

A close-up photograph of a person's face, wearing a white surgical-style face mask. The person has dark hair and is looking directly at the camera. The image is overlaid with a dark blue, semi-transparent filter and some abstract, light-colored brushstroke-like patterns. The text is positioned on the left side of the image.

# A simple Face Mask Detector

by Ibrahim Hameem (2020)

# Motivation

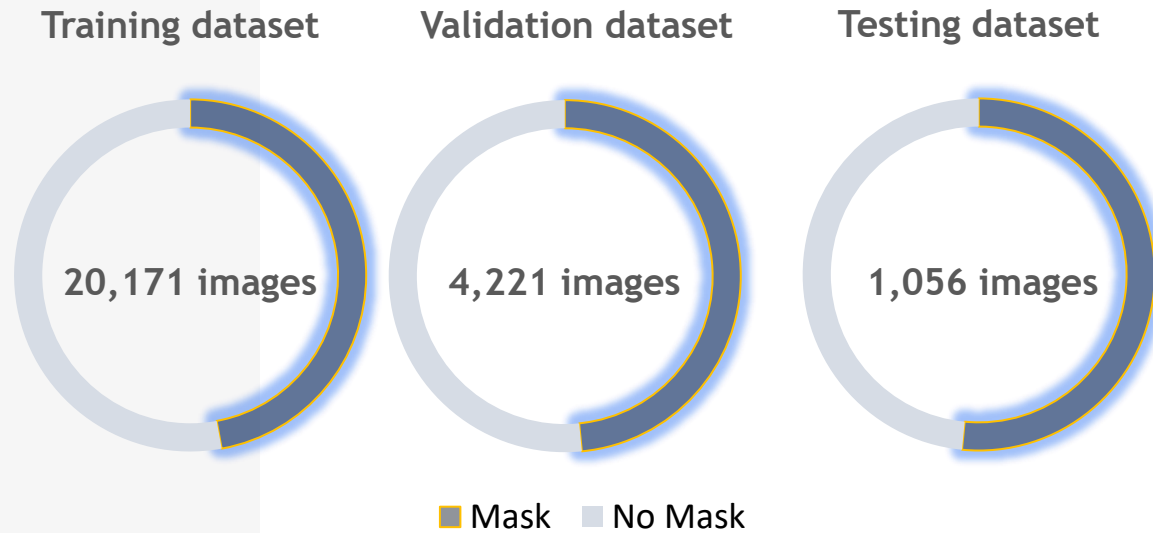
- Wearing a face mask is generally accepted to be a simple but effective health and safety precautionary measure for slowing the spread of COVID-19.
- However forgetting to wear a mask, taking the mask off or wearing the mask incorrectly in vulnerable areas can threaten the safety of a given individual, 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

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## 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

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Creating a CNN using “MobileNet V2” as a base

Data Augmentation layers

Google’s MobileNet V2 –  
Pre-Trained CNN

*The top 79 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



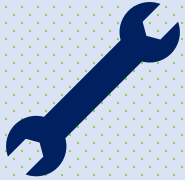
# Methodology

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## Compiling the CNN and Training



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



Optimizer: Adam



Metrics: Accuracy



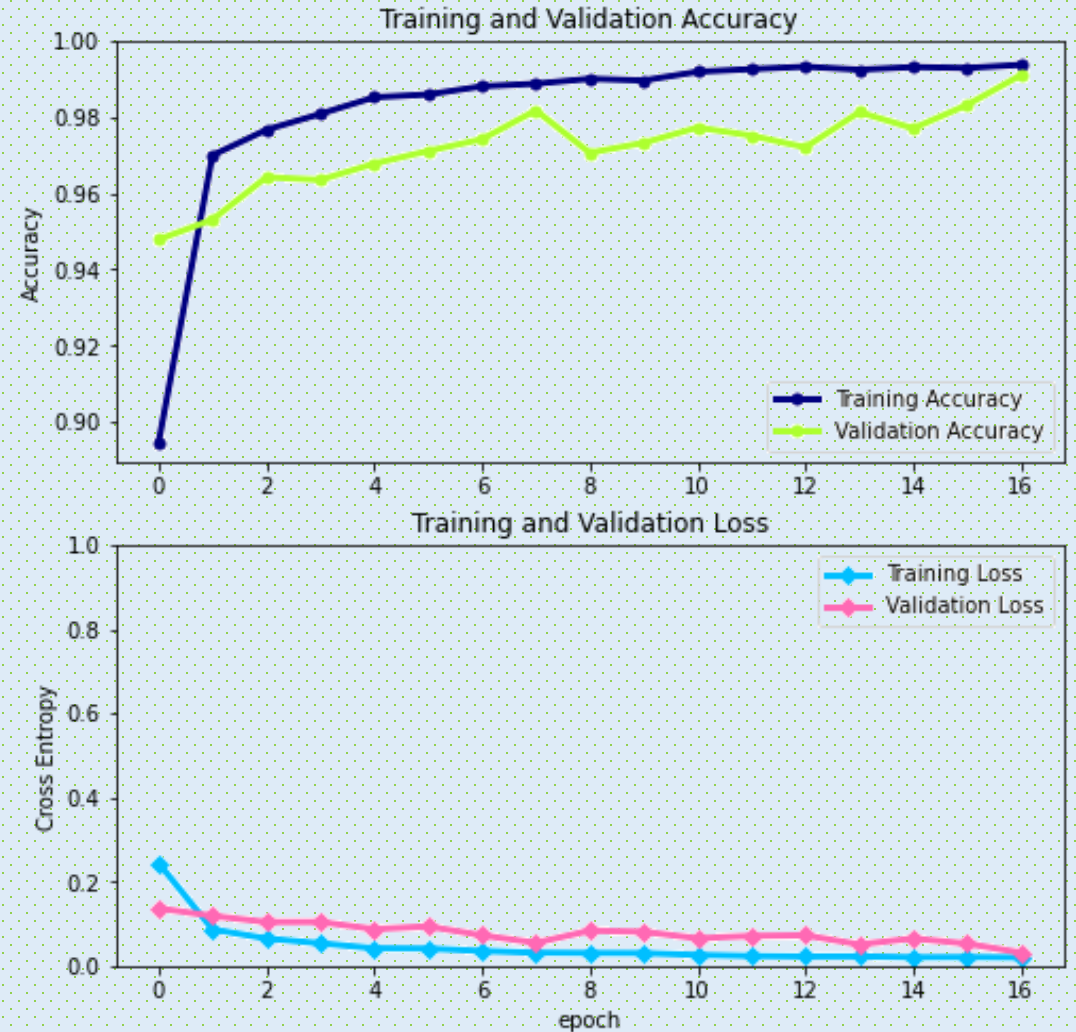
Epochs: 17



# Methodology



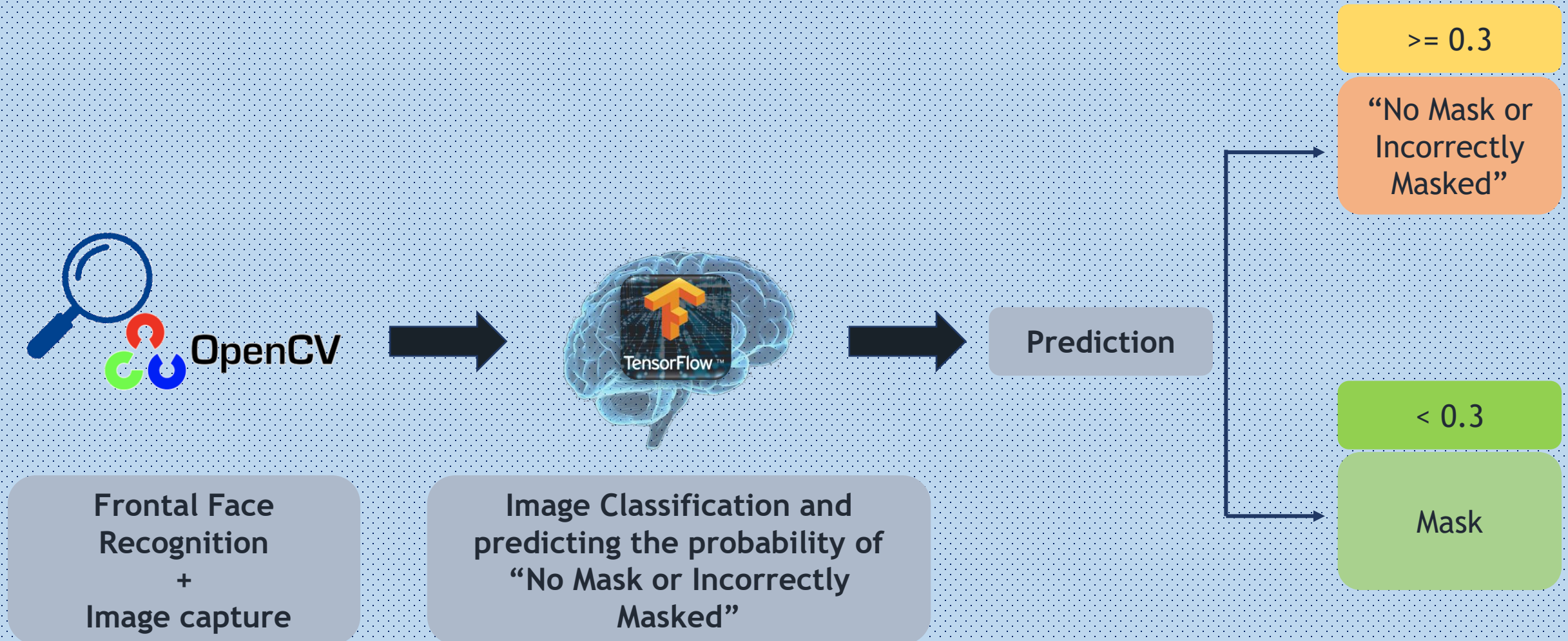
## Training Results



# Methodology

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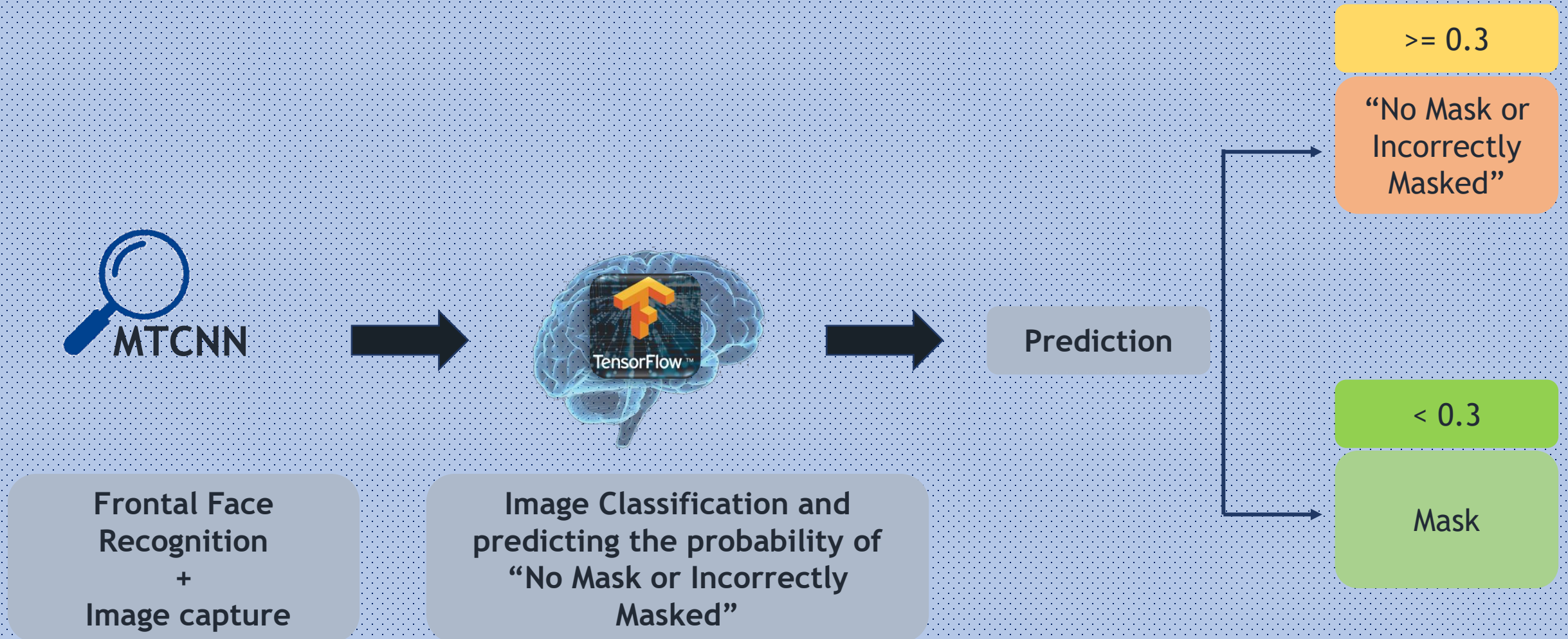
Using Open CV - Python for face recognition



# Methodology

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





# References

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*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*