أكاديمية سدايا
SDAIA Academy

Face Detector Using Deep Learning

By : Aishah Alenazi, Hala Alenazi, Hussain Alsultan
Yaqeen Alhawaj and Sheikha Saud.

BACKSTORY

Deep learning is now more accessible than ever before for organizations of any size. Face recognition is a biometric system used to identify or verify a person from a digital image. Face recognition is one of the most used methods in the field of image analysis .

The **goal** of this project is to build a deep neural network model that uses image data to extract its features and then recognize it, regardless of lighting, expression, illumination, ageing, transformations (translate, rotate and scale image) and pose, which is a difficult task ,this project can be used for Security cameras, Offices, University, ATM, Bank, in any locations with a security and to collect criminal's images automatically and notify the authorities.

01

DATA

- Backstory
- Data set
- Tools
- Data Processing

02

MODELS

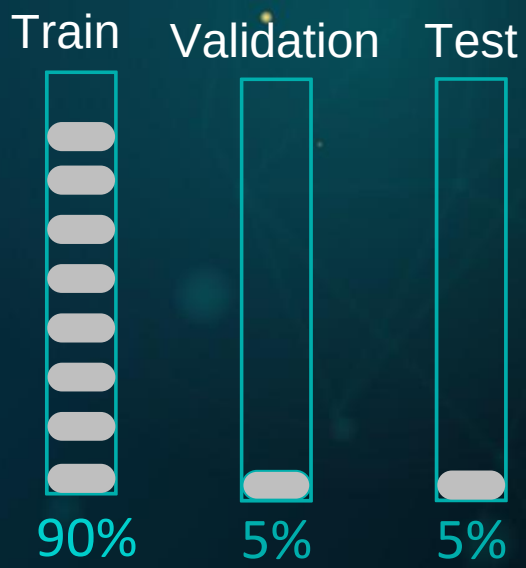
- Baseline model
- Convolutional Neural Network Model
- Transfer Learning model

03

DEMO
Challenges
Future Work

DATASET

- Facial Detector
- Data from Kaggle.
- There are 105 celebrities and 17534 faces.
- Data Sample 9 celebrities and 1489 faces.



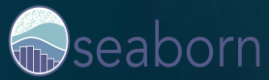
TOOLS


NumPy


TensorFlow


jupyter


K
Keras


seaborn


scikit
learn


matplotlib

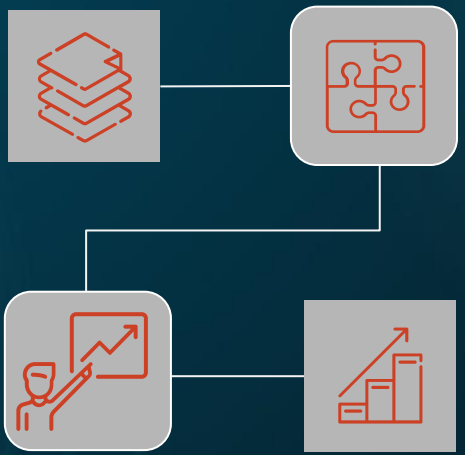

pandas


OpenCV

PROJECT WORKFLOW

DATA READING

Reading images using TensorFlow



DATA AUGMENTATION

- Resize the images (180x180)
- Scaling/Normalization (1 to 255)
- flip images (Horizontally)
- rotate images (up to 20°)

BASELINE MODELS

Sample images.
Data classes graph.

MODELS

CNN Model
Transfer Learning Model

DATA SAMPLE

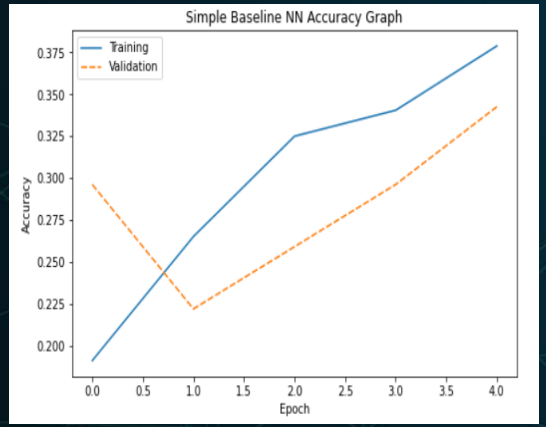

pins_Anne Hathaway
pins_Alexandra Daddario
pins_Ben Affleck
pins_Alvaro Morte
pins_Bill Gates
pins_barack obama
pins_Anthony Mackie
pins_Adriana Lima
pins_amber heard

BASELINE MODELS

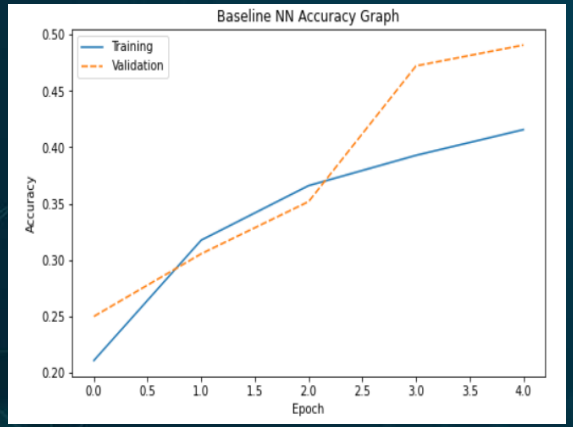
Model	Simple NN	Neural Network	Simple CNN
Training	0.416	0.392	0.468
validation	0.457	0.396	0.493

BASELINE MODEL GRAPHS

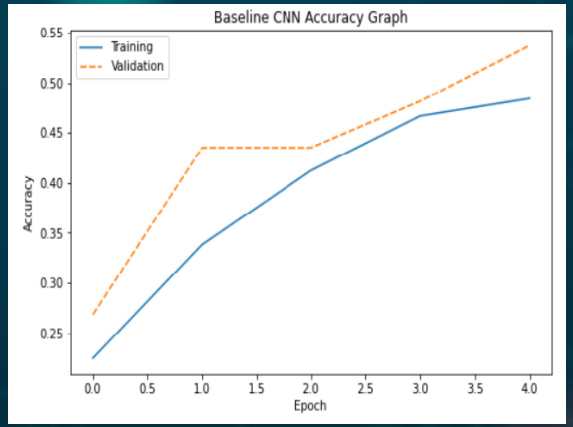
Simple NN



Neural Network



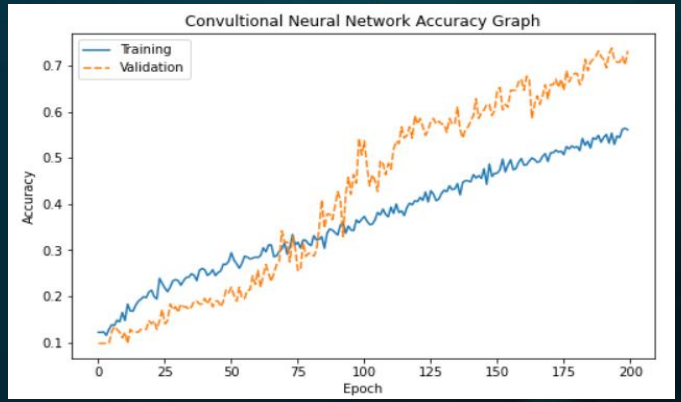
Simple CNN



Epochs =5

Convolutional Neural Network Model

Model	CNN
Training	0.733
validation	0.731



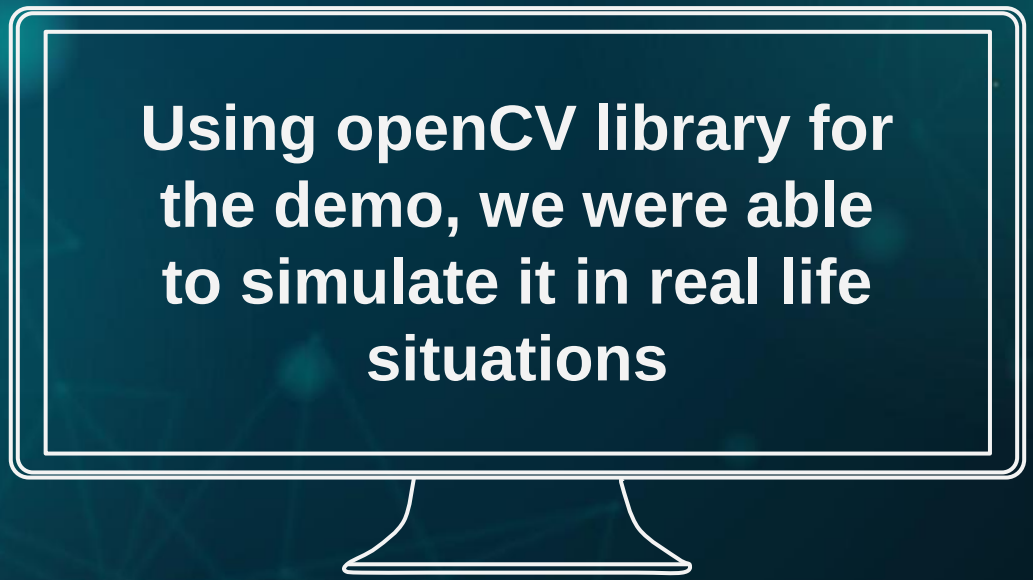
Epochs =200

Transfer Learning Models

Epochs =30

Model	DenseNet	VGG-16	VGG-19	InceptionV3	ResNet50
Training	0.889	0.953	0.969	0.874	0.546
validation	0.792	0.932	0.926	0.829	0.231

Demo


Using openCV library for the demo, we were able to simulate it in real life situations

Challenges

- ✓ It was easier for us to find out the identity of subject however it was pretty difficult to identify human identity.
- ✓ The model takes long time to run .
- ✓ The demo was able to identify the face for the video at the end, but it took long time.
- ✓ Difficulties during the past few weeks due to Covid-19.

Future Work

- refine our model to be faster and more efficient.
- use it for collecting violations in public places.
- increasing the number of people detected per second.
- using multiple models to gain different types of information (for example: detect identity, car, clothing, smoking, crowded streets, Weather, time of day).

THANKS!