

Face Mask Detector

By Ibrahim Hameem



Motivation

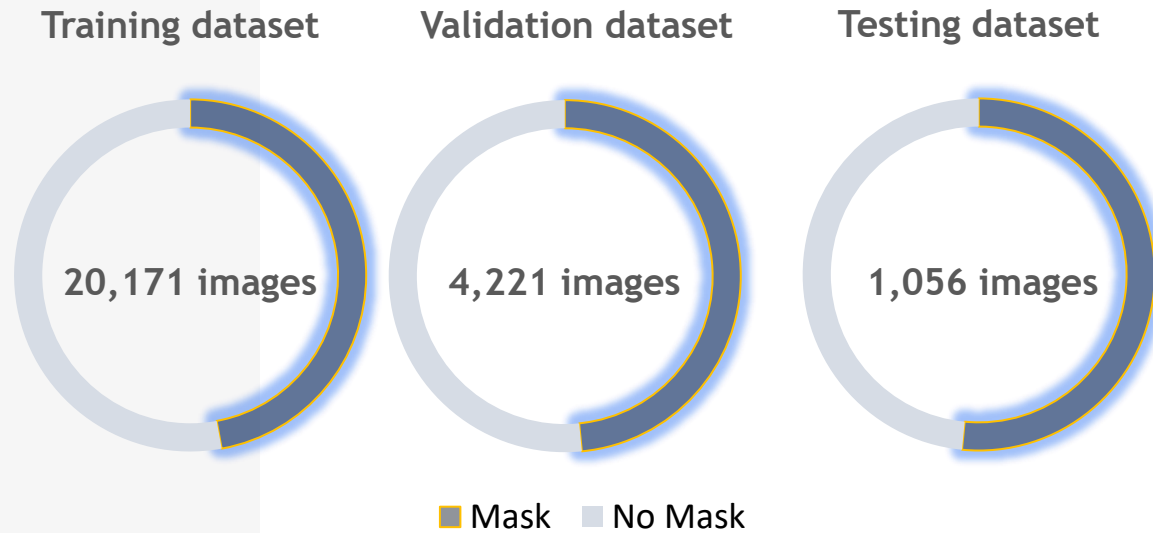
- Wearing a face mask is generally accepted to be a simple but effective health and safety precautionary measure for slowing the spread of COVID-19.
- However forgetting to wear a mask, taking the mask off or wearing the mask incorrectly in vulnerable areas can threaten the safety of a given individual, their colleagues and co-workers.
- This project was done with the objective of developing a face mask detector that can help automatically monitor vulnerable areas and identify individuals not wearing a mask or the ones wearing a mask incorrectly such that they can be reminded not to do so in future!



Methodology

1

Collating the dataset



Sources:

[Dataset made available by Cabani et al used to create MaskedFace-Net](#)

[Face Mask Project of Mr. Thakshila Dasun - Google Drive Link](#)





Methodology

2

Creating a CNN using “MobileNet V2” as a base

Data Augmentation layers

Google’s MobileNet V2 –
Pre-Trained CNN

The top 74 layers of MobileNet V2 was unfrozen and re-trained to recognize masked and no mask or incorrectly masked images

Average Pooling layer

Flattening layer

Dense layer with 128 units and ReLU activation

Random dropout layer with a dropout rate of 20%

Output layer with sigmoid activation function

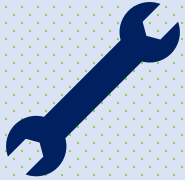
Methodology

3

Compiling the CNN and Training



Learning Rate: $10e^{-5}$



Optimizer: Adam



Metrics: Accuracy



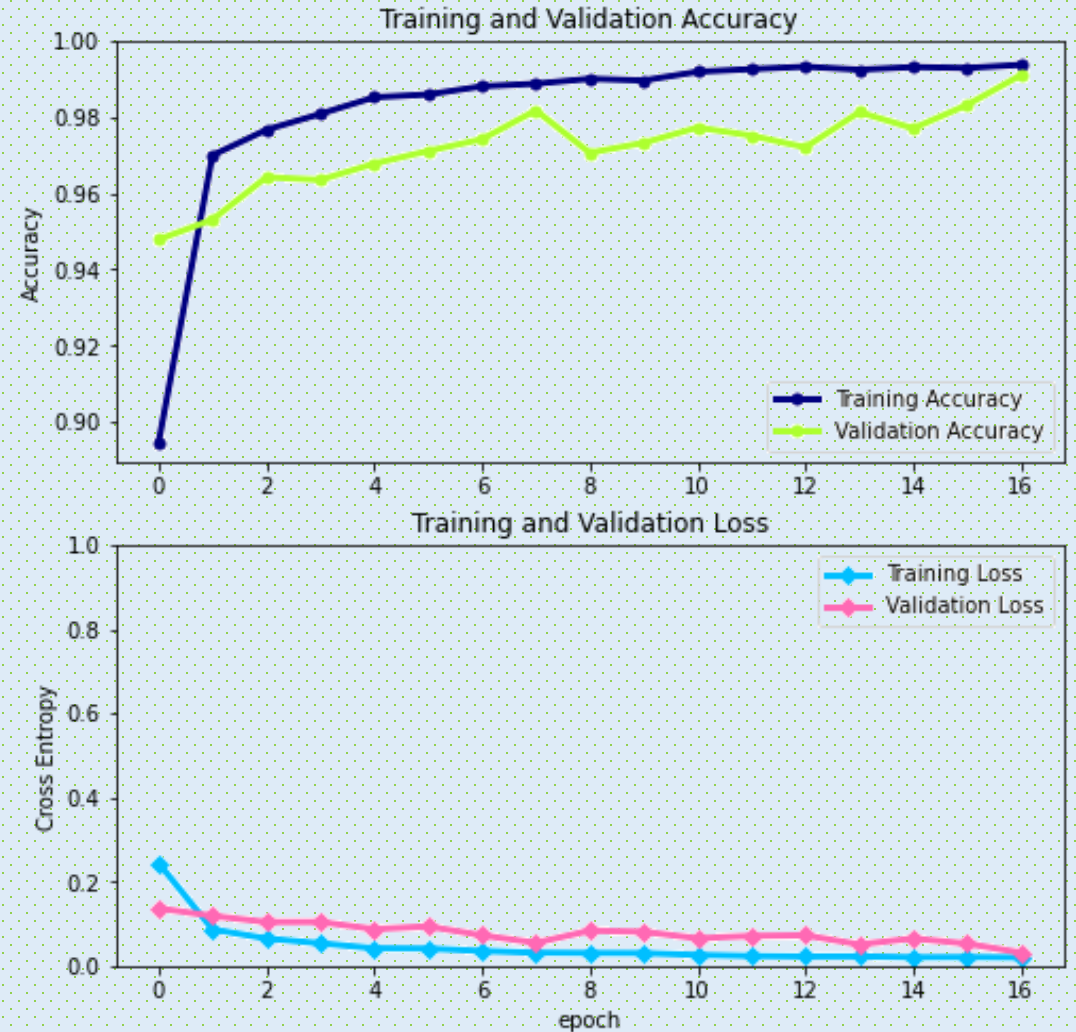
Epochs: 17



Methodology



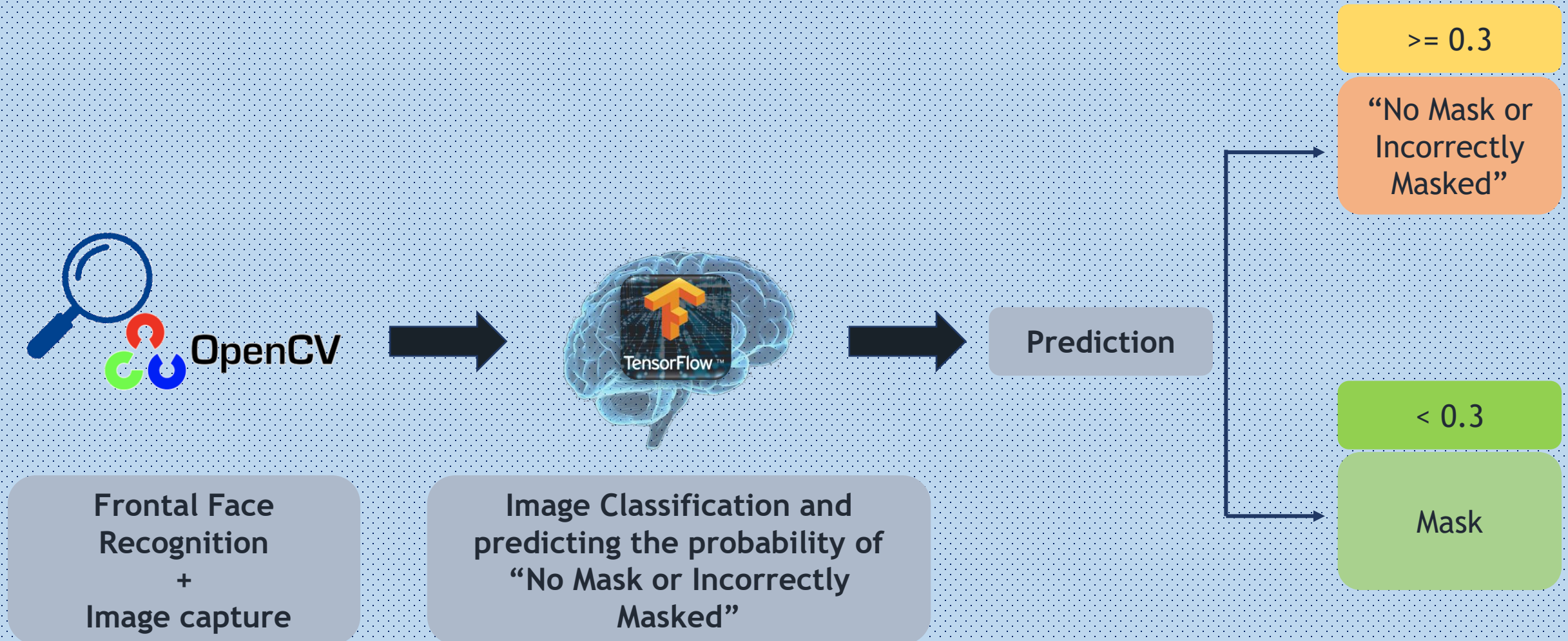
Training Results



Methodology

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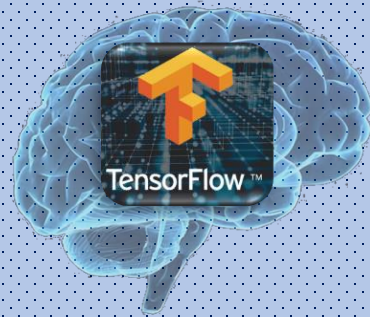
Using Open CV - Python for face recognition



Methodology

4

Using Multi-task Cascaded Convolutional Neural Network (MTCNN) for face recognition



Prediction

Frontal Face
Recognition
+
Image capture

Image Classification and
predicting the probability of
“No Mask or Incorrectly
Masked”

≥ 0.3

“No Mask or
Incorrectly
Masked”

< 0.3

Mask

References

Deep Learning and Computer Vision A-Z: OpenCV, SSD & GAN
by Hadelin de Ponteves and Kirill Eremenko

TensorFlow Transfer Learning Tutorials

Face Detection Using MTCNN - Mr. Hussain Mujtaba's blog