جامعة حلوان
Helwan University

كلية الحاسبات والذكاء الإصطناعي
Faculty of Computers & Artificial Intelligence

CS 396 Selected Topics in CS-2

Team ID No. **47**

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Paper Name : A Real-time Driving Drowsiness Detection Algorithm With Individual Differences Consideration

Corresponding authors: Haiwei Wang and Hongyi Li

Yawn_Eye_dataset_new

Link Dataset : https://www.kaggle.com/datasets/serenaraju/yawn-eye-dataset-new

Dataset contains pictures of people yawning and falling asleep while driving .

- It contains 433 images for Testing and 2467 for Training. In Total 2900 images.

Training is classified into :

- Closed (617 images)
- No_Yawn (616 images)
- Open (617 images)
- Yawn (617 images)

Testing is classified into :

- Closed (109 images)
- No_Yawn (109 images)
- Open (109 images)
- Yawn (106 images)

We only use 2 directories of each (Closed,Open).

The dimension of images is no the same for all images.

Implementation details :

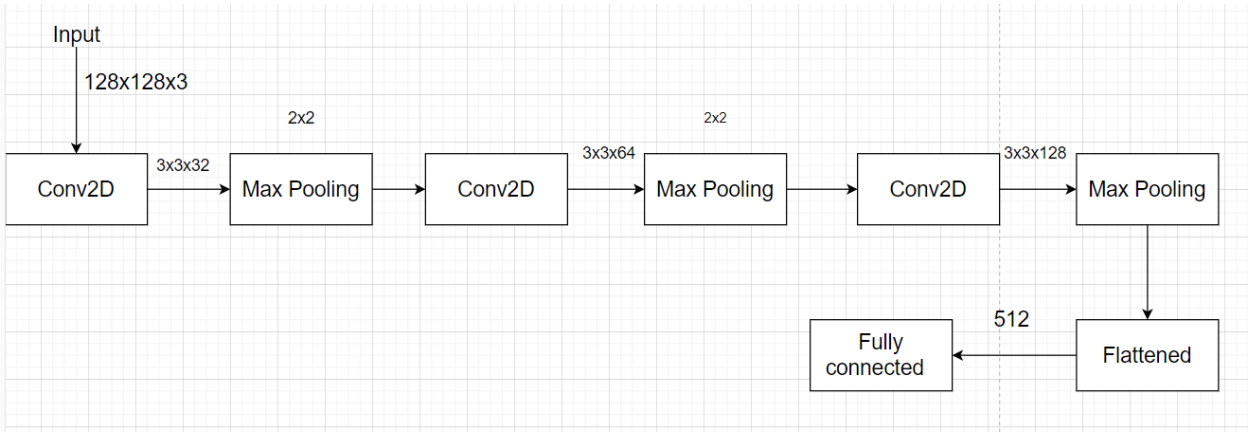
- In this model we only used eyes not yawn to detect if the drivers are asleep or no .

- We used image data generator because the dataset is small.

- We split our dataset into 85% Training and 15% Testing and split the training into 80% Training and 20% validation.

- The Dataset of 1452 images were split into the training set (1252 images)

Block Diagram :



Layer (type)	Output Shape	Param #
conv2d (Conv2D)	(None, 126, 126, 32)	896
batch_normalization (BatchNormalization)	(None, 126, 126, 32)	128
max_pooling2d (MaxPooling2D)	(None, 63, 63, 32)	0
dropout (Dropout)	(None, 63, 63, 32)	0
conv2d_1 (Conv2D)	(None, 61, 61, 64)	18496
batch_normalization_1 (BatchNormalization)	(None, 61, 61, 64)	256
max_pooling2d_1 (MaxPooling2D)	(None, 30, 30, 64)	0
dropout_1 (Dropout)	(None, 30, 30, 64)	0
conv2d_2 (Conv2D)	(None, 28, 28, 128)	73856
batch_normalization_2 (BatchNormalization)	(None, 28, 28, 128)	512
max_pooling2d_2 (MaxPooling2D)	(None, 14, 14, 128)	0
dropout_2 (Dropout)	(None, 14, 14, 128)	0
flatten (Flatten)	(None, 25088)	0
dense (Dense)	(None, 512)	12845568
batch_normalization_3 (BatchNormalization)	(None, 512)	2048
dropout_3 (Dropout)	(None, 512)	0
dense_1 (Dense)	(None, 1)	513

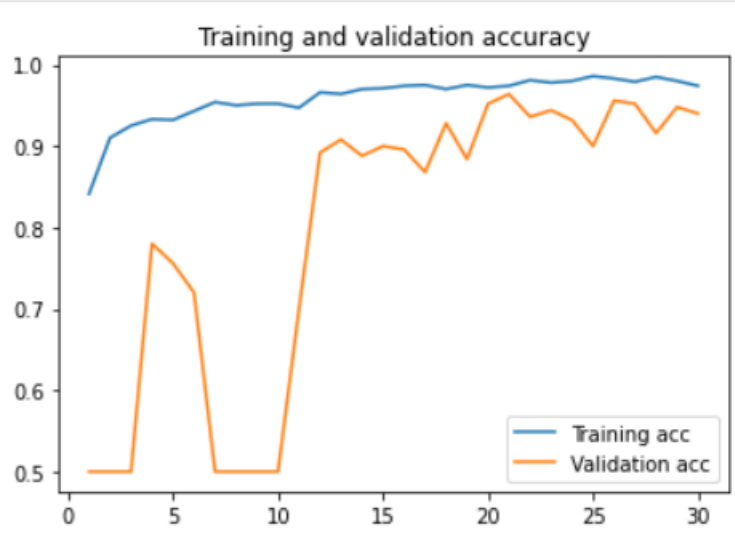
Hyperparameters :

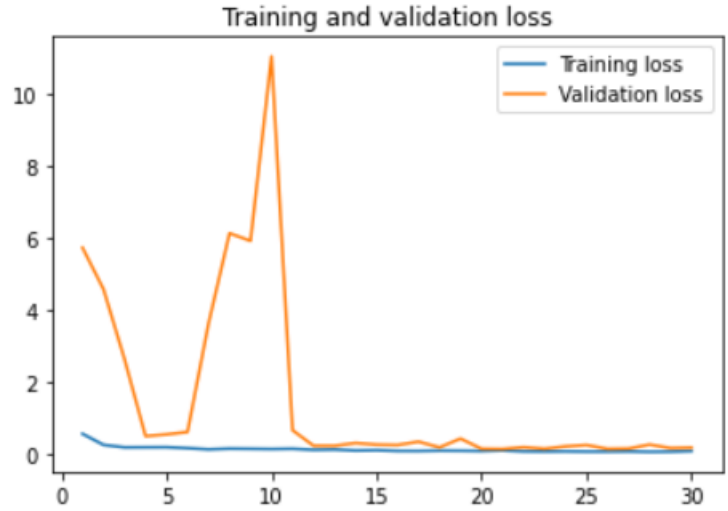
Activation functions : Relu, Sigmoid

Number of epochs = 30

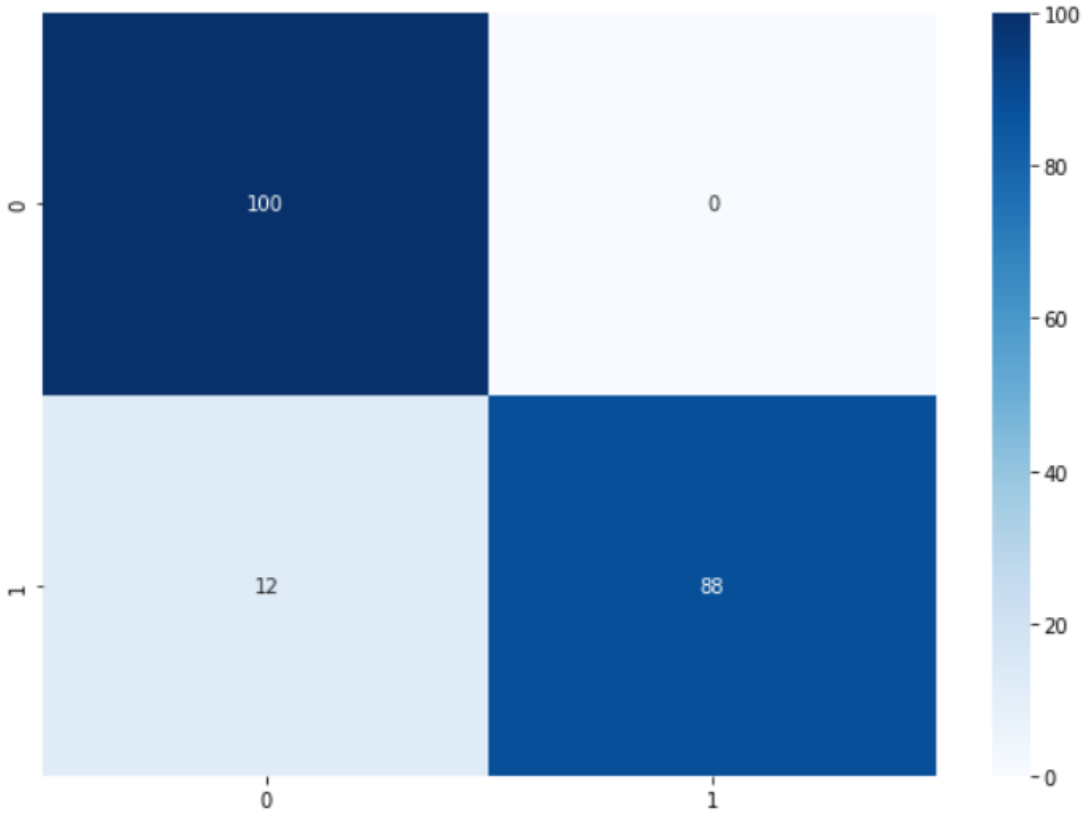
Optimizer : Adam

Result and Visualization :





Convolution Matrix :



Precision & Recall & Score :

	precision	recall	f1-score	support
close	0.89	1.00	0.94	100
open	1.00	0.88	0.94	100
accuracy			0.94	200
macro avg	0.95	0.94	0.94	200
weighted avg	0.95	0.94	0.94	200

After Optimization :

Accuracy :

```
(200, 128, 128, 3)
7/7 [==============================] - 0s 50ms/step - loss: 0.0349 - accuracy: 0.9800

[0.03494064509868622, 0.9800000190734863]
```