DROWSINESS DETECTING SYSTEM

REPORT

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BONAFIDE CERTIFICATE

Certified that this project report "**DROWSINESS DETECTING SYSTEM"** is the Bonafide work of "**SHUJAT HUSSAIN (19IT091), SREERAM B (19IT100), SRI RAM PRASAD S(19IT103)"** who carried out the project work under my supervision during the Academic Year 2021 -2022.

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1.ABSTRACT

In recent years driver fatigue is one of the major causes of vehicle accidents in the world. A direct way of measuring driver fatigue is measuring the state of the driver that is drowsiness. So it is very important to detect the drowsiness of the driver to save life and property. This project is aimed towards developing a prototype of drowsiness detection system. This system is a real time system which captures image continuously and measures the state of the eye according to the specified algorithm and gives warning if required. Though there are several methods for measuring the drowsiness but this approach is completely non-intrusive which does not affect the driver in any way, hence giving the exact condition of the driver. For detection of drowsiness the per closure value of eye is considered. when the closure of eye exceeds a certain amount then the driver is identified to be sleepy. For implementing this system several Open CV libraries are used

In the last years, the traffic accidents study is become important because they produce several died and hurt around the world. To help in reducing this fatality, in this paper, a new Advanced Driver Assistance System (ADAS) for automatic driver's drowsiness detection based on visual information and Artificial Intelligent is presented. This system works on several stages to be fully automatic. In addition, the aim of this algorithm is to locate and to track the face and the eyes to compute a drowsiness index. Examples of different driver's images taken over real vehicle are shown to validate the
algorithm that works in real time

The major aim of this project is to develop a drowsiness detection system by monitoring the eyes; it is believed that the symptoms of driver fatigue can be detected early enough to avoid a car accident. In such a case when drowsiness is detected, a warning signal is issued to alert the driver. This detection system provides a noncontact technique for judging different levels of driver alertness and facilitates early detection of a decline in alertness during driving. In such a case when fatigue is detected, a warning signal is issued to alert the driver. The system also has additional feature of slowing down the vehicle if driver fails to respond to the alarm and ultimately stops the vehicle.

2.PROBLEM DESCRIPTION

Detecting the driver's alertness and drowsiness is an efficient way to prevent road accidents
With this system, drivers who are drowsy will be alerted by an alarm to regulate consciousness, attention and concentration of the drivers. This will help to reduce the number of road Accidents
So, taking it as a serious problem, we had planned to create a device along with the camera which is placed in front of the driver or behind the steering wheel. So that the camera fitted with the device keep on watching or tracking the drivers face expression If the drivers feel drowsiness and closes his eyes for sleeping, the camera will detect his face expression and gives an alarm or beep sound

3.EXISTING SOLUTIONS – RESEARCH PAPER, PATENT, APPLICATIONS

Existing Solutions:

Many researchers have considered the following physiological signals to detect drowsiness:
1.electrocardiogram (ECG),
2.electromyogram (EMG),
3.electroencephalogram (EEG) and
4. electro-oculogram (EOG)
5.Some researchers have used the signal to identify driver drowsiness through eye movements
6.Computer vision techniques to detect the changes in driver's facial expressions
7.Computer vision method to detect driver drowsiness based on detecting eyelid closing and opening using artificial neural networks as classification algorithm.

LITERATURE REVIEW The developed system is a real time system. It uses image processing for eye and face detection. HAAR based cascade classifier is used for face detection. An algorithm to track objects is used to track the eyes continuously. In order to identify the drowsy state of the driver, the PERCLOS algorithm issued. The paper focuses on developing a nonintrusive system which can detect fatigue and issue a warning on time. The system will monitor the driver's eyes using a camera. By developing an algorithm, the symptoms of driver fatigue can be detected early enough to avoid accident. When the signs of fatigue have been identified output in the form of sound and seat belt vibration is provided to alert the driver. Warning will be deactivated manually rather than automatically. This system also uses cascade classifiers in order to improve the accuracy of face detection. The system is a real time nonintrusive model. To reduce the number of accidents caused by drowsiness, various methods for detecting drowsiness automatically have been developed. Three ideas are discussed in this paper; the first idea is creating a dataset of drowsy facial expressions. The second idea is to combine visual, non-visual, and vehicular features into one.

Algorithm or source code of the project Designing better source code. Mr. Vibishek Designing and finalizing the best source code for the project without any error and also at right time as mentioned before in the agreement. Final Design Combing the hardware and software component to get a complete project module. Mr. Jagaganesh Finding the success and failure criteria to rectify it. Final Testing/Verification Final testing and verification of the project/product and its design. The project sponsors and the project team. Rectifying the failures found during final design and making it a successful product

PATENT:

S.NO	PATENT NUMBER/FILE	INVENTOR	APPLICATIONS
1	US682273B2	OTMANADAM,BASIR	non-intrusive system used to determine if the driver of a vehicle is drowsy and at risk of falling asleep at the wheel due to drowsiness
2	US7202792B2	HARRY,R.SMITH	low-cost system for detecting a drowsy condition of a driver of a vehicle includes a video imaging camera

4. MISSION, OBJECTIVES & CONSTRAINTS

Mission:

Driver drowsiness is one of the major causes of traffic accidents.it is a serious highway safety problem. If drivers could be warned before they became too drowsy to drive safely So Our mission is to reduce some of these crashes so that many of the road accidents could be prevented. In order to reliably detect the drowsiness, it depends on the presentation of timely warnings of drowsiness

Objectives:

The main objective of drowsiness detecting system is to prevent road accident The Drowsiness Detection System developed based on eye closure of the driver can differentiate normal eye blink and drowsiness and detect the drowsiness while driving The proposed system can prevent the accidents due to the sleepiness while driving. The purpose of the Driver Monitoring system is to alert the driver when signs of drowsiness or distraction are detected Designed to keep all vehicle occupants safe, the system monitors the usual driving habits and behaviour of the driver. If the system detects some risk of fatigue or distraction, it will generate a series of acoustic signals, alerting the driver.

Constraints:

Dependence on ambient light: The model developed for this purpose strongly depends on the ambient light condition. As our algorithm considers the eye sight as a dark region when it is closed and brighter region when it is open so if the ambient condition affects such that there may be possibility of brighter and darker condition depending on light source then it causes error in the result. Also this model depends on certain minimum level of light condition otherwise it becomes very difficult to detect. To avoid this error we can use either LED light for better detection or we can use an infrared camera.

Distance of camera from driver face: For best result we have assumed and designed the code according to the fact that the distance between camera and face should be nearly 100 cm. Hence the designed set up output may vary from vehicle to vehicle as different vehicle have different types of seat lengths.

Processor speed of hardware: We have used RaspberryPi for implementation. The processor speed of RaspberryPi is 700 MHz. So this speed of processor is not compete enough to do video processing. Hence processor with very high speed is needed which will ultimately increase the cost of the product.

Use of spectacles: In case the user uses spectacle then it is difficult to detect the state of the eye. As it hugely depends on light hence reflection of spectacles may give the output for a closed eye as opened eye. Hence for this purpose the closeness of eye to the camera is required to avoid light.

Multiple face problem: If multiple face arise in the window then the camera may detect more number of faces undesired output may appear. Because of different condition of different faces. So we need to make sure that only the driver face come within the range of the camera. Also the speed of detection reduces because of operation on multiple faces.

5. STAKEHOLDERS NEEDS

In this project our stakeholders are the drivers who are driving for a very long distance without even taking Rest we conducted a survey to the stakeholders they wants us to create a innovative thing to alert them when they felt drowsy their main need is to drive carefull without getting drowsy we came up with many possible ideas as having a Co driver so that both the drivers can drive periodically ,
Their usual needs At the first sign of tiredness, stop and take a break Stop in a safe place – don't stop on a motorway hard shoulder Drink two cups of coffee or an equivalent caffeinated drink Take a short nap of around 15-20 minutes

6. SYSTEM PHYSICAL/ LOGICAL REQUIREMENTS

Physical requirements:

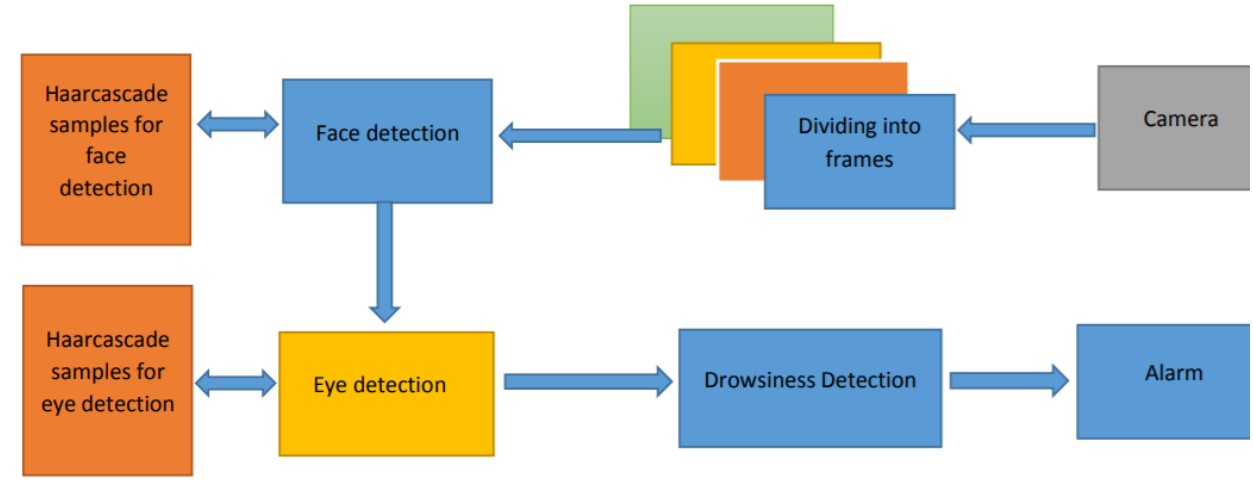
1.Raspberry pi Camera v2
2. Analysis of heart rate variability (HRV) signals
3. Alarm Sensor
4. Accident reporter
5.Gps model

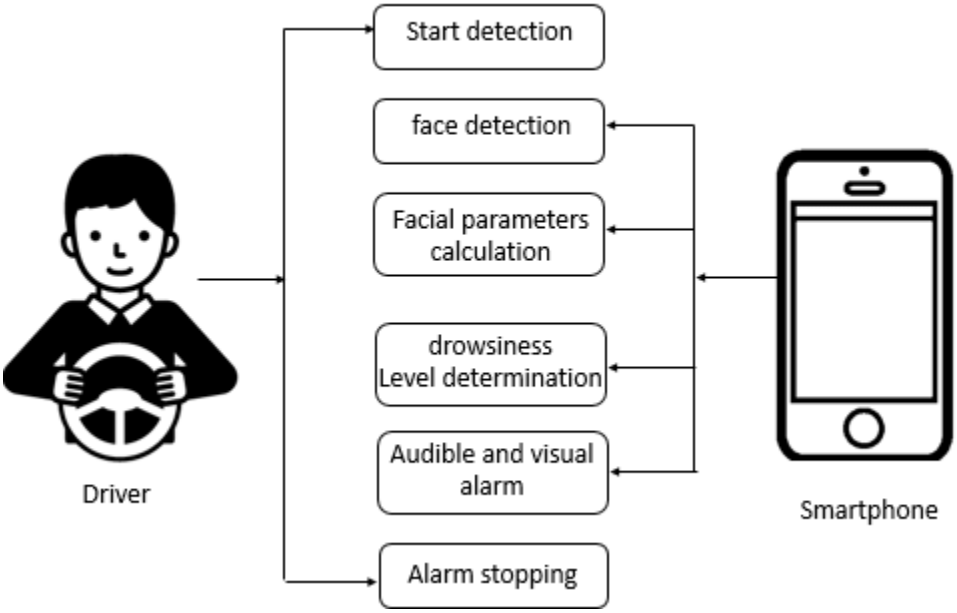
Logical requirements:

Open CV, Keras, Tensorflow, Pygame, Python

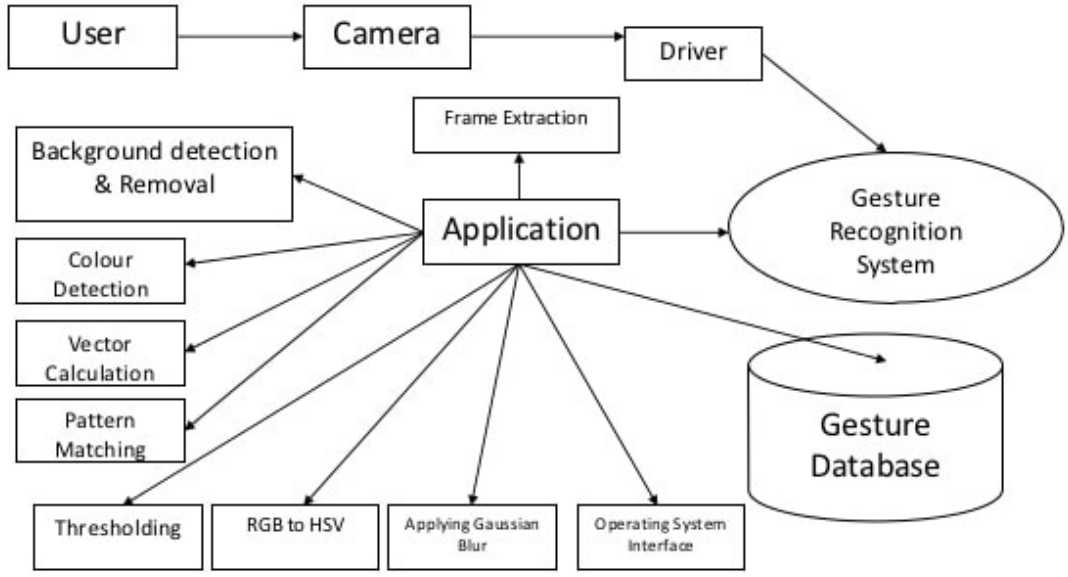
7. MODELING DIAGRAMS

Flowchart of the proposed system





Data flow diagram:



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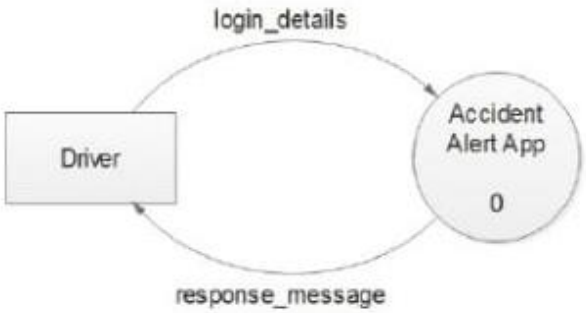


8. FINAL PROTOTYPE – DESIGNS/ PICS

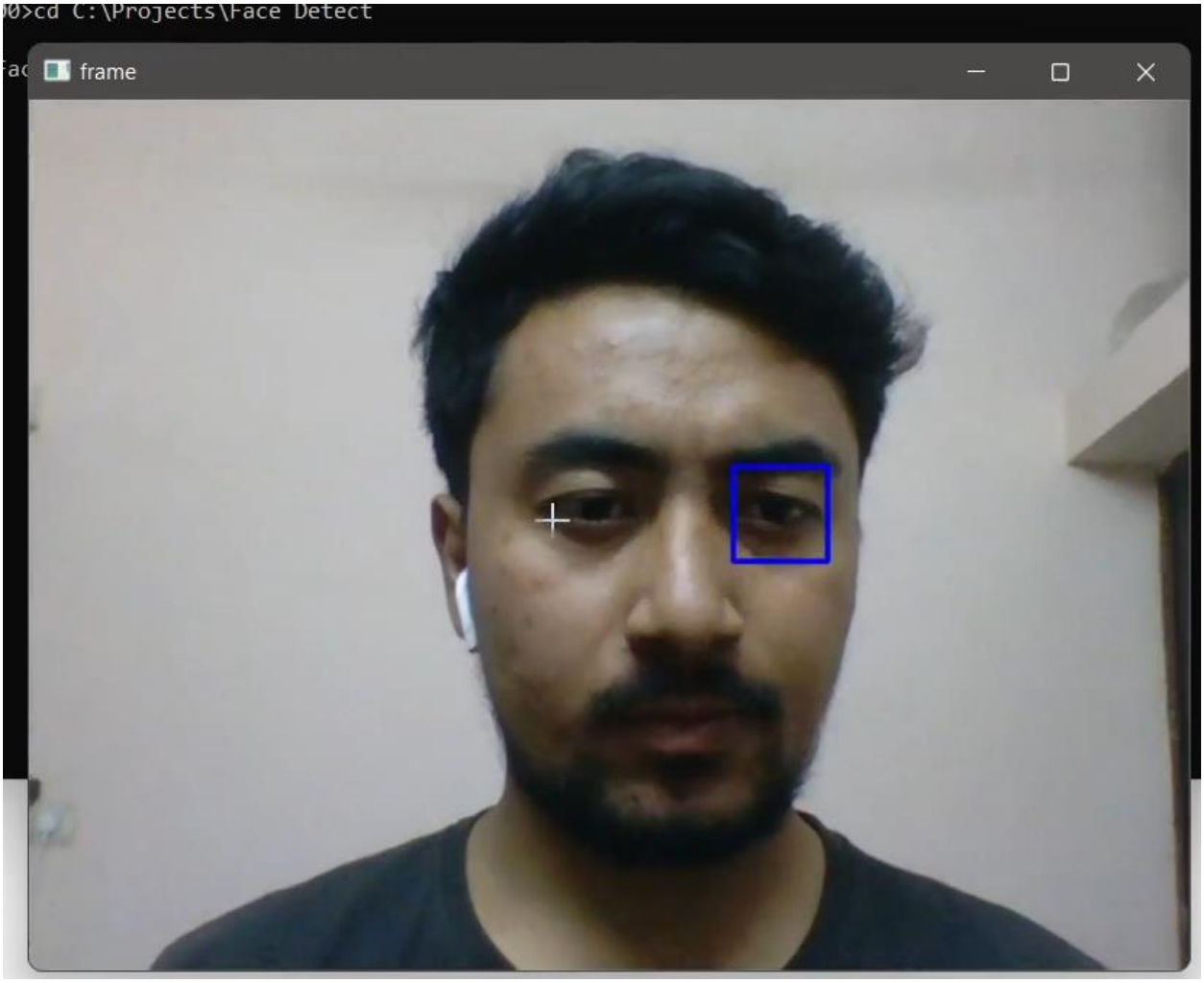
Low Cost models:

MINI CAMERA:

Steering-mini camera to be fitted in front of steering

Low cost model-Alarm system:

When eyes are open blinking shows not in drowsy state:



9. RESULTS:

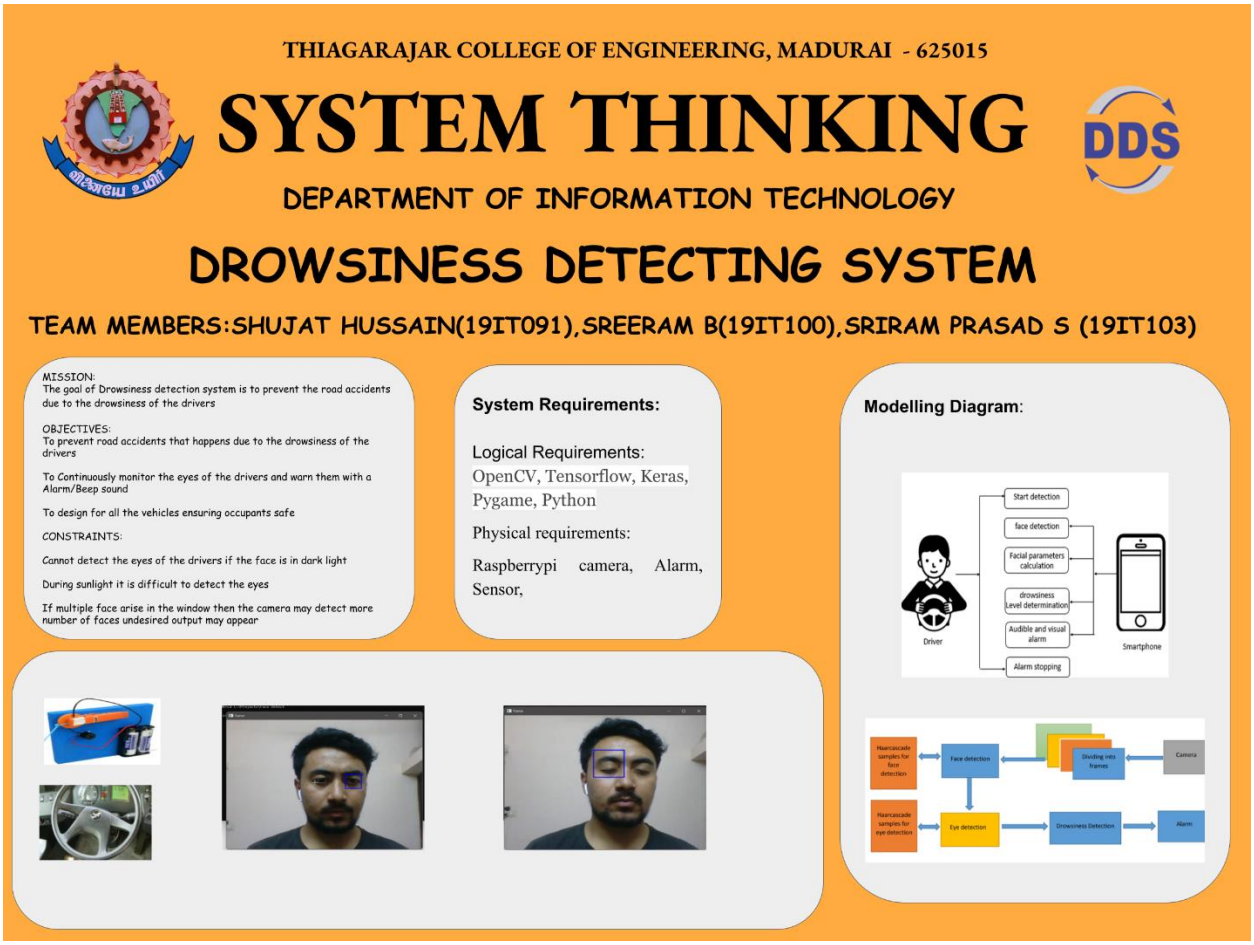
Implementation of drowsiness detection with Raspberry Pi was done which includes the following steps: Successful runtime capturing of video with camera. Captured video was divided into frames and each frame were analyzed. Successful detection of face followed by detection of eye. If closure of eye for successive frames were detected then it is classified as drowsy condition else it is regarded as normal blink and the loop of capturing image and analyzing the state of driver is carried out again and again. In this implementation during the drowsy state the eye is not surrounded by circle or it is not detected and corresponding message is shown. If the driver is not drowsy then eye is identified by a circle and it prints 1 for every successful detection of open eye.

10. CONCLUSIONS AND FUTURE PLAN/WORKS:

Our model is designed for detection of drowsy state of eye and give and alert signal or warning may be in the form of audio or any other means. But the response of driver after being warned may not be sufficient enough to stop causing the accident meaning that if the driver is slow in responding towards the warning signal then accident may occur. Hence to avoid this we can design and fit a motor driven system and synchronize it with the warning signal so that the vehicle will slow down after getting the warning signal automatically. Also we can avoid the use of RaspberryPi which is not so fast enough for video processing by choosing our own mobile phone as the hardware. This can be done by developing a proper mobile application which will perform the same work as RaspberryPi and response will be faster and effective.

Wearable technology and eye detection can be integrated into vehicles as a standard safety feature
Integrate the alarm into car stereo's system
Integrate armband with car ignition system such thet the car wont start if the armband is not worn
Mount the PI camera/RPI on the dashboard or sun visor of the car
Create a fully wireless system (with a wireless bracelet)

11. POSTER:


THIAGARAJAR COLLEGE OF ENGINEERING, MADURAI - 625015
SYSTEM THINKING
DDS
DEPARTMENT OF INFORMATION TECHNOLOGY
DROWSINESS DETECTING SYSTEM
TEAM MEMBERS:SHUJAT HUSSAIN(19IT091),SREERAM B(19IT100),SRIRAM PRASAD S (19IT103)
MISSION:
The goal of Drowsiness detection system is to prevent the road accidents due to the drowsiness of the drivers
OBJECTIVES:
To prevent road accidents that happens due to the drowsiness of the drivers
To Continuously monitor the eyes of the drivers and warn them with a Alarm/Beep sound
To design for all the vehicles ensuring occupants safe
CONSTRAINTS:
Cannot detect the eyes of the drivers if the face is in dark light
During sunlight it is difficult to detect the eyes
If multiple face arise in the window then the camera may detect more number of faces undesired output may appear
System Requirements:
Logical Requirements:
OpenCV, Tensorflow, Keras, Pygame, Python
Physical requirements:
Raspberrypi camera, Alarm, Sensor,
Modelling Diagram:
Start detection
face detection
Facial parameters calculation
drowsiness Level determination
Audible and visual alarm
Alarm stopping
Driver
Smartphone
Face detection
Camera
Eye detection
Drowsiness Detection
Alarm

12. REFERENCES

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