

Face Mask Recognition

- COVID-19 has become the world's number one challenge.
- Wearing face masks are an effective way to prevent COVID-19.

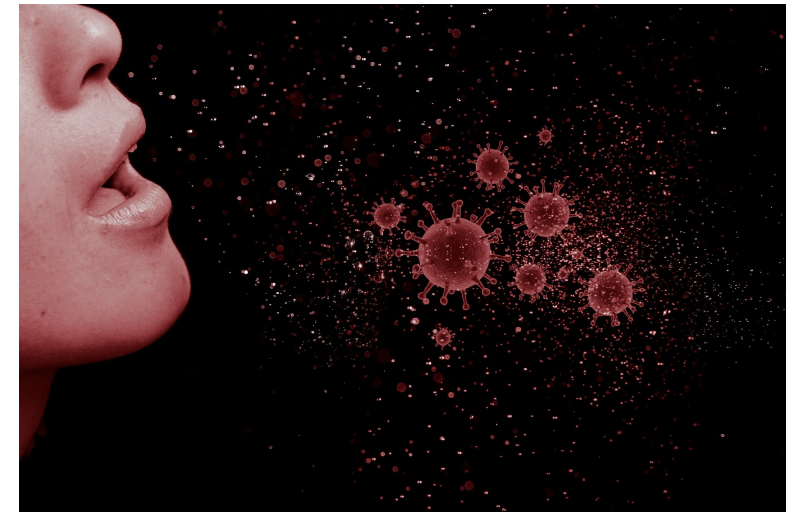
Goal: to build a tool to recognize people who are not wearing a mask using machine learning and deep transfer algorithms

Novelty:

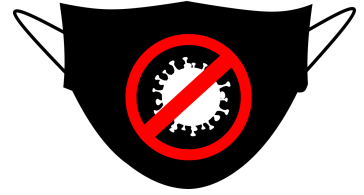
- To design computationally efficient algorithm by using novel approaches (e.g. Using mask location as an input layer for NN)
- Improve performance using datasets containing diverse face coverings,..



<https://pixabay.com>



Dataset



- Total face (2925), mask(47%), no mask(53%)
- Image annotation (label, face location, mask location)



<https://www.kaggle.com/alexandralorenzo/maskdetection>

<https://www.kaggle.com/wobotintelligence/face-mask-detection-dataset>

<https://kaggle.com/andrewmvd/face-mask-detection>

<https://kaggle.com/alexandralorenzo/yolov3-startkit>

Pre-processing

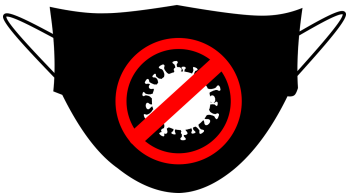
Identify and crop faces

Resize cropped faces

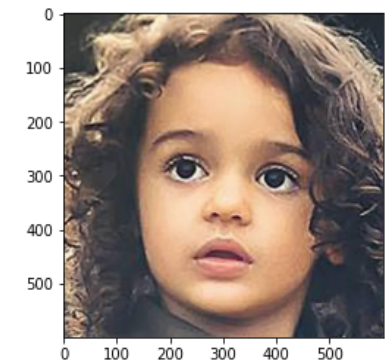
Generate flattened feature vectors

Model development

Logistic regression vs. Multi-Layer Perceptron (MLP)



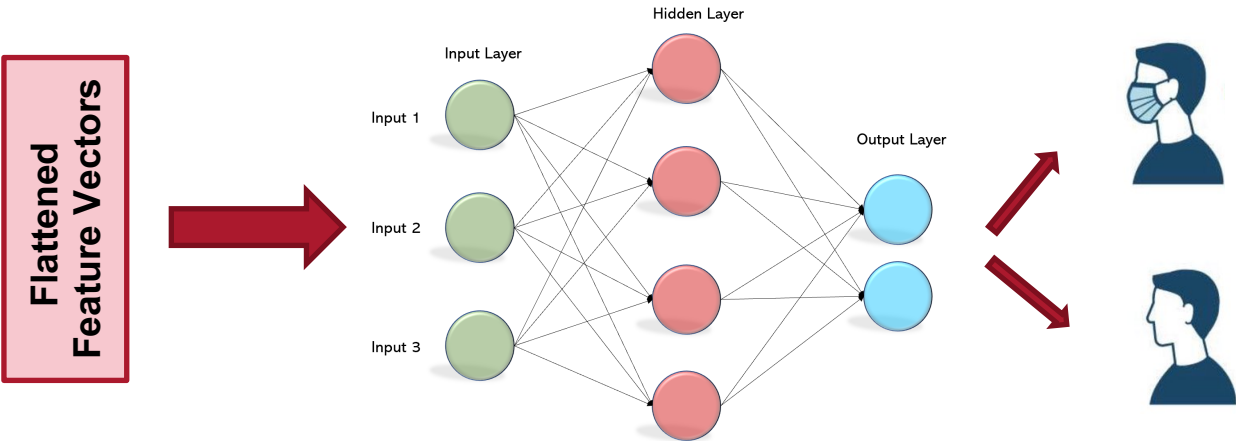
Logistic regression



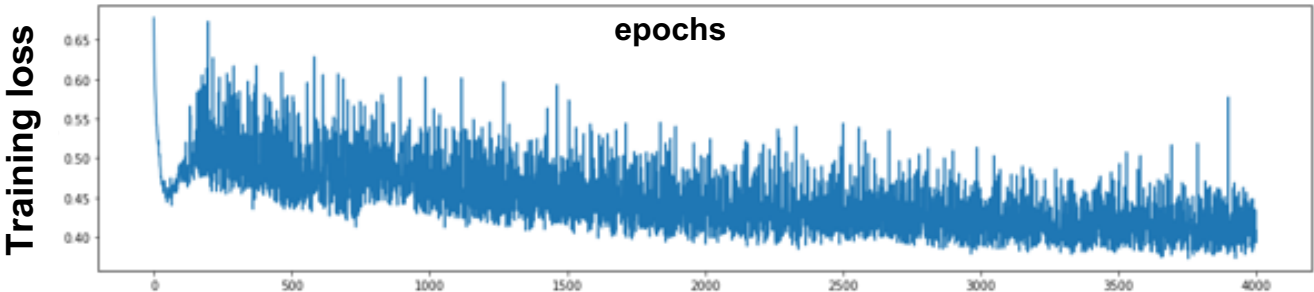
	Mask	No
precision	0.55	0.64
recall	0.88	0.23
F1-score	0.68	0.34

- MLP with optimized architecture performs better than logistic regression

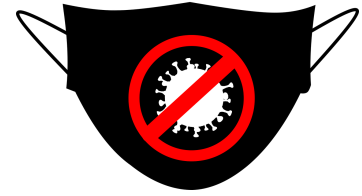
MLP



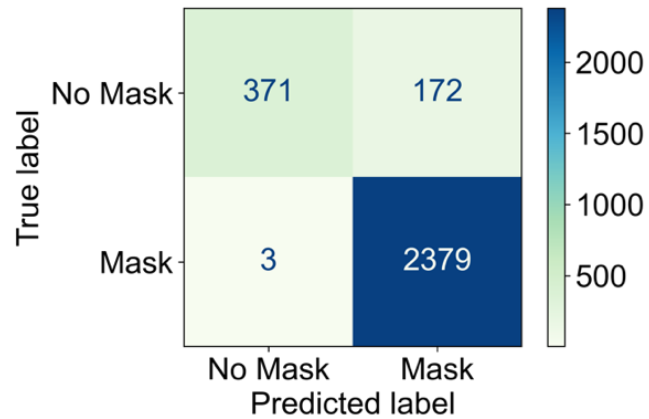
	Mask	No
precision	0.87	0.67
recall	0.54	0.92
F1-score	0.66	0.78



Deep Convolutional Neural Network (Transfer learning using DenseNet121)

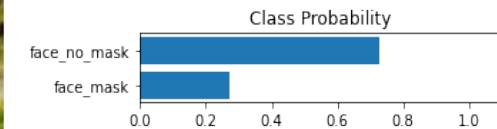
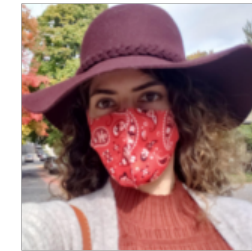


Performance on Test set



	No	Masked
precision	0.99	0.93
recall	0.68	0.99
F1-score	0.81	0.96

- Some experiments with images not in the training set



On going work

- Improve the computational efficiency of the model to be used with surveillance cameras to detect people who are not wearing face masks
- Improve the diversity of the dataset to improve performance