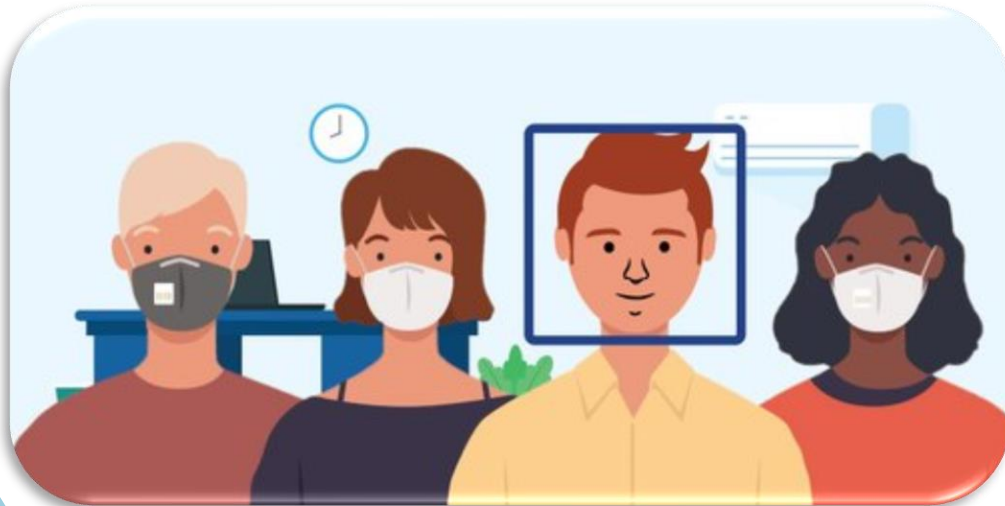


Face Mask Dectection



Presented By:
Nada Alruwayth
Wafaa Alharbi

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• Introduction

The COVID 19 pandemic is causing a worldwide health crisis. Wearing a face mask in public places and whatever else is the most effective safety gear.



Solution

Develop a system that detects through the camera if the person is wearing a mask , without mask or wearing mask incorrectly.

Tools



Tensorflow



OpenCV



Keras



Streamlit



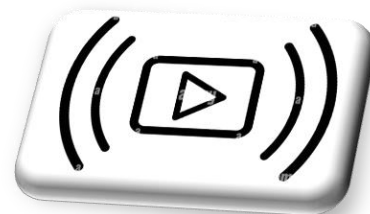
Matplotlib



Sklearn



Plotly



**imutils.video
for Video
Stream**

Data

- **Resource**
Kaggle with a total of 8982 images
- **Image quality**
Different Quality
Close up face only
- **split dataset**
Train -> 7130 images
Test -> 899 images
Validation -> 899 images
Sorted by each class label

mask_weared_incorrect



mask_weared_incorrect



with_mask



without_mask



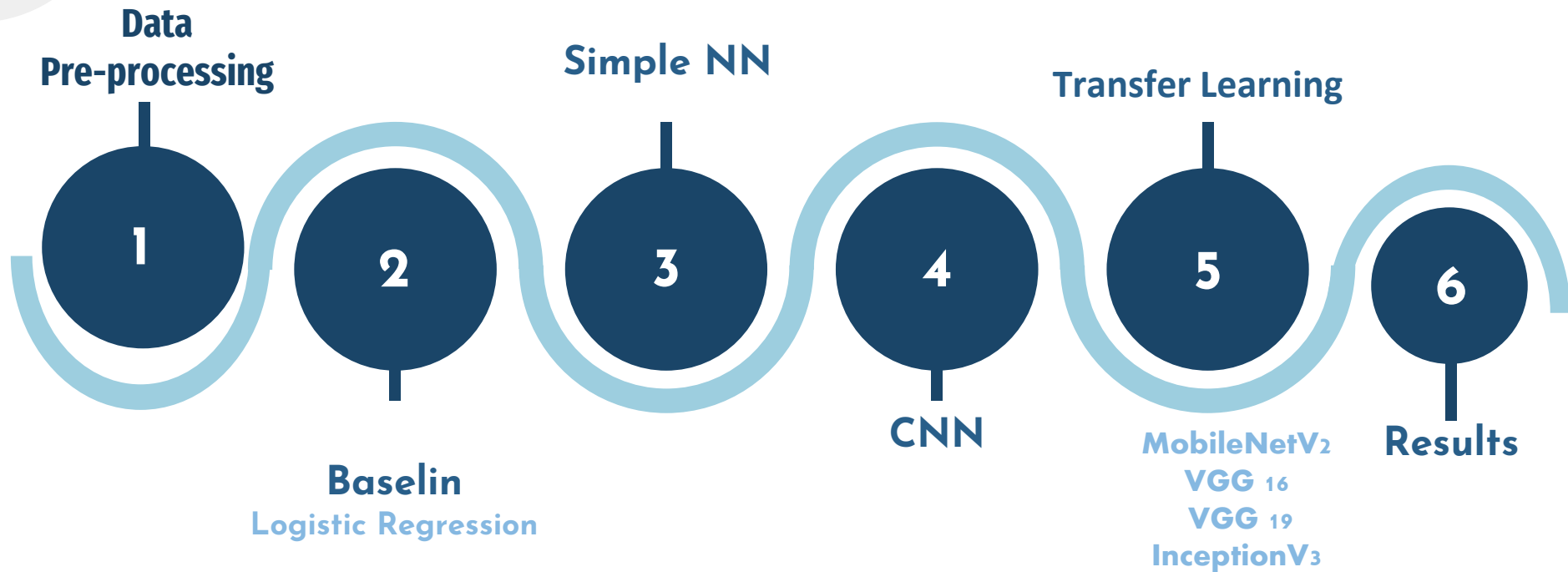
EDA

No Class imbalance issue **2994** images for each class

Convert BGR and RGB with OpenCV function



Workflow





1

Baseline

Logistic Regression:

Training: 96%

Validation: 92%

Test: 92%

2

Simple NN

Model: "sequential_2"

Layer (type)	Output Shape	Param #
dense_6 (Dense)	(None, 15)	737295
dense_7 (Dense)	(None, 10)	160
dense_8 (Dense)	(None, 5)	55
dense_9 (Dense)	(None, 3)	18

=====
Total params: 737,528

Trainable params: 737,528

Non-trainable params: 0

Accuracy Score:

Training: 33%

Validation: 33%

3

CNN

Experiment 1

- *Conv2D + Maxpooling*
- *Different size of filters : 32,128*
- *Flatten*
- optimizer : Adam

Experiment 3

- Add more layers

Experiment 2

- Dropout(.05): only 5 %
- ReduceLROnPlateau
- EarlyStopping
- optimizer : Adagrad

Experiment 4

- Dense try 512
- Regularizer

3

CNN

	Training	Validation
Experiment 1	97%	95%
Experiment 2	99%	97%
Experiment 3	93%	92%
Experiment 4	98%	97%

4

Transfer Learning Model

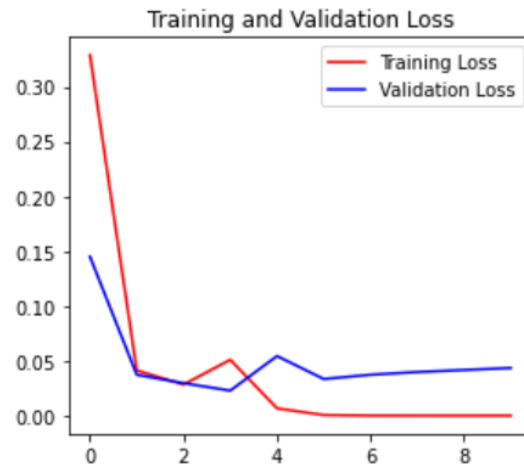
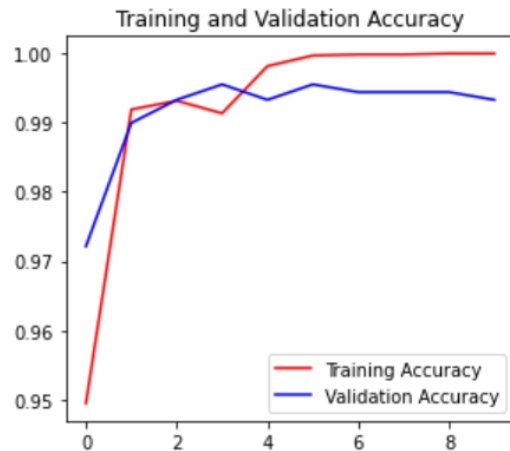
	Training	Validation
MobileNetV₂	99%	95%
VGG₁₆	99%	99%
VGG₁₉	100%	99%
InceptionV₃	93%	93%

• Best Model

VGG 19 Model

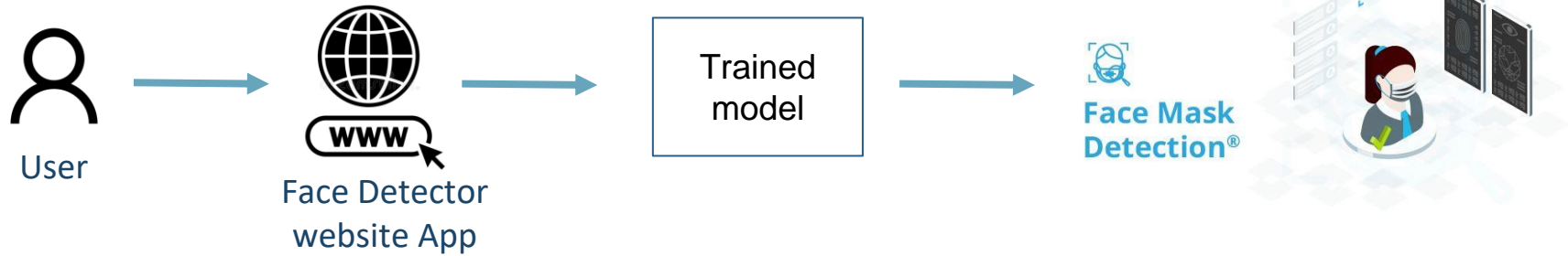
Accuracy Score:

- Training: 100%
- Validation: 99%
- Test: 98%



Results

1- Face-Detector cloud environment



Demo..

(Try it with us)



2- Face-Detector in real-time video streams

VGG16 Model



Video stream app

Deploy



Thanks♥

Any Questions