

DRIVER DROWSINESS DETECTION

Aditya
K V Vishnu Swaroop
K Goutham



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Accidents Prevention

Detecting driver drowsiness is important because it can help prevent road accidents and save lives. When a driver is drowsy or fatigued, their reaction times slow down, their decision-making abilities are impaired, and their attention may wander. These factors can increase the risk of accidents, especially if the driver falls asleep at the wheel.

Motivation

Life threat Prevention

The consequences of a single drowsy driving accident can be far-reaching. For example, an accident caused by a drowsy driver could result in the loss of life or injury to innocent passengers, pedestrians, or other drivers. In addition, the psychological impact on survivors and their families can be long-lasting.

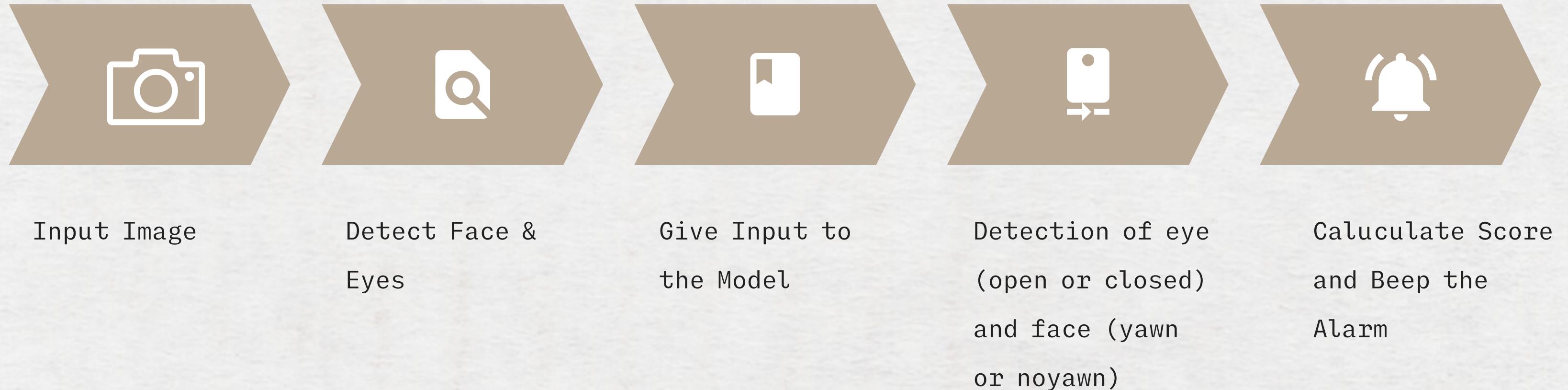
Problem Statement

Develop an Accurate and reliable system that automatically recognizes whether a person from a still image or video is in a state to drive a vehicle or not

Introduction

- With this Project, we will be making a drowsiness detection system.
- The majority of accidents happen due to the drowsiness of the driver. So, to prevent these accidents we will build a system using Python, OpenCV, and Keras.
- This System alerts the driver whenever he feels sleepy.

Proposed Approach

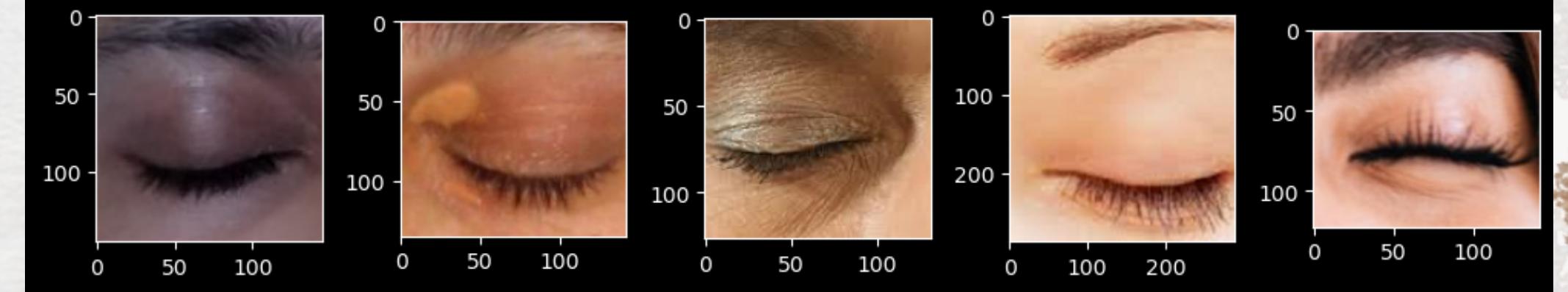


Dataset

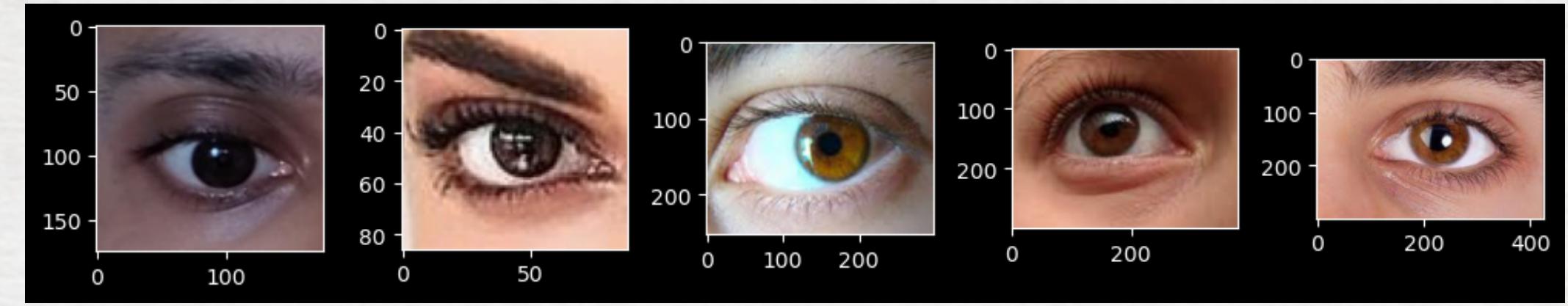
- The dataset used for this model is taken from [Kaggle](#)
- The dataset consists of 2900 images which include both normal and yawning images.
- In the Normal images dataset is divided into Open Eye and Close Eye and in Yawning images it is divided into yawn and Noyawn

Dataset

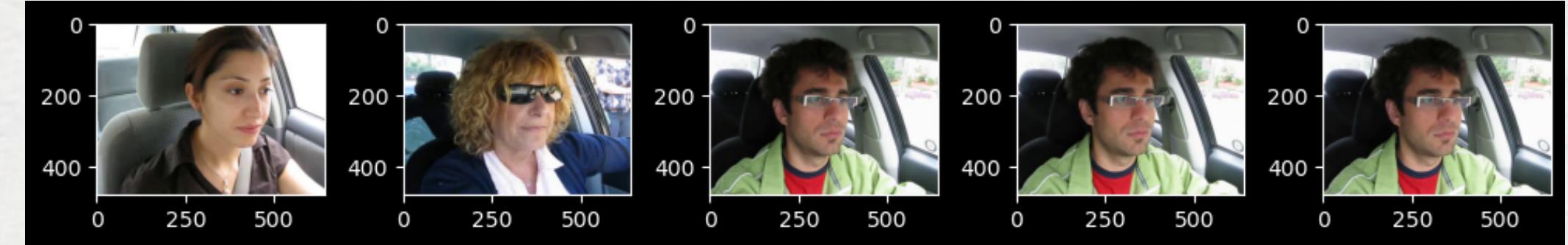
- Closed Eye



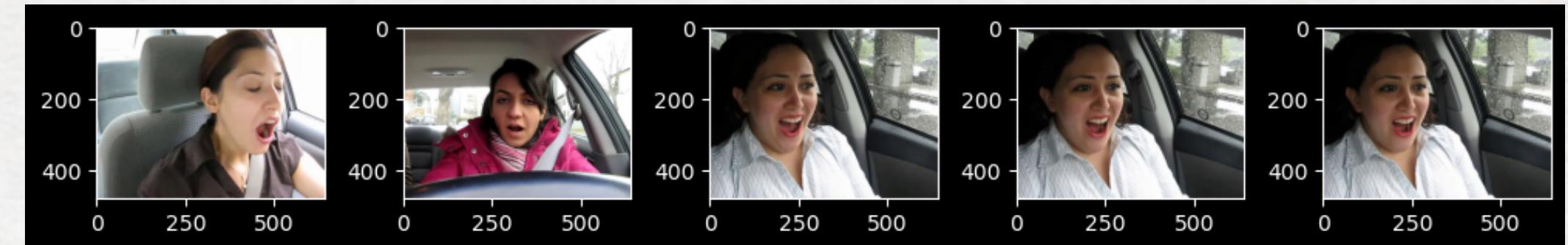
- Open Eye



- No Yawn



- Yawn

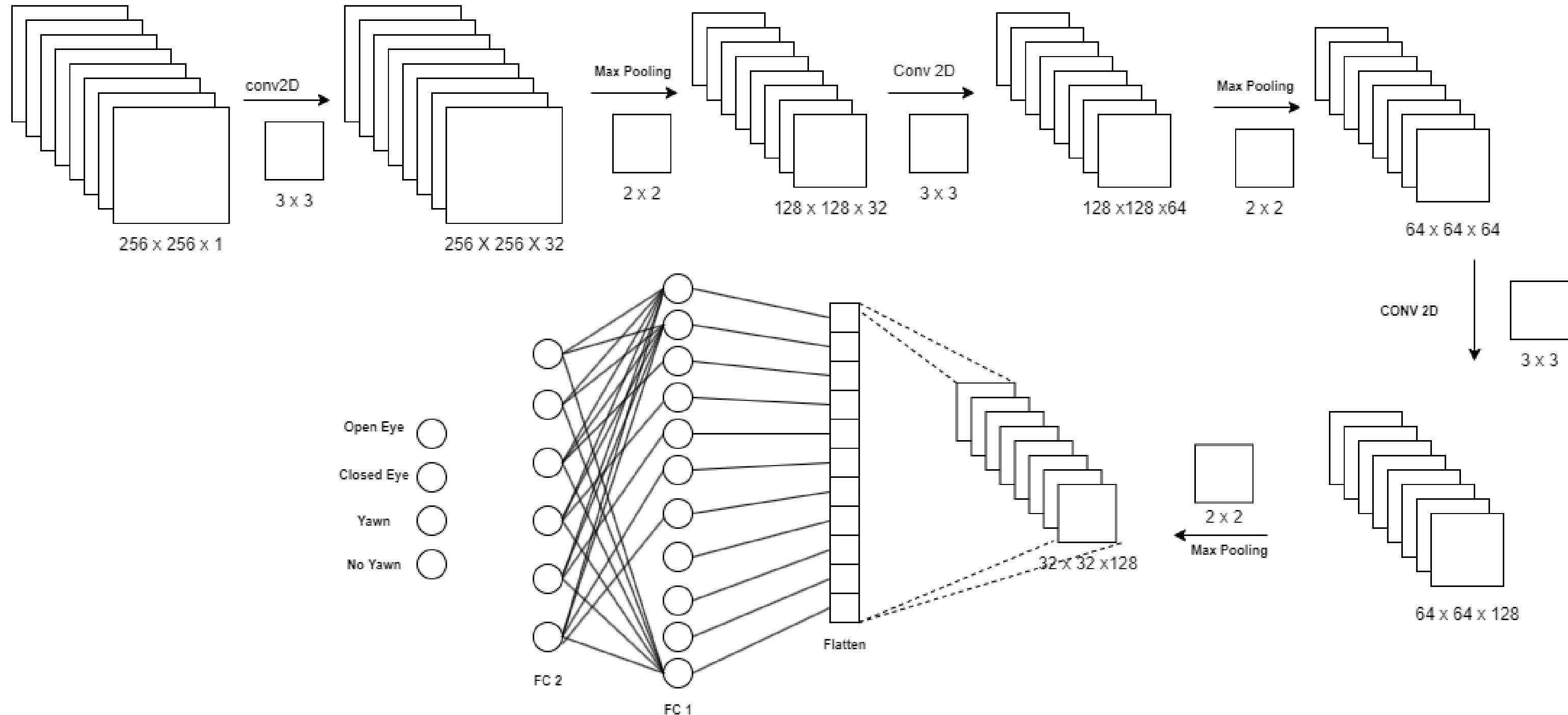


Proposed Model

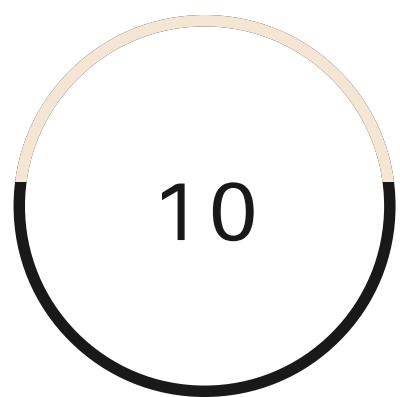
The model we proposed is a simple convolutional neural network (CNN) with three convolutional layers followed by max-pooling layers, a flattened layer, two fully connected (dense) layers, and a softmax activation function for multiclass classification.

- Conv2D Layer (with 32 filters of size 3x3)
- Max Pool (with a pool size of 2x2)
- Conv2D Layer (with 64 filters of size 3x3)
- Max Pool (with a pool size of 2x2)
- Conv2D Layer (with 128 filters of size 3x3)
- Max Pool (with a pool size of 2x2)
- Flatten
- FC Layer (64 Neurons + ReLU)
- Output layer (with a softmax activation function)

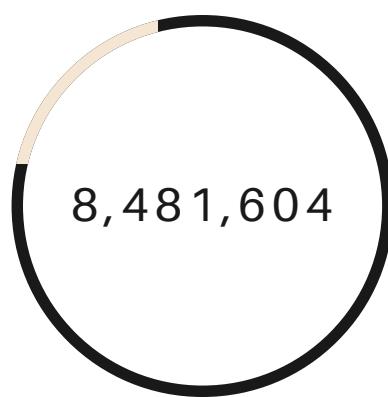
Proposed Model



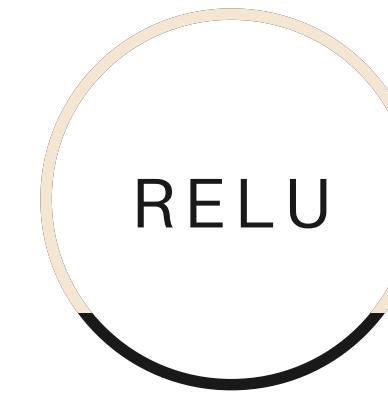
Training Parameters



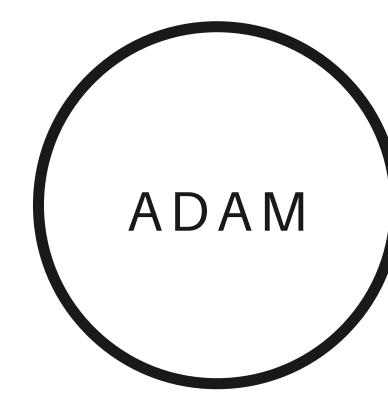
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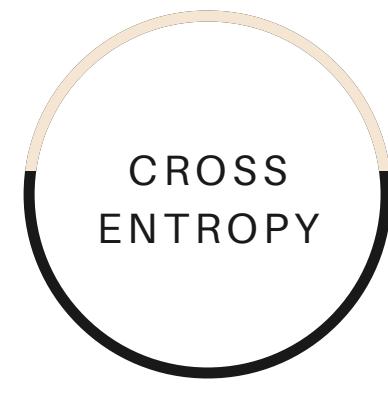
NO OF PARAMS



ACTIVATION
FUNCTION



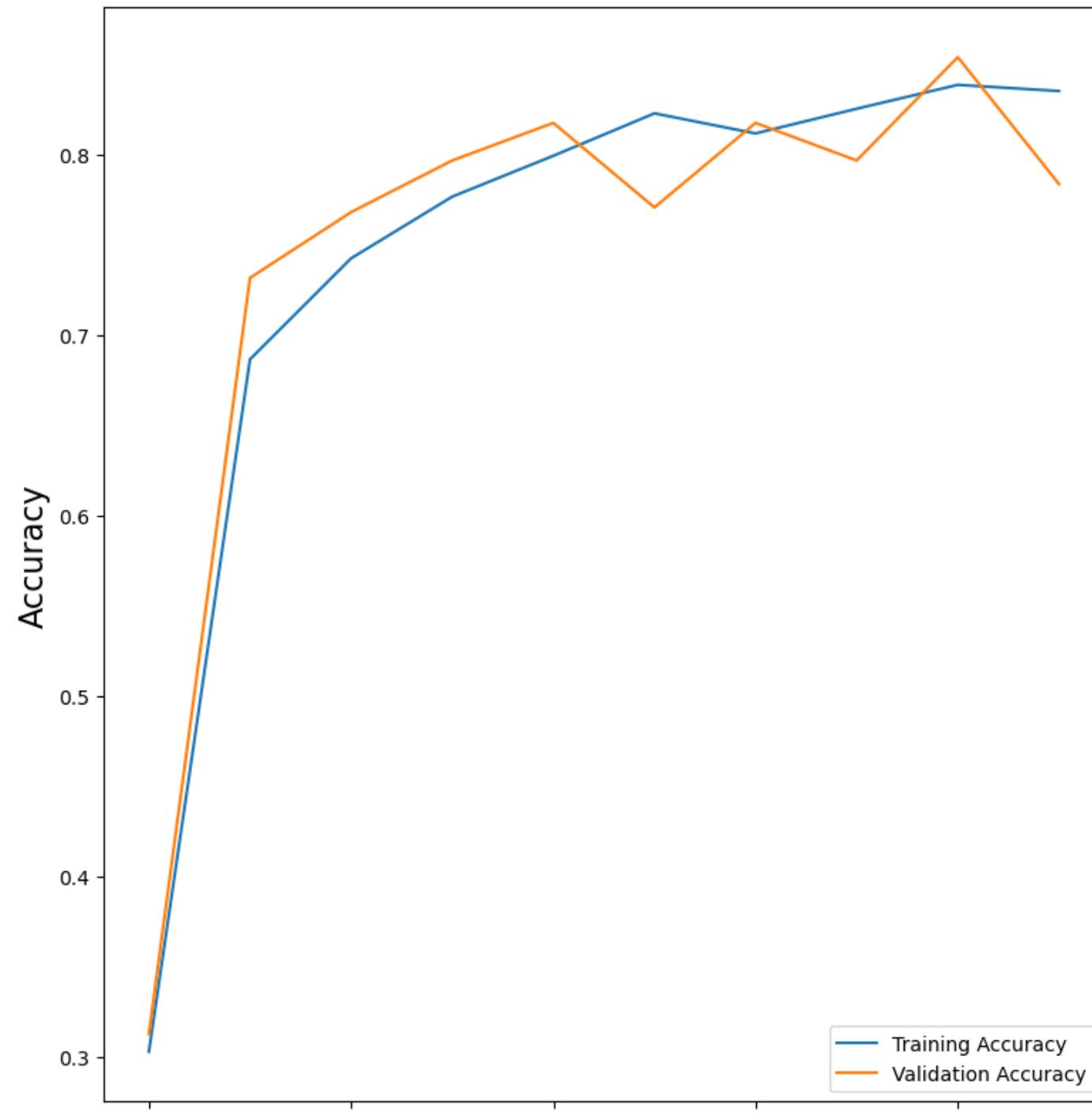
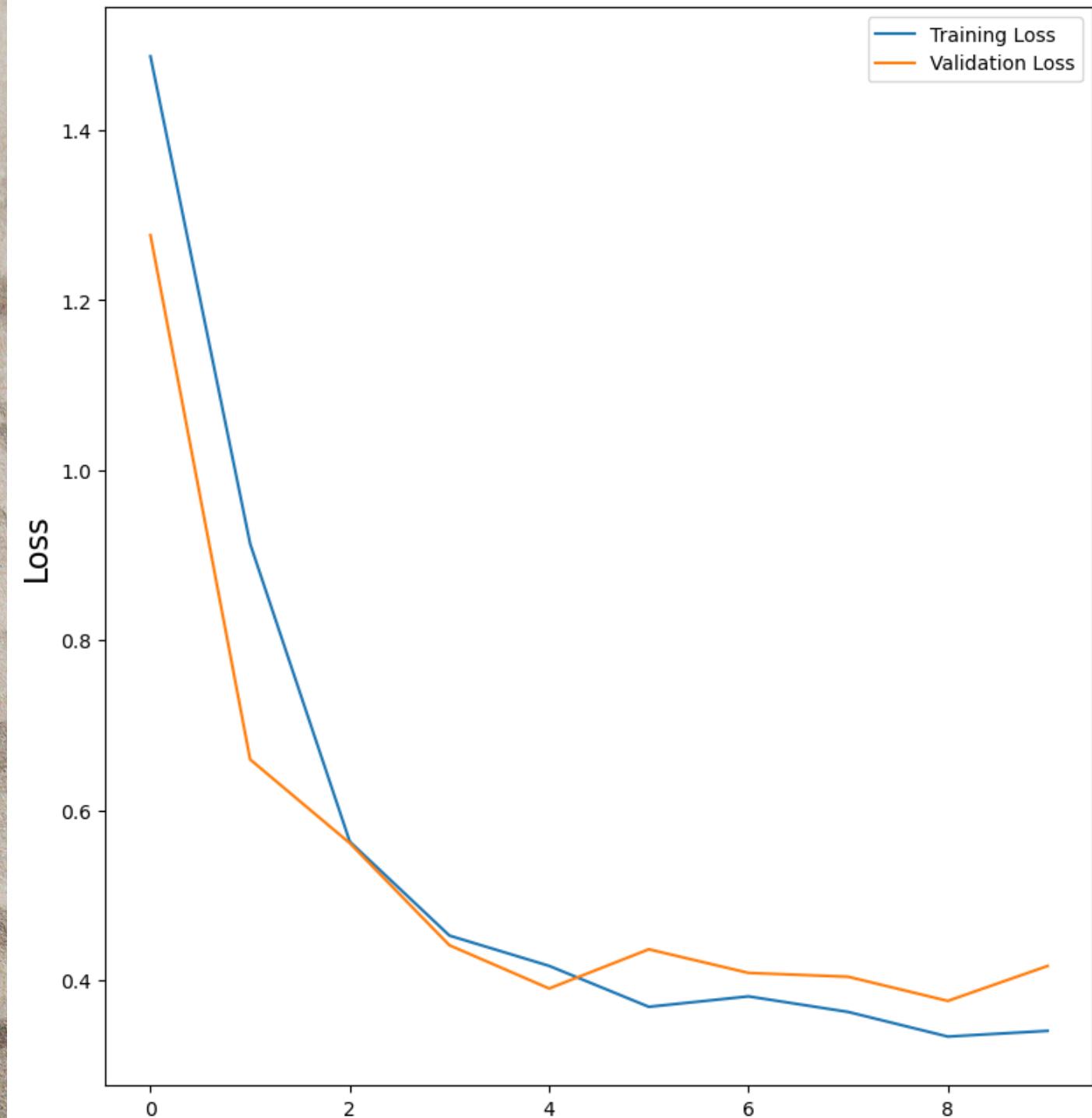
OPTIMIZER



LOSS FUNCTION

Results

Optimizer : Adam



Work Done Until Now

- Conducted a thorough search for a suitable dataset to use in the project, taking into account factors such as data quality, availability, and relevance.
- Spent time carefully considering different modeling approaches and selecting the most appropriate one based on factors such as model complexity, accuracy, interpretability, and feasibility.
- Began implementing the chosen model, including setting up the necessary software and programming environment, importing and preprocessing data, and experimenting with different model parameters and configurations.
- Conducted initial tests of the model's performance, such as assessing its accuracy on a small subset of the data, identifying potential issues or challenges, and making necessary adjustments to improve the model's performance.

Conclusion

Proposed an accurate CNN model with accuracy 0.82 for open,closed eye and yawn, No yawn face detection which can enhance safety in various industries, including transportation, healthcare, and manufacturing.

Future Work

Captures video from the default camera using OpenCV and Detects faces and eyes in the frame

Classifies eye states (open or closed) and Yawn State (Yawn or No Yawn) using the Keras model

Calculates a score based on the number of consecutive frames in which both eyes are closed, yawn and to display the video frame with text showing the current score and eye state

If the score exceeds a threshold, the program beeps the alarm and overlays a red rectangle alert on the video frame

Thank you!