Drowsiness Detection System:

Introduction:

In this project, a drowsiness detection system has been designed which will detect the drowsiness in a user by analysing their eye state. If the user’s eye is kept closed for a long time, then this model will alert the user that he is drowsy.

Background:

This project has been implemented using Python Programming Language. And the various packages used are OpenCV (to detect the face and eye of the user), Tensorflow (for backend), Numpy(to perform numeric operations), pygame (to play the alarm sound), and Keras (to build the classification model). The input image is captured in a webcam and and at the output, an alarm will be played if the user’s eyes are closed for more than the predefined time.

Learning Objectives:

The main objective of this drowsiness detection system is to provide a safety monitoring system which will help in preventing the accidents of vehicles. This model will detect the early drowsiness symptoms of the driver before he fully sleeps, beep an alarm to wake him up and hence it will prevent major road accidents.

Activities and Tasks:

The input image of the user is first captured in a camera. The face is detected and a region of interest (ROI) is created. Then the eyes of the user are detected from the ROI and fed to the classifier. The classifier then categorizes whether the eyes are open or closed. Then it calculates the score to check whether the user is drowsy or not.

Skills and Competencies:

Installation of Python 3.8 version, install all the necessary libraries in it like numpy, openCV, matplotlib, tensorflow, jupyter notebook etc. Installation of Anaconda prompt for checking the output. Python coding is done in Jupyter notebook and in Visual Studio Code. Convolutional Neural Network layers has to be defined. Programs are run on Kaggle also for a better optimized output.

Feedback and Evidence:

There is a lot of things that we can learn from this project. It is a complete use of Deep Learning of CNN in Python. References are taken from:

1. Text Book “Python Programming by Reema Thareja”.
2. Few Research Papers like [www.researchgate.net](http://www.researchgate.net), [www.sciencedirect.com](http://www.sciencedirect.com) etc.
3. Few previous works on which people have already worked.

Challenges and Solutions:

The main challenge of this drowsiness detection system is that sometimes it cannot detect the emotions of the image or sometimes it cannot give very accurate results. And the solution to this challenge is that we have to train the model with more number of epochs to get better and accurate results or we should train the model with more number of images.

Outcomes and Impact:

The output of this model is calculated based on a score. The score is a value which is used to determine how long a person has closed his eyes. When both the eyes of the person are closed, the score keeps on increasing whereas when both the eyes are open, the score keeps on decreasing till 0. The threshold value of the score is kept 15. If the score becomes greater than 15, which means the person has closed his eyes for a longer period of time, then the alarm sound will ring to alert the driver.

Conclusion:

Drowsiness detection is a safety technology that can prevent accidents that are caused by drivers who fell asleep while driving. This system detects whether a person’s eye is open or close. If the person’s eye is closed for a few seconds, then the system detects it and rings an alarm which will wake up the driver and hence prevent accidents.