Face Mask Dectection

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Table of Contents

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

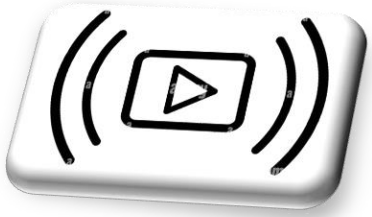
Keras

Streamlit

Matplotlib

Sklearn

Plotly



imutils.video for Video Stream

Data

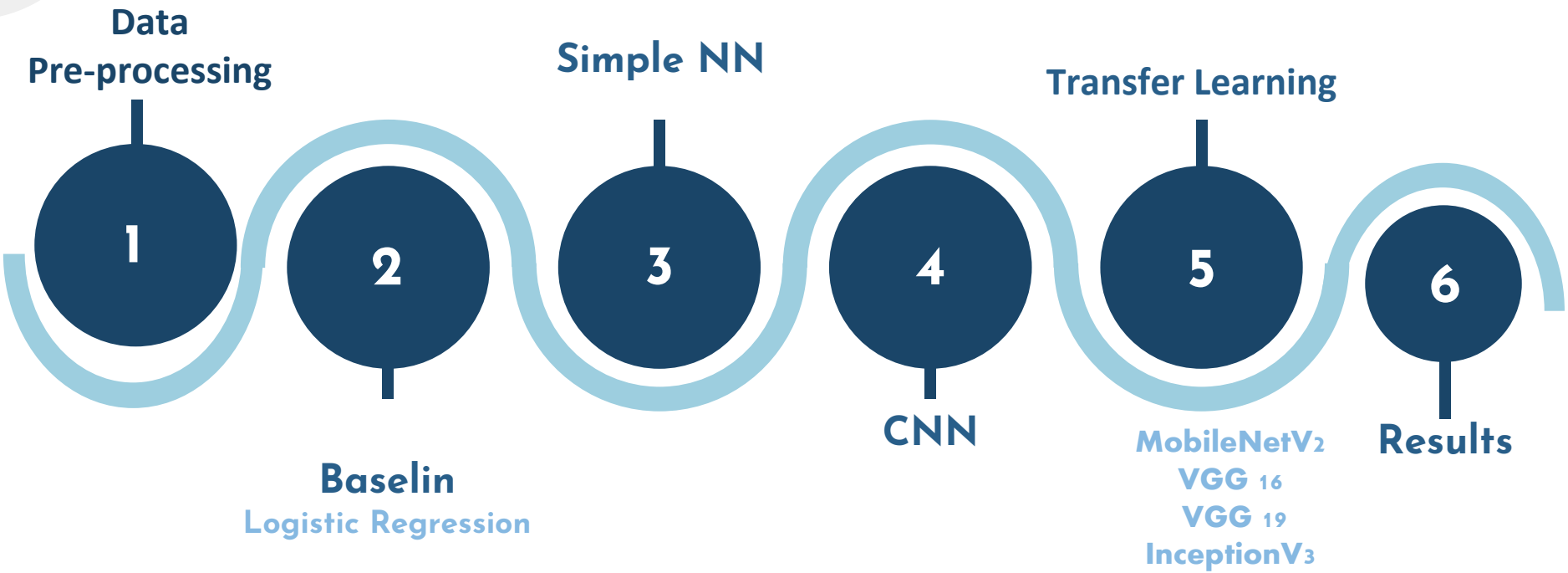
- **Resource**
  Kaggle with a total of 8982 images
- **Image quality**
  Different Quality
  Close up face only
- **split dataset**
  Train -> 7130 images
  Test -> 899 images
  Validation -> 899 images
  Sorted by each class label

EDA

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

Convert BGR and RGB with OpenCV function

Workflow


Data
Pre-processing
1
2
Baselin
Logistic Regression
Simple NN
3
4
CNN
Transfer Learning
5
MobileNetV2
VGG 16
VGG 19
InceptionV3
6
Results

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 2

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

Experiment 3

- Add more layers

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%

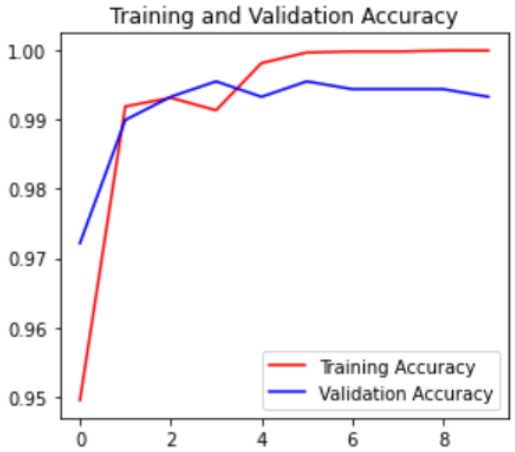
4

Transfer Learning Model

	Training	Validation
MobileNetV2	99%	95%
VGG 16	99%	99%
VGG 19	100%	99%
InceptionV3	93%	93%

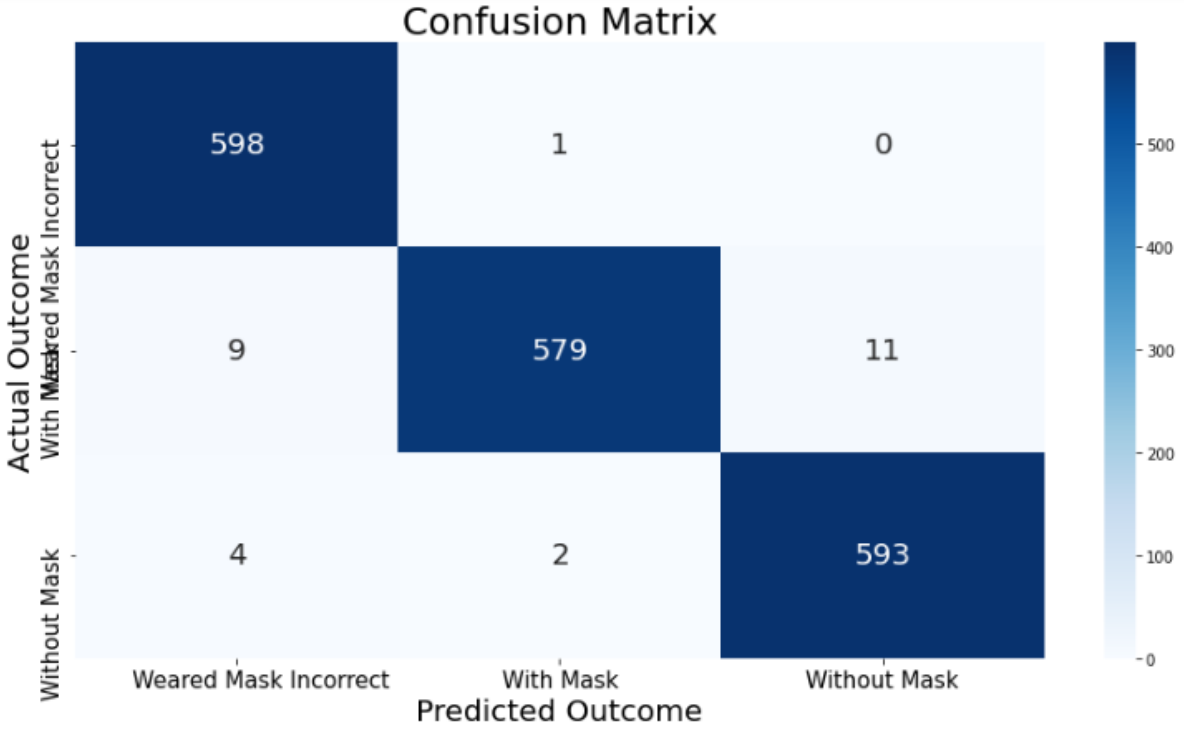
Best Model

VGG 19 Model



Accuracy Score:

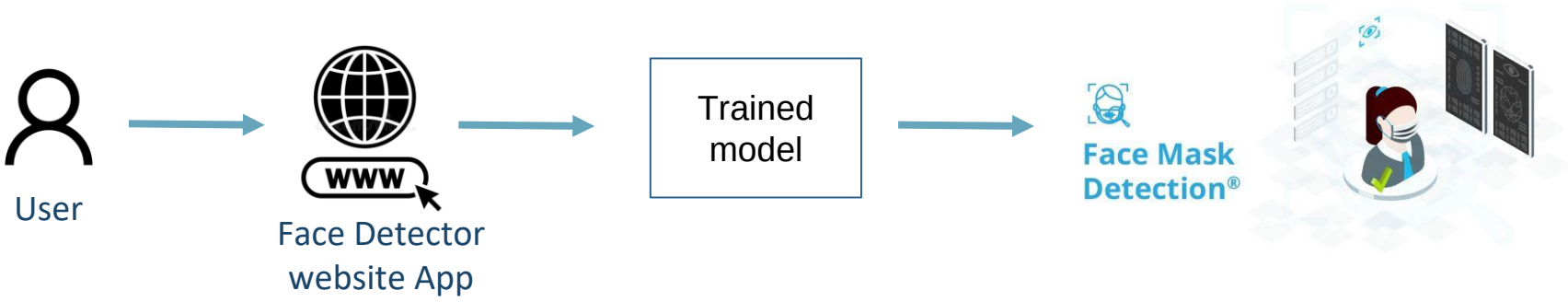
- **Training: 100%**
- **Validation: 99%**
- **Test: 98%**



get 27 wrong predictions out of 1797 samples.

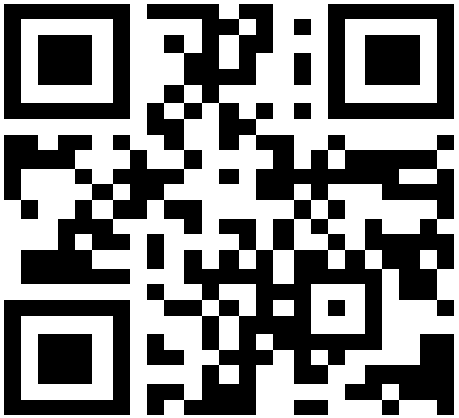
Results

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