Drowsy Driving with Health Monitoring and Machine Learning

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Abstract: This project presents a method to automatically detect driver emotion if sleeping or not using Linux based system. Co-ordinates, distance and movement of tracked points were used to create features from visual input that captured facial expressions, head, and face gestures. Spectral features, prosodic features were extracted using the web camera. Face API was used for calculation of features. A combined feature vector was created by feature level fusion and cascade classifier was used for emotion detection. Live participants and actions are to be used for recording simultaneous mixed emotional experience. As per calculated result system we generate the sound when driver any emotion driving the car. If we analysis then accident. We also the different sensor's like heartbeat sensor, temperature to verify the human health for emergency situation.

Keywords: Drowsy, machine learning, face detection, eye detection, image processing, open computer vision (OpenCV).

I. INTRODUCTION

Natural Everyday road accidents are happening all over the world according to the statistics (20 – 40) percentage of road accidents are happening due to drunk & driving and rash driving. If the driver drunk means he/she will be unconscious they will not able to control themselves in that situation if they drive the car means it can affect them and others also. Some of the drivers will be over speed after they drunk.

There are different modules to prevent these road accidents, in this system we are using eye blink sensors, alcohol detection sensors, and heartbeat -temperature sensors. The eye blink sensors are used in the steering wheel of the car it will check the eyeball movement of the driver while he/she driving the car whether a driver is sleepy or not.

The alcohol detecting sensors are also fixed in the steering of the car so that it can detect the driver is consuming alcohol or not, if the driver consumes the alcohol means car will not start itself if the driver consumes the alcohol while driving means it will detect by using alcohol detection sensor and it will slow down the car and it will also send the SMS to the relatives of the driver and it will also send the SMS to the local police. We also check the human body temperature, heartbeat values from the sensor.

II. PROBLEM STATEMENT

Drowsy driving is a major problem in every country. This usually happens when a driver has not slept enough, but it can also happen due to untreated sleep disorders, medications, drinking alcohol, shift work or long late night drives, so mostly accident will happen.

So we develop the desire system to reduce the above problem using the different sensors, to overcome this problem.

III. LITERATURE SURVEY

[2] A. Amditis, M. Bimpas, G. Thomaidis,M. Tsogas, M. Netto, S.Mammar, A. Beutner, N. Möhler, T.Wirthgen, S. Zipser, A. Etemad,M. Da Lio, and R. Cicilloni,"A situation-adaptive lanekeeping support system: Overview of the SAFELANE approach", The paper[1] addresses the development of a system that is able to deal with a large set of different traffic situations. The input to the system comes from cameras, which are supplemented by active sensors (such as radar and laser scanners) and vehicle dynamic data, digital road maps, and precise vehicle-positioning data.

[3] Jaeik Jo, Ho Gi Jung, Kang Ryoung, Jaihie Kim, "Vision –based method for detecting driver drowsiness and distraction in driver monitoring system", The paper [2] presents a driver-monitoring systems that contains both drowsiness detection method and distraction detection method. Drowsiness involves a driver closing his eyes because of fatigue, and distraction involves a driver not paying sufficient attention to the road despite the presence of obstacles or people. Here an eye-detection algorithm is designed which combines adaptive boosting, adaptive template matching, and blob detection with eye validation. Also a novel eye state–detection algorithm that combines two techniques PCA and LDA is used.

[4] Kohji Murata, Etsunori Fujita, Shigeyuki Kojima, Shinitirou Maeda, Yumi Ogura, Tsutomu Kamei, Toshio Tsuji., "Noninvasive Biological Sensor System for Detection of Drunk Driving ", This paper [3] presents a non-invasive system to detect

individuals driving under the influence of alcohol by measuring biological signals. We used the frequency time Series analysis to attempt to distinguish between normal and intoxicated states of a person as the basis of the sensing system.

[5] Paul Viola Michael J. Jones Daniel Snow., "Detecting Pedestrians Using Patterns of Motion and Appearance", This [4] paper describes a pedestrian detection system that integrates intensity information with motion information. The human motion pattern is well known to be readily distinguishable from other sorts of motion.

[6] A. Jesudoss, Muthuram .B.O, Lourdson Emmanuel .A, "SAFE DRIVING USING IOT SENSOR", The main concept of this paper is to prevent the road accident so to prevent the road accident we are using alcohol detection sensor, eye blink sensor, over speed control sensor. The alcohol sensors are used to detect the driver is drunk or not. The eye blink sensors are used to check the driver is sleepy or not with the help of the eyeball movement of the driver, if the driver is sleepy means it will trigger the alarm to conscious the driver. The over speed controller sensors is used to check the car is over speed or not and if the car is over speed means it will reduce the speed of the car & maintain the car speed into normal speed.

IV. BLOCK DIAGRAM

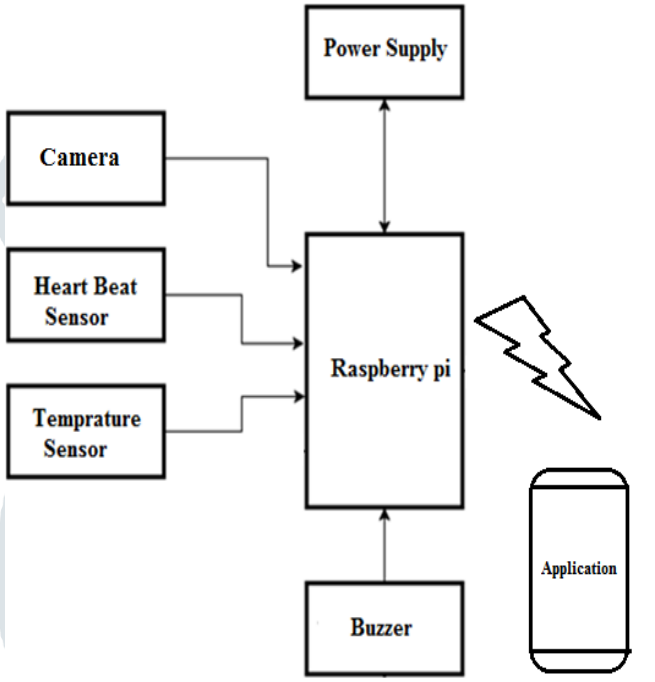

Fig 1. Block Diagram

Description:

IMAGE PROCESSING MODULE
This module will aim at processing the acquired video images. The processing will target to detect the drivers face from the video stream; once the face is detected, the region of interest that is the eyes will then be located from the facial features. The state of the eye will then be computed using the pixel intensity difference and a threshold value.

DROWSINESS DETECTION MODULE
This module determines the drowsiness levels of the driver based on the statistical information obtained the predecessor stage.

HEALTH DETECTION MODULE:
This module determines the health monitoring of the driver based on the variable sensor.

V. HARDWARE DESCRIPTION

1. A Raspberry Pi (Either a Model B or Model B+)

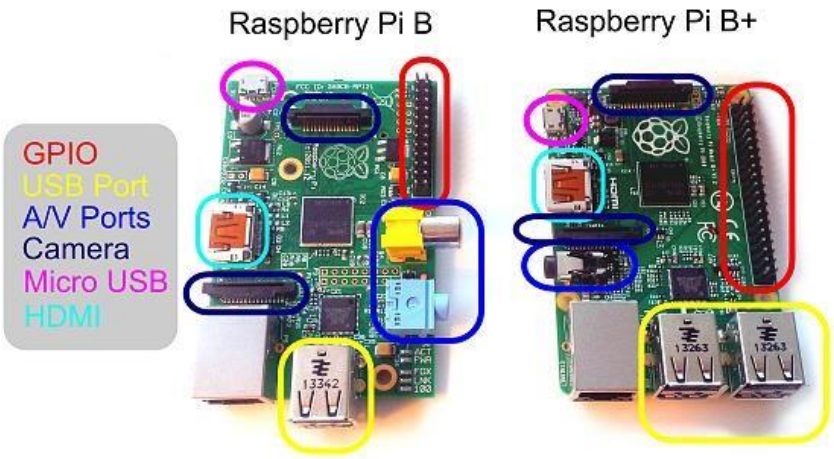

Fig 2. Raspberry pi

SD Card

- We recommend an 8GB class 4 SD card.

Display and connecting cables

- Any HDMI/DVI monitor or TV should work as a display for the Pi.
- For best results, use one with HDMI input, but other connections are available for older devices.

Keyboard and mouse

- Any standard USB keyboard and mouse will work with your Raspberry Pi.

Power supply

- Use a 5V micro USB power supply to power your Raspberry Pi. Be careful that whatever power supply you use outputs at least 5V; insufficient power will cause your Pi to behave unexpectedly.

Internet connection

- To update or download software, we recommend that you connect your Raspberry Pi to the internet either via an Ethernet cable or a WiFi adaptor.

Sound

- Headphones, earphones or speakers with a 3.5mm jack will work with your Raspberry Pi.

2. **Heat beat Sensor**

Fig 3. Heartbeat sensor

Feature:

- Use IR LED and an optical transistor to detect pulsation in fingers
- Small and Compact module
- Easy to use.

3. Temperature Sensor

Fig 4. Temperature sensor

The LM35 series are precision integrated-circuit temperature sensors, whose output voltage is linearly proportional to the Celsius (Centigrade) temperature. Since it has Linear + 10.0 mV/°C scale factor it is very easy to calculate temperature value.

VI. APPLICATIONS

1. System can be used in any type of vehicles to detect drowsiness of driver and to alert them.
2. This system will help to prevent accidents and it will save many lives.
3. Students can also use this system, while studying.
4. Various organizations can use this system to keep watch on employees.

VII. RESULT

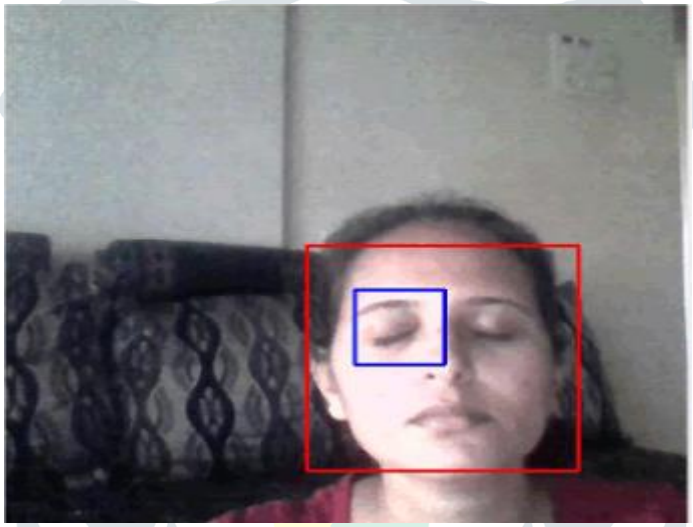

Fig 5. Simple example for drowsiness detection

Driver drowsiness detection is a car safety technology which helps prevent accidents caused by the driver getting drowsy. Various studies have suggested that around 20% of all road accidents are fatigue-related, up to 50% on certain roads.

VIII. CONCLUSION

About 20% of road accidents occur due to distraction of driver and health issues. Among that 30% is due to driver fatigue. There are many methods to monitor driver and there by alert him/her in case of distraction. This system is conducted to study various methods to detect the driver fatigue and to select an appropriate method to detect the causes of driver's distraction. In order to reduce road accidents we use the different sensor and buzzer to avoid the causes such as drowsiness, fatigue and heart problem to alert the driver.

IX. FUTURE SCOPE

In future scope use the camera for live streaming, if any unconscious condition happen then we directly send the image of the driver to the server. We also trace the location and send notification to the nearest police station and parent.

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