# SURVEY ON REAL TIME DRIVER DROWSINESS DETECTION APP USING ML

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## ABSTRACT

Every year road accidents are increasing rapidly as technological and mechanical advancements in vehicles permits drivers to drive at high speed. Approximately 1.35 million people die each year as a result of road accidents in India alone 151 thousand casualties were recorded last year. From this nearly 78% road accidents are caused due to driver's fault. Main factors for this accidents are drowsiness, drunk and drive and over speeding from which nearly 40% of the accidents caused due to drowsiness. People are conscious about the risk of drinking and driving but don't realize the dangerous of drowsiness because no instruments exist to measure the driver drowsiness. If the Driver fails to concentrate on driving it reduces the driver reaction time and impairs steering behavior To solve this problem we are going to use the power of machine learning to identify if the driver is drowsy or not. Generally when someone feels drowsy his\hers eye blinking speed decreases by specifying threshold value we can detect if the driver is drowsy or not.

***Key Words : Driver Drowsiness, classification, Machine learning, feature extraction, app development, flutter, tensorflow lite.***

## INTRODUCTION

Proposed system is a mobile application which can detect drowsiness of driver by using feature extraction and machine learning which will help reduce road accidents due to drowsiness. Each year poor physiological health and bad sleep cycles are causing fatigue among people which is more severe if we look at the number of casualties caused daily all over globe due to drowsy driving. Research shows that nearly 40% of all the road accidents caused due to driver's fault are the result of drowsy driving. Preventing fatigue in early stages is really important as we are not only saving the life of the driver but potentially saving the life of other people like co-passengers, pedestrians etc.



Recent technological and computational advancements in the Smartphone industry allowed us to implement a robust drowsy driver detection system by making use of feature extraction and machine learning algorithms. Proposed system makes use of Smartphone's' front camera to take frame by frame pictures of the user and scans that image for facial landmarks to detect eye location to track eye. This information is then fed to the ML model to detect if the user is drowsy or not. If found drowsy the system will make alarming sound which can be only switched off manually after some time period.

## LITERATURE SURVEY

In the past many methods were used to detect and analyze drowsy drivers. This method include both the software and hardware implementation

In Driver Drowsiness Detection Using Eye Blinking Algorithm by Smt. B. A Sujatha used eye blinking parameter to check if driver is drowsy or not and as it is iot based approach it has high success rate but needs vehicle modification[1] another iot based approach Eye Awake: A Cost Effective Drowsy Driver Alert and Vehicle Correction System by Akshar Bhaskar used approach that monitors the behavioral and physiological characteristics of the driver such as eye blinking rate, unnatural head nodding/swaying, breathing rate and heart rate to detect drowsy driving. It has a high success rate but using a multithreaded microcontroller shows latency[6].

Another iot based approach IOT based Real-time Drowsy Driving Detection System for the Prevention of Road Accidents by Md. Yousuf Hossaib and Fabian Parsia George used eye aspect ratio to detect drowsiness but only effective at a daytime[7]

In software implementation eye blinking and yawning are two variable parameters which are used to detect driver drowsiness. In paper using mobile platform to detect and alert driver fatigue author used snapdragon library which accurately detects fatigue but has limitations as not all smartphones have snapdragon chipset inside them[2]. Facial Features Monitoring for Real Time Drowsiness Detection by Manu B. N. used support vector machine to monitor eyes as well as mouth which has high detection rate but taking mouth variable in the equation lowers the accuracy by 8%.[3] Another approach Sleepy Eye's Recognition for Drowsiness Detection uses binary pattern and edge detection to recognize eye state adaboost classifier is used the proposed method has high success rate but requires high computational power which compact system can't provide[4].

Drowsiness Detection Based on Eyelid Movement by Danghui Liu used Cascaded classifiers algorithm and the diamond search algorithm to track eyelid movement its accounts for vibration but results are satisfactory[5]

A Survey on Drowsy Driver Detection System by Kusuma Kumari made different observations by making use of Karolinska Sleepiness Scale (kss), Steering Wheel Movement (SWM) methods to predict drowsy driving but works in limited scenarios[8]

An attempt to prevent traffic accidents due to drowsy driving Prediction of drowsiness by Bayesian estimation uses bayesian estimation on a dataset acquired using simulated environment it can predict when driver will feel drowsiness but requires heart rate sensor[9]

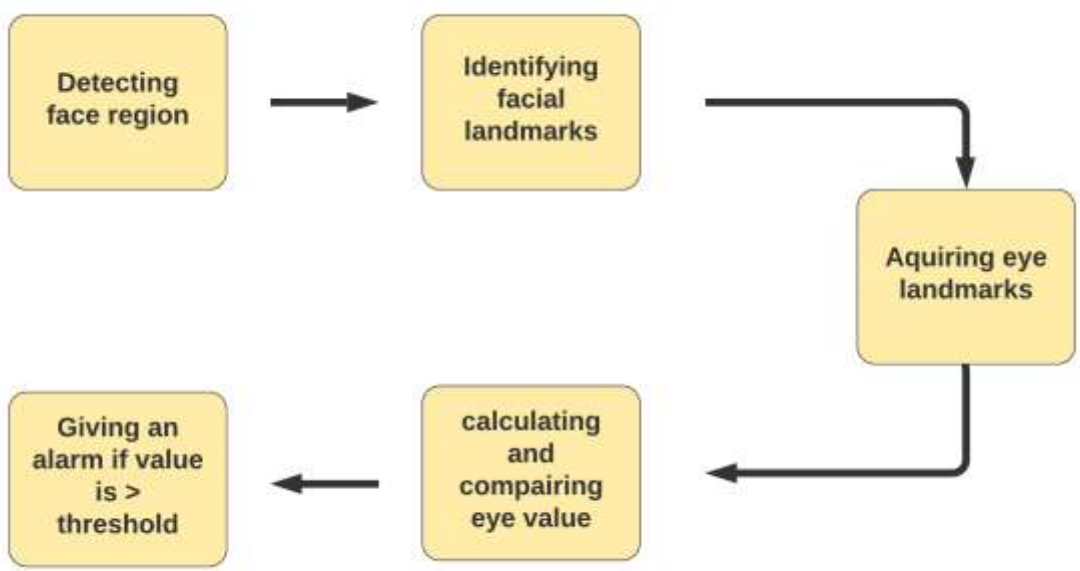
Support vector machines are used in Real-Time Eyelid Open/Closed State Recognition based on HLAC towards Driver Drowsiness Detection by Y. Ishii to classify drowsy and active state of driver but as it uses SVM so model need to be cover all parameters to accurately detect drowsiness[10]

Driver drowsiness detection using Behavioral measures and machine learning techniques make use of CNN which outperforms other techniques but training requires large data recorded in multiple environments[12]

Another study in Detection and prediction of driver drowsiness using artificial neural network models shows whether the data acquired to check drowsiness will also predict when a given drowsiness level will be reached. Moreover, this paper explores whether adding data such as driving time and participant information improves the accuracy of detection and prediction of drowsiness.[15]. Real-Time Driver Drowsiness Detection System Using Eye Aspect Ratio and Eye Closure Ratio uses eye closure and eye aspect ratio to detect drowsiness having high success rate even while wearing eyeglasses but as the model is implemented at server time it reduces functionality[16].

Enhanced Drowsiness Detection Using Deep Learning detects drowsiness using functional near-infrared spectroscopy (fNIRS) which measures brain signals[18]

## PROPOSED SYSTEM

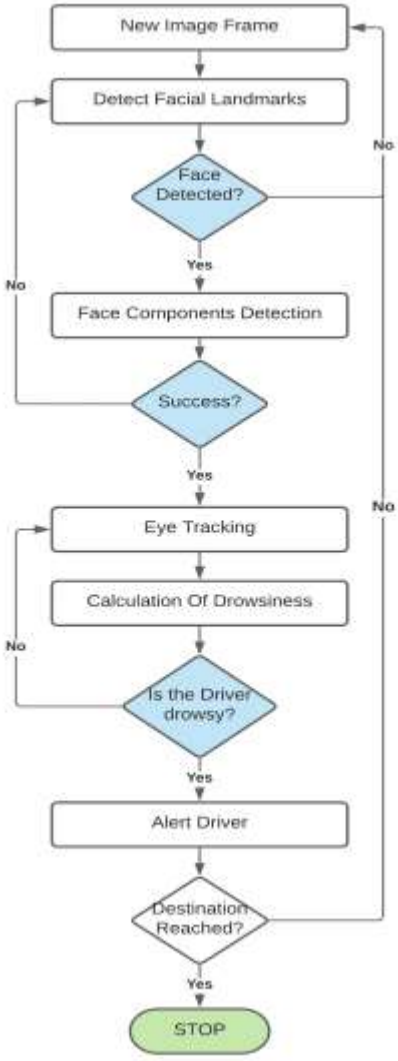



(fig : proposed system)

Most of the reference technologies that we studied had one downfall which was it had one or more hardware components. This makes them unaffordable to normal public which are actual users of this technology also it is very time consuming and complex to assemble.

Proposed system is a cross platform smartphone application which can be used on android as well as on ios devices as the application is built on a flutter framework. Flutter is a relatively new framework developed by google which is based on a widget based approach that makes apps to work on android as well as ios devices. The Machine learning model will be created on tensorflow and then will be converted to a smaller model by using tensorflow lite to be compatible with smartphones computational powers. This model is then implemented in a smartphone app by using google's firebase api. Firebase allows apps to use their ML Kit library to implement various inbuilt as well as custom ML models to work on smartphone devices. Models can be hosted on their cloud servers to reduce app size and computational time.

System will use smartphones' front camera to track drivers' faces all the time, it will take frame by frame pictures from which face region is detected. This data is used to detect eye region using the methods for left eye left Eye Open Probability and for the right eye right Eye Open Probability after that the average distance between upper and lower part of the eye is calculated if the value is smaller than the threshold value then driver will be informed by a loud alarming sound which can be only turned off manually.






(fig : proposed system)

## CONCLUSION

The primary objective of the proposed system is to make use of easily available and relatively cheap smartphone technology to effectively reduce car accidents by early detection of drowsiness in real time. Other approaches have used hardware implementation to detect fatigue which is complicated to install and generally expensive. By making use of machine learning and feature extraction techniques, the proposed system can detect early symptoms of drowsiness.

The proposed system is helpful to people or businesses which are using car rental services and cab booking services to constantly track their drivers state. It is also useful to late night travelers like goods transportation or state transportation services.

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