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Driver Drowsiness Detection System Using Android Application

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Abstract:
A countless number of people drive on highway day and night. The taxi drivers, bus drivers, truck drivers and people travelling long-distance suffer from lack of sleep. Due to which it becomes very dangerous to drive when feeling sleepy. The objective of this intermediate android project is to build Drowsiness Detection System that will extract the frames of driver's face using camera and detect the person's eyes and mouth measurements. If any changes occur in measurement ratio or drowsiness is detected then this system will alert the driver. This system is used to prevent road accidents happens due to drowsiness of driver.
Keywords: *Driver Drowsiness Application, Face Detection System.*

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I. Introduction:

Drowsy driving is one of the major causes of deaths occurring in road accidents. The truck drivers who drive for continuous long routes (especially at night), bus drivers of long route or overnight buses are more susceptible to this problem. The majority of accidents happen due to drowsiness of Driver. So, to prevent these accidents we have build an android application and a website using android which will alert the driver when he feels sleepy .Drowsiness detection is a safe technology that can prevent accidents caused by drowsiness. Detection of any abnormal change in these values is considered as driver drowsiness. This is a nonintrusive measurement as the sensors are not attached on the driver. These factors motivate us to develop a low-cost, real time driver's drowsiness detection system with acceptable accuracy.

The truck drivers who drive for continuous long routes (especially at night), bus drivers of long route or overnight buses are more susceptible to this problem. In this android system we have two modules Admin Module & User Module in which Admin has control over the Website and Android Application. User will login to the app and turn on the camera**.** Here the Google Libraries and classes are used for face detection, measuring facial landmarks and giving alert to the drowsy driver.This model will classify whether the eyes and mouth of person is open or closed. By using eyes closing and yawning process the driver will be detected to be drowsy. The approach we will be using for this system is we have used the libraries such as espressocore,com.google.android.gms.playservices, com.google.android.gms.playservices,com.google .android.support.multidex and classes such as Graphicsoverlay.graphics,camerasource,facedetector. The android application will work in the manner like firstly the app will be opened and user have to login to the application and click on start button then the camera will be on.The camera takes image as an input and detects face image to calculate measurement of face using facial landmarks. After this the system will categorize whether the eyes and mouth is opened or closed. If the person's eyes are closed and he is detected to be drowsy then the alert alarm will be given.

II. EXISTING SYSTEM

Existing system of Driver Drowsiness Detection system contains the external camers and sensors are used, which are costly and harmful for health.Also the camera and sensor can expensive or burst anytime so it may stop working and affect the drivers body.So to overcome this problem we have implemented and designed an android application which an inbuilt camera and is not harmful for the human being.

III. LITERATURE SURVEY

In 2016, G. Kong e described 'Visual Analysis of Eye State and Head Pose for Driver Alertness Monitoring'. They presented visual analysis of eye state and head pose (HP) for continuous monitoring of alertness of a vehicle driver. The proposed scheme uses visual features such as eye index (EI), pupil activity (PA), and HP to extract critical information on non-alertness of a vehicle driver. Experimental results show that the proposed scheme offers accuracy with acceptably low errors.

In June, 2014, Eyosiyas described 'Driver Drowsiness Detection through \HMM based Dynamic Modeling'. They proposed a new method of analyzing the facial expression of the driver through Hidden Markov Model (HMM) based dynamic modeling to detect drowsiness. They have implemented the algorithm using a simulated driving setup. Experimental results verified the effectiveness of the proposed method.

V. Kazemi and J. Sullivan; "One millisecond face alignment with an ensemble of regression trees", IEEE Conf. on Computer Vision and Pattern Recognition.

IV. SYSTEM ARCHITECTURE

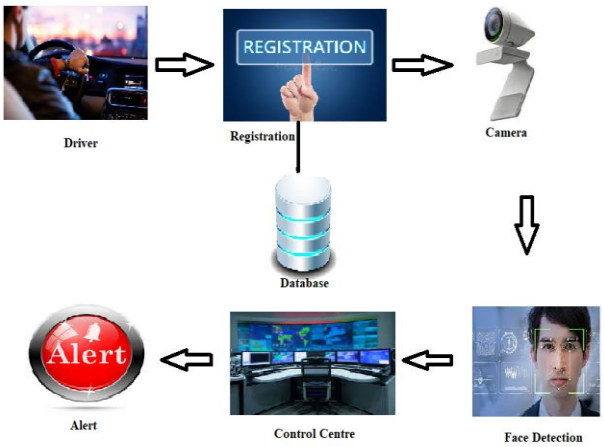


Fig1.System Architecture

V. PROPOSED SYSTEM

Driver Drowsiness Detection System is used to minimise theOccurrence of accident od drowsy driver.The proposed systemof Driver Drowsiness Detection System consists of two modules: The Admin and The User.The Admin handles the website and the application.The User consists of the components such as Registration,Camera,Face Detection,Facial Landmarking,Alert System and Database.

- **Admin Module:**

The first module is of Admin**.** Admin monitors and handles the website and application.

- **User Module:**

The second module is of user. The user model consists of the following components.

1.Registration

Firstly the user has to login into the application. User have to enter username and password in the login process, if user is new user then he/she should register first. After registration user is able to login in the application. If user enter wrong password then they cannot login in the application and if user entered correct password then he can move ahead.

If user forgot password then he has to reset password and then login.

2.Camera

After login the second component is of camera. The camera get started in this component. The camera is used to capture frame of the driver's face. camera needs to be adjusted neatly so that the eyes and mouth should be detected properly. After capturing the frames it will move to the face detection.

3.Face detection

In this component face is detected. Here, the eye and mouth will be detected. weather the eyes are open or not or the driver is yawning or not it will be seen in this component.

4.Face Detection
After face detection the main focus will be on eyes and mouth.The facial landmarks are applied on eyes and mouth.In this component the measurement of eyes and mouth will be taken.As per the measurement the movement of eye and mouth will be detected.Therefore this system extract the eye and mouth region from a set of facial landmarks.

5.Alert system
According to the facial landmarking if there is change in measurements and with the movement of eye and mouth if the driver is found to be Drowsy then the Alert will take place otherwise not.

6.Database
The login information of the user will be saved or stored in the database.

VI. Flow Chart

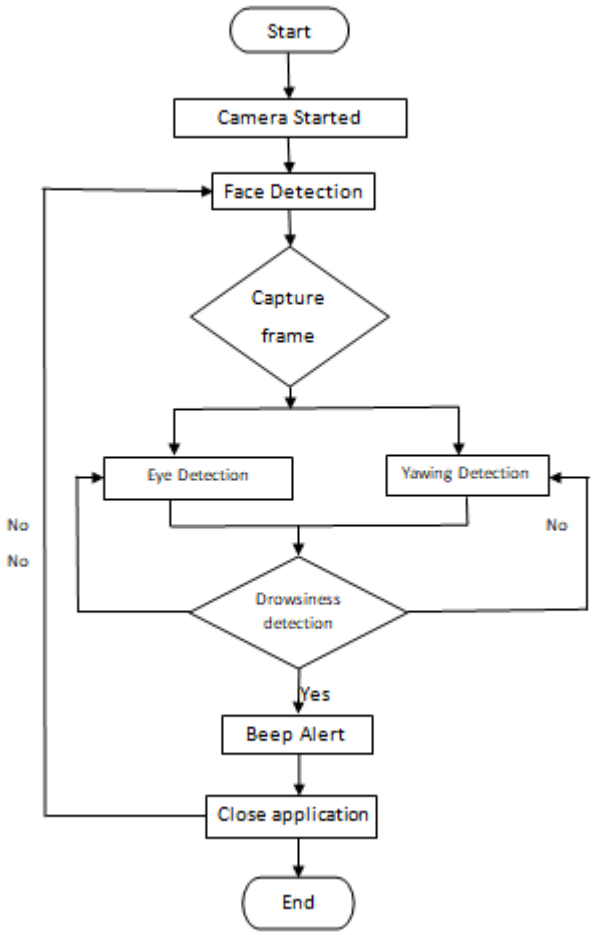


Fig 2. Flow Chart

VII. EXPERIMENTAL SETUP

- **Camera module**

In camera module camera get started to capture the face of driver. CameraSource class of Android Framework is used to capture the frames.This CameraSource makes a best effort to manage processing on preview frames as fast as possible.

- **Android**

Android is a software package and Linux based operating system for mobile devices.In this application we have use libraries and classes.
The libraries are :
a)espresso-core:

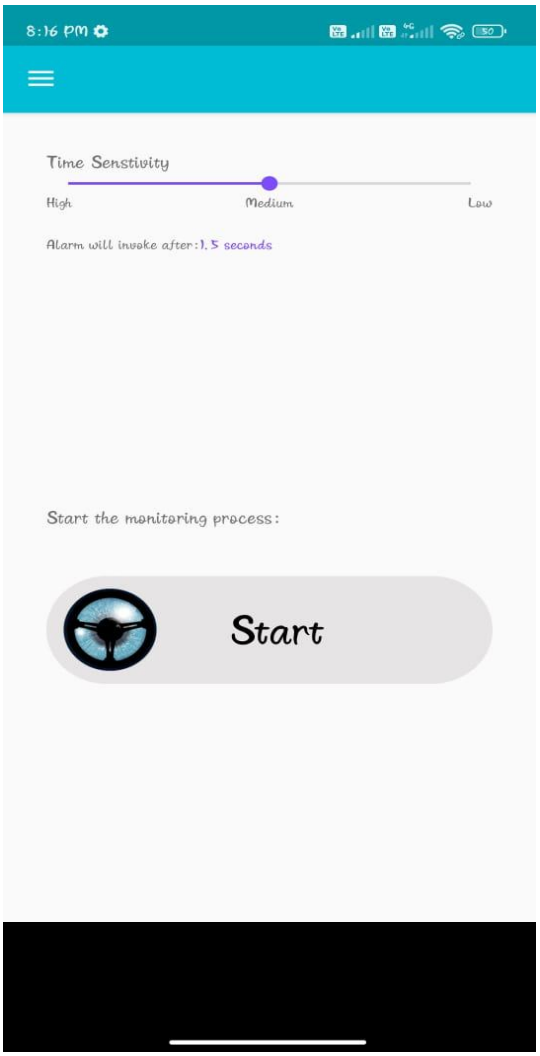
It is default library.It is used to run the application.
b)com.google.android.gms.playServices
c) com.google.android.support:multidex

The Classes are:
a)GraphicsOverlay.graphics:
Calculates the measurement of face and tracks the face. b)CameraSource
It is used to start the camera.
c) Facedetector
It is used to detect the face.

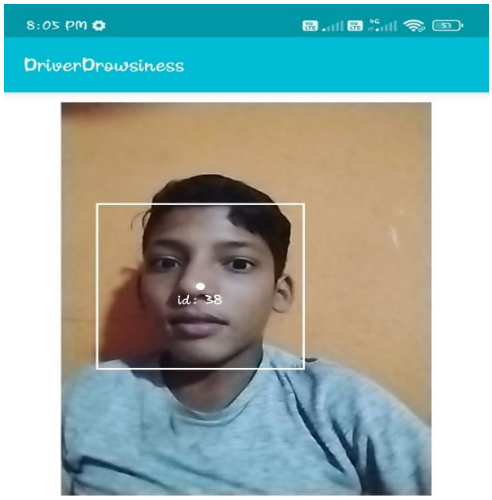
- **Media player**

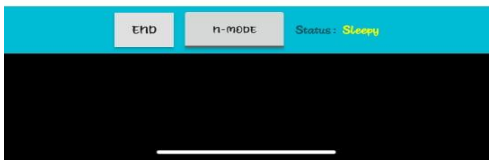
Android media player Framework includes support for playing variety of common media types,so you can easily integrate audio video in the application. We can play the audio or video which are stored and are saved in the application resources.

VIII. EXPERIMENTAL RESULTS

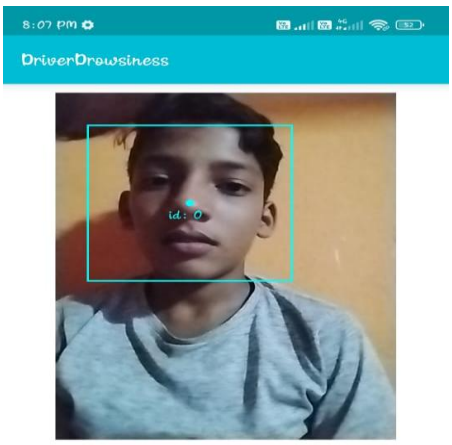


IN THIS SYSTEM,FIRSTLY WE HAVE TO START THE CAMERA.

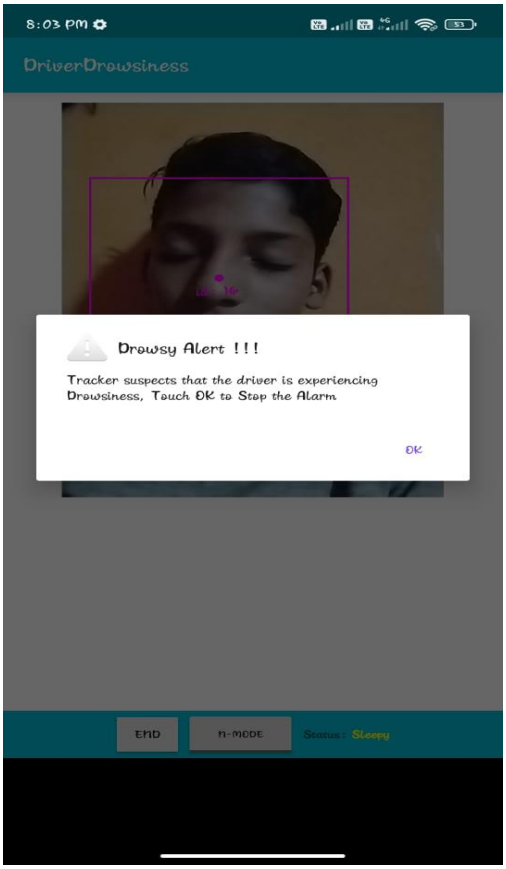




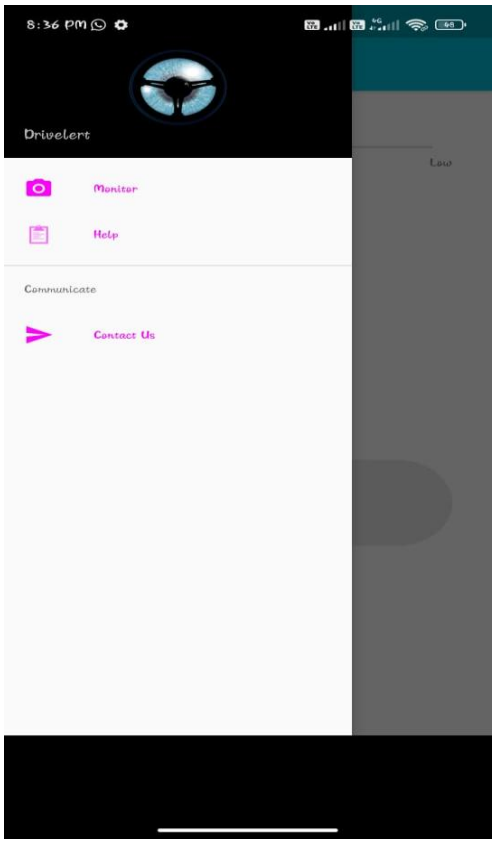
HERE THE FRAMES OF DRIVER ARE EXRACTED THROUGH THE CAMERA.



IN THIS, THE SYSTEM IS DETECTED THE EXTRACTED FRAME OF DRIVER.



WHEN THE DRIVER DETECTED AS DROWSY THE THIS SYSTEM WILL ALERT THE DRIVER.



V. CONCLUSION

Hence,the driver drosiness detection system developed
is capable of detecting drowsiness in rapid manner.The system identifies the normal eye blink and drowsy driver eye blink which prevent the driver from enlering state of sleepiness while driving .By doing this many accidents will be reduced and provides safe life to drivers .The driver safety and vehicle security is presented only in expensive cars. By using driver drowsiness detection system the driver safely and vehicle safely can be implement in normal cars too.

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