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Face Mask Recognition

- COVID-19 has become the world's number one challenge.

- Wearing face masks are an effective way to prevent COVID-19.
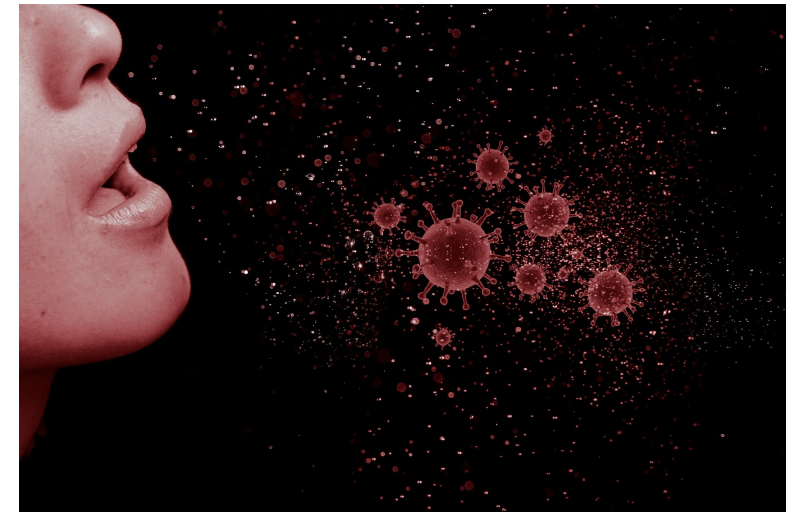
Goal: to build a tool to recognize people who are not wearing a mask using machine learning and deep transfer algorithms
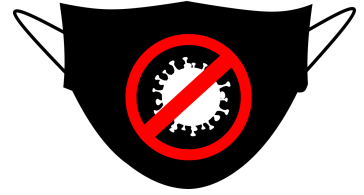

https://pixabay.com

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,..

Dataset

- Total face (2925), mask(47%), no mask(53%)

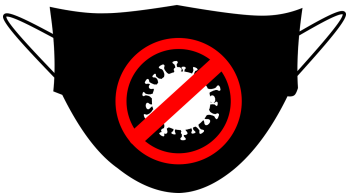- Image annotation (label, face location, mask location)

Pre-processing

Identify and crop faces
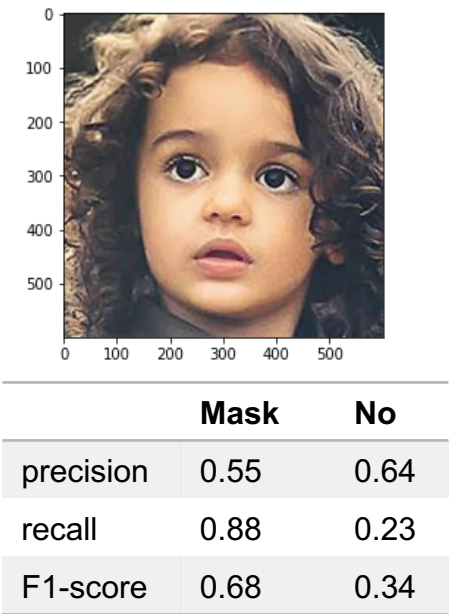
Resize cropped faces

Generate flattened feature vectors

Model development

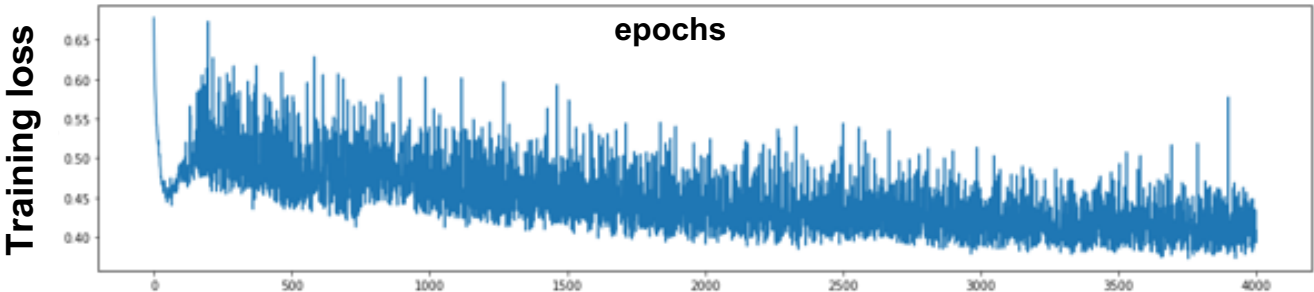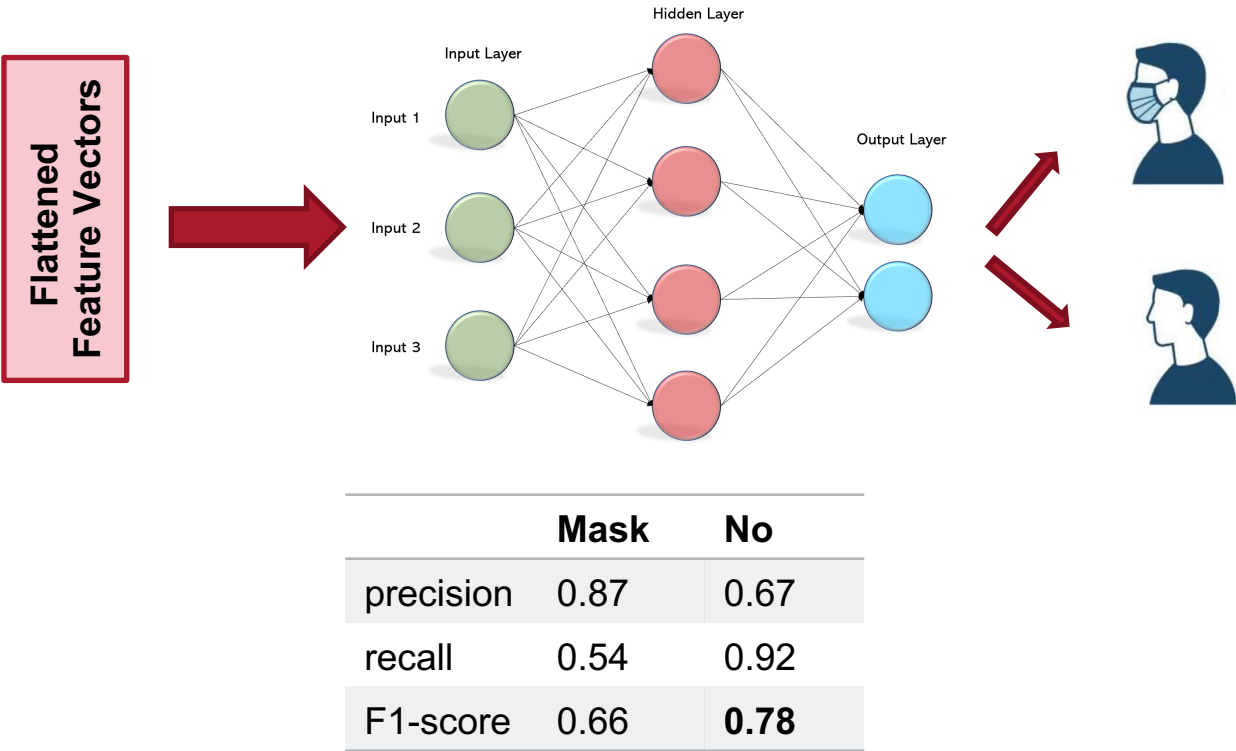# Logistic regression vs. Multi-Layer Perceptron (MLP)

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

Flattened Feature Vectors

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

epochs

Training loss

Yolo dataset

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
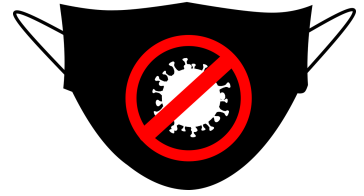
- Some experiments with images not in the training set
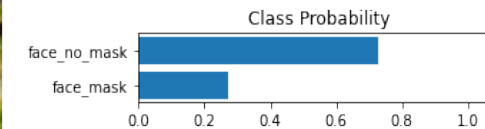
On going work

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

- To increase the diversity of the dataset to improve performance

Compiled dataset