. To deal with the matter we tend to propose a vision-based driver fatigue detection System using clustering. A clustered network structure is usually recommended owing to its a lot of utilization of network resource associated higher communication quality within which the motive force and different vehicles area unit then alerted by operational an in-vehicle alarm and causation alert messages containing corrective actions via wireless technology. The system includes driver fatigue detection and additionally observance of varied vehicle parameters in vehicle-to-vehicle communication in intelligent transportation to fulfil safety and luxury needs of the motive force

Index Terms- V2V, Eye Tracking

I. INTRODUCTION

The increasing number of transportation accidents has become a serious problem for society. The traffic accidents will be largely decreased if finding a judging rule to determine whether drivers stay awake or not, and make a warning to the drivers when they begin to fall asleep, so it is meaningful to research fatigue detection algorithm which is also a key technology in smart vehicles driving. The driver fatigue problem has become an important factor for causing traffic accidents[1-5]. Driver fatigue may be a major reason for automobile accidents, since asleep drivers are unable to form fast choices, and that they could have slower reaction times. As a result, several governments have education program to alert people to the risks of driving whereas tired, and drivers are inspired to avoid conditions which can result in driver fatigue. Therefore, the way to supervise and avoid fatigue driving expeditiously is one among the numerous issues[6-11].

In this paper, it is important to use new technologies to design and build systems that are able to monitor drivers and to measure their level of attention during the entire process of driving.

Vehicular Ad Hoc Networks have received increasing attention from the research and industrial communities recently many valuable applications such as entertainments, Congestion Control, and accident avoidance have been envisioned or planned. Vehicle-to-Vehicle (V2V) and Vehicle-to-Infrastructure (V2I) are two major types of communications allow vehicles to connect to roadside units (RSUs)[12-17], which are fixed infrastructure that are equipped with powerful computing devices and

Connect with each other via a wired network and with passing by vehicles through wireless communications[18-22]. Each vehicle equipped with an on Board Unit (OBU) can either transmit hop by hop to the destination using V2V communication or transmit to a Roadside Unit (RSU) using V2I will be possible directly when in range, or across multiple hops. Such hybrid design is very important to realize various types of applications.

In cluster based routing vehicle near to each other form a cluster. Each cluster has their one cluster head. Which is responsible for inter and intra-cluster management function Intra-cluster node communicate each other using direct link. Whereas inter -cluster is communicate via cluster head .In cluster based routing the formation of clusters and selection of cluster head is an important point[23-27]. In VANET due to high mobility dynamic cluster formation is a towering process. The design of a system able to monitor the drowsiness level of a driver in an ordinary vehicle is presented. In which the environment can continuously monitor what's happening in it and vehicles can communicate each other exchanging its relative positions and potentially dangerous.

Installed at different locations in a city. They can

conditions, such as the presence of an uncontrolled vehicle[28-33]. As we know large numbers of automobile accidents are caused due to driver fatigue, to address this problem we are proposing a clustering technique which uses V2V communication. The system includes driver fatigue detection System to avoid accident.

II. RELATED WORK

Alshaqai , Belal , Baquhaizel, Abdullah Salem, Ouis, Mohamed El Amine, Boumehed, Meriem, Ouamri, Abdelaziz ,Keché, Mokhtar [34-37] proposes an algorithm to locate , track ,and analyses the driver face and eyes to measure PERCLOS. Their aims is to warn a driver if is in a drowsy state.

Marco Javier Flores, Jose Maria Armingol, and Arturo de la Escalera [38-41] Proposes a drowsiness alert system which based on computer vision and Artificial intelligence. They uses in-car camera to detect and monitor various feature of human face such as head movement etc. state of the driver's eye in real time they check for both daytime and nocturnal situation

.which prevent driver falling asleep while driving.

In [11] D.Rajini Girinath , S.Selvan worked on Cluster based approach for VANET. Clustering was used for routing in the city scenario. Multipath flooding algorithm was proposed for Cluster formation. They tried to group vehicles with low mobility with respect to each other into the same cluster.

B. Ramakrishnan, Dr. R. S. Rajesh, R. S. Shaji [8] created a new cluster model for efficient communication among the VANET nodes communication. The result show the outperform the existing VANET model in terms of cluster creation, Head creation and head switching time on a highway vehicular environment.

Shuhua Jiang and Hsi-Lu Chao [3] Uses a linear cooperation framework for accident detection in a cluster-based VANET two efficient algorithms to do alarm detection, native detection and international detection. The cooperative detection algorithm can be applied to highway or local traffic systems for accident avoidance.

Alexandra Branzan Albu, Ben Widsten, Tiange Wang, Julie Lan, and Jordana Mah [9] Monitoring the driver fatigue for real time detection of sleep onset , sleep onset is the most critical consequence of fatigue driving. Their approach is to monitor a real time event detection technique. Further they show the tracking in real time of single visual cue. The experimental result shows the hardware Consist of webcam Connected to a laptop. The Experimental result shows that the proposed approach work well

for in-vehicle Environment. D.Jayanthi, M.Bommy [10] proposes a nonintrusive prototype computer vision system for real time monitoring of a driver's vigilance, which based on a hardware system of a driver's images using an active IR illuminator and for monitoring the fatigue level of a driver they implement a software algorithm which based on the six parameters i.e. PERCLOS, eye closure duration, blink frequency, face position and fixed gaze.

Liling Li, Mei Xie, Huazhi Dong [12] proposes a driver fatigue detection method, by establishing the appearance model AAM ,on the basis of human face detection locate the position of the eye accurately. Which calculating the ratio of eye's height and width.

Shifeng Hu, Zuhua Fang, Jie Tang, Hongbing Xu [13] Proposes driver fatigue eye features detection algorithm based on openCV image processing and computer vision development platform which implements eye localization and state detection via template matching method and Hough variant round transform from rough to accurate thought.

III. PROPOSED DESGINE

A Proposed Drowsiness (Driver Fatigue) Detection System:

The system proposed in this paper is able to perform real-time processing of capturing an image in order to infer the driver level of fatigue by determining the number of frames in which driver's eyes are blink[42-45]. Successively, processing system output is sent to an alarm system that will activate an alarm when an index, computed by mean of PERCLOS parameter.

The system consists of 4 parts (a) Dividing in to frames (b) Face Detection (c) Eye Detection (d) Drowsiness Detection. In addition there is 1 external hardware components namely Camera. The external hardware required for capturing the image After Capturing the image from an external device. The next procedure is to divide in to frames/image .once the frame is capture the face is detected from each and every frame. This is achieving by harrcascade file for face detection .harrcascade contain the various feature of the face such as facecolor, width, etc. After detecting the face the next procedure is to detect the eyes by using the same technique which we use for face detection. To reduces the amount of process for eye detection. We mark the region of interest before detecting the eyes from face gabber. Once the eye is detected the next step is to check the states of eyes whether it is closed or open. This is check according to the percentage of eyes of the vehicle driver. As the percentage of eyes is closed higher than the normal state of eyes then it should be clear that the driver is in drowsy state .the last step is to generate an in vehicle alarm to alert the vehicle driver.

B V2V Communication:

Vehicle-to-vehicle (V2V) communications comprises a wireless network where vehicle send messages to each other with information about what they're doing. This data would include speed, location, braking, and loss of stability and also the driver is in a sleepy state or not. V2V would be a mesh network, meaning every node (car, smart traffic signal, etc.) could send, capture and retransmit signals

On below of the situation is of V2V communication wherever the road has been style and on it street road the nodes can create that represent a vehicle. Wherever some general nodes are created that represent a bunch of car to create a cluster. This vehicle node then communicates with one another to send and alert messages.

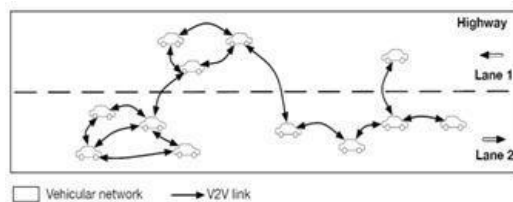


Fig1: General V2V Communication

The Below figure is the hardware vehicular model which contain the following hardware component which is summarized as follows. UART, Microcontroller, Max232, RX232, Capacitors, IR Sensor, Battery, etc. let's give the brief description of the entire summarized Hardware component which present in Vehicular model. The Microcontroller AT89c51 passes an ASCII value to Max232 IC then max232 IC Convert ASCII value in to Binary form (0, 1) and send it to Rs-232 connector which communicates to System. Let's see the block diagram of Hardware to System Connection.

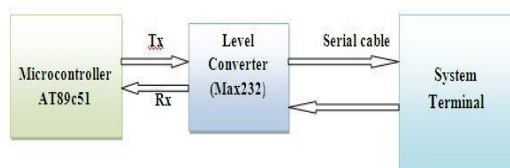


Fig2: Block diagram of Hardware to System Connection

1 Microcontroller:

A microcontroller is a small chip computer on a single integrated circuit containing a processor core, memory, and programmable input/output peripherals.

2 MAX232:

The MAX232 from Maxim was the primary IC that in one package contains the mandatory drivers (two) and receivers (also two), to adapt the RS-232 signal voltage levels to TTL logic. It became popular, as a result of it simply wants one voltage (+5V) and

generates the mandatory RS-232 voltage levels (approx. -10V and +10V) internally. This greatly simplified the look of electronic equipment. Electronic equipment stealers now not have to be compelled to design and build an influence offer with 3 voltages (e.g. -12V, +5V, and +12V), however might simply give one +5V power offer, e.g. with the assistance of an easy 78x05 voltage converter.

3 RS-232 Connector:

RS232 is a standard for a serial communication interface which allows sending and receiving knowledge via a minimum of 3 wires. With the RS232 interface it is possible to setup a connection between a microcontroller and a System. A very famous RS232 level converter is the MAX232 chip.

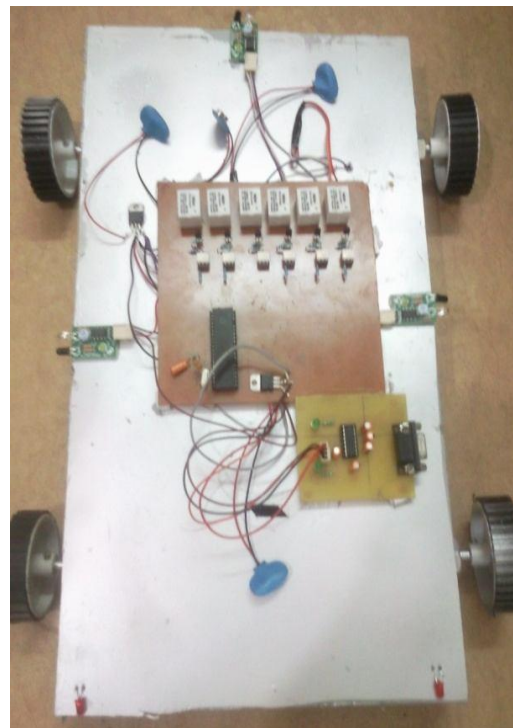


Fig3: Vehicular hardware Module

4 IR Sensors:

The IR diode keeps sending IR infrared rays up to some vary. Once some object (The object her is that the vehicle) comes within the IR infrared vary, the IR waves hits the article and comes back at some angle, picture diode detects that IR rays and hence works as an IR sensor device.

IV. IMPLEMENTATION RESULT

The Below fig carries with it 3 affiliation that's camera, system and hardware transport module. The fig shows the camera and vehicle module is connected to System.

The Above result shows that the driver eye is in drowsy state .as the drive eye is detected the alert signal is given to that driver and the message is pass to the nearby vehicle. The below fig shows the result of displaying of drowsiness message this alert information is floated to other vehicles to provide safety to other vehicles on the roads.

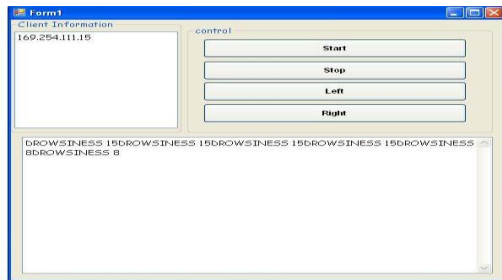


Fig5: Displaying alert message

CONCLUSION

This paper proposes an approach for Real time drowsiness detection system based on eye tracking in Vehicular network model to avoid an accident for road safety. The system is to perform real-time processing of capturing an image by using a hardware vehicular module in order to infer the driver level of fatigue by determining the number of frames in which driver's eyes are blink Successively, processing system output is sent to an alarm system that will activate an LEDS when an index computed by mean of PERCLOS parameter. It will even be useful for alternative vehicles as they will be alerted by messages regarding the vehicles there in a network. It will produce higher opportunities for the drivers on a main road in future.

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