



31.7.-10.8.

PETNICA SUMMER INSTITUTE

**MACHINE
LEARNING**

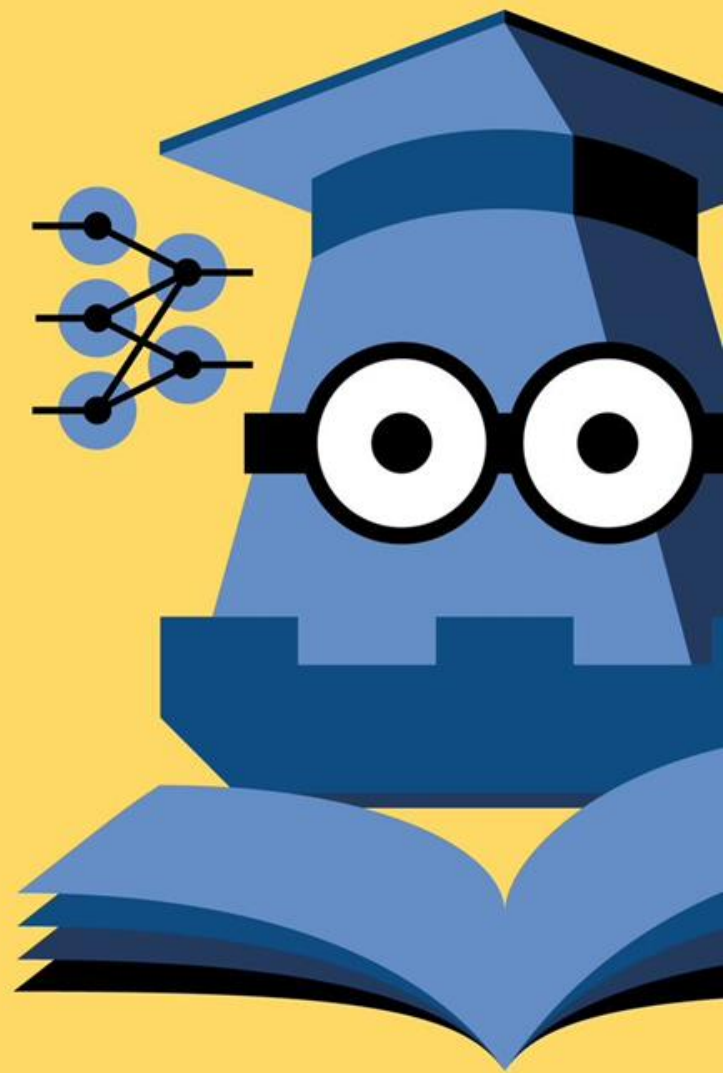


Face Mask Recognition

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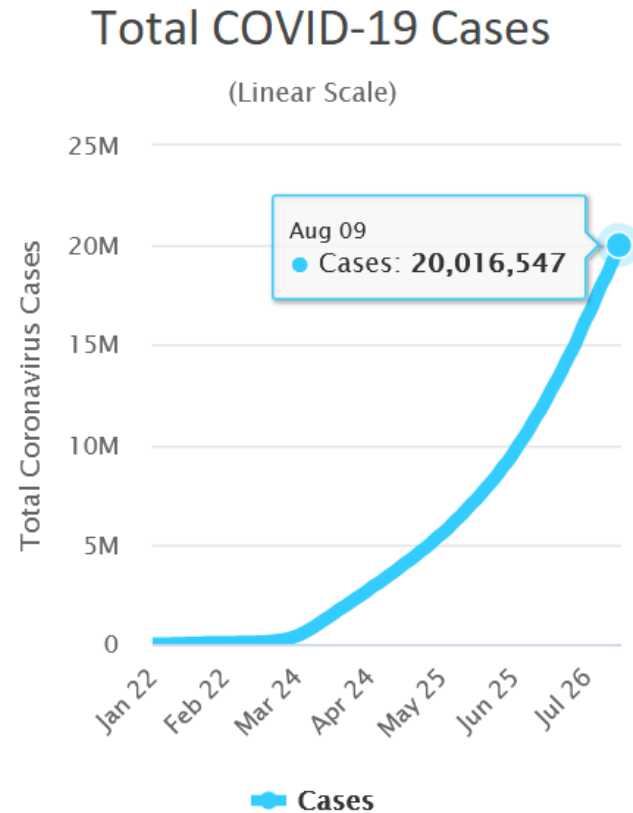
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Problem and Motivation



- Real time, video and image mask detection





Dataset

- Dataset has 4530 images of people (2606 with masks, 1924 without masks)
- Most of the faces are narrowly cropped
- About $\frac{1}{4}$ of images are with computer generated masks
- There are augmented images (added noise, rotated, changed colors)
- Small number of group images
- Masks are in multiple colors





Model

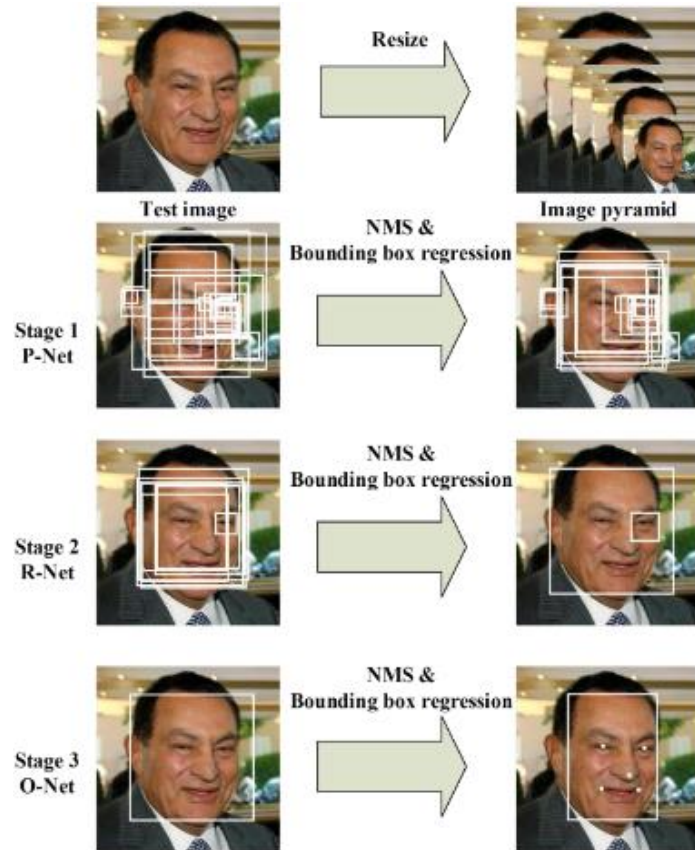


Figure: Model Scheme of MTCNN

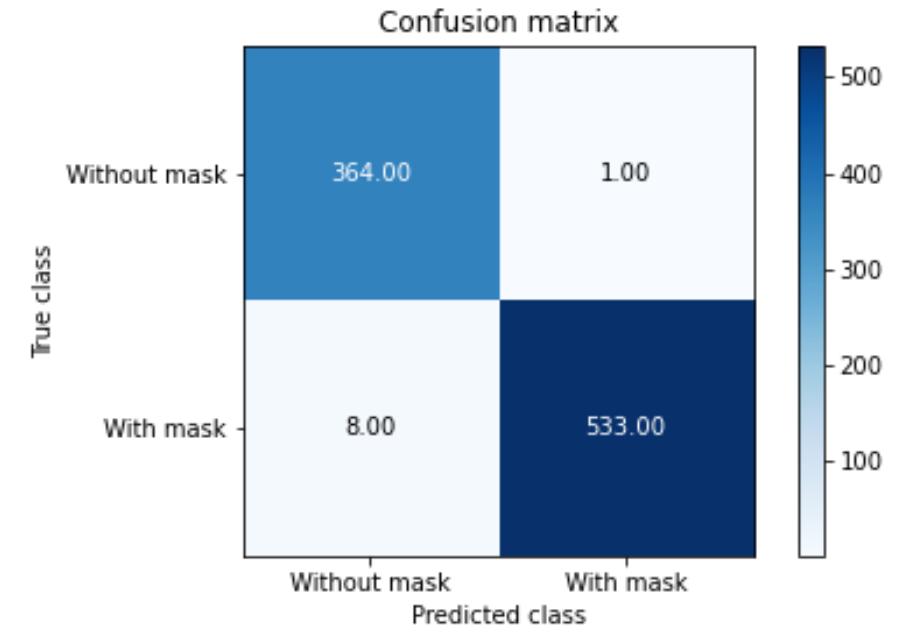
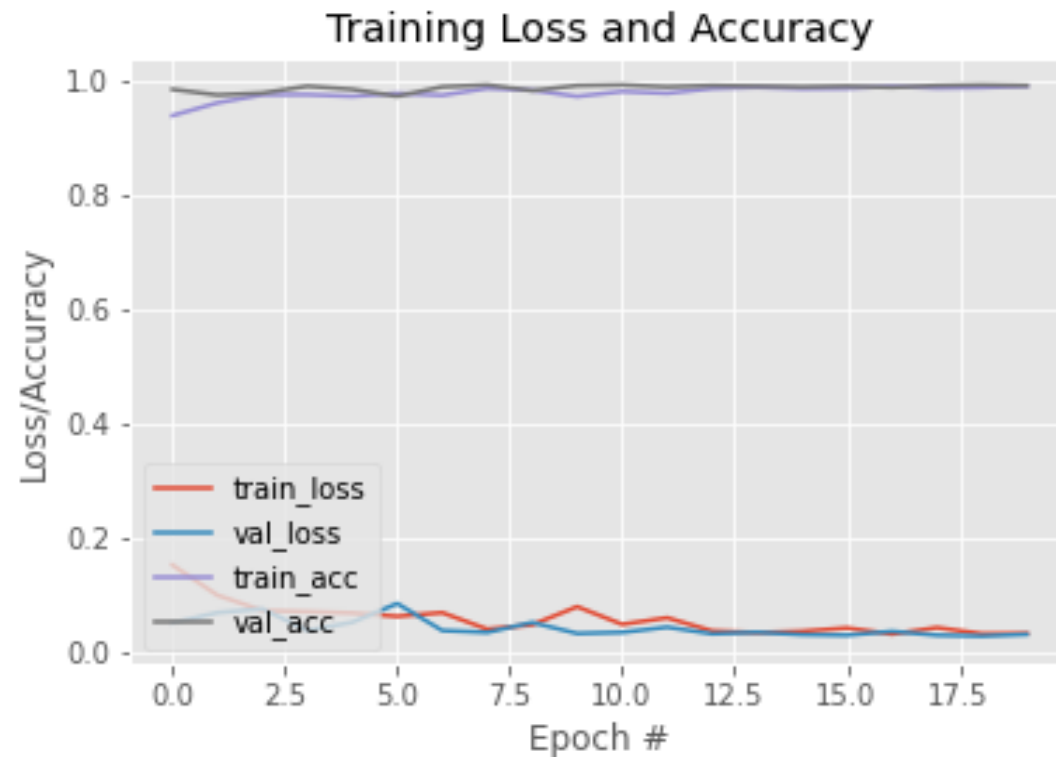
- Face detector and classifier
- Finetuned pretrained MobileNetV2 as face classifier
- Added layers:
 - Linear layer with ReLU activation
 - Dropout with 0.5 probability
 - Linear layer with Softmax activation function
- Pretrained Multi-task Cascaded Convolutional Neural Network (**MTCNN**) as face and landmark detector





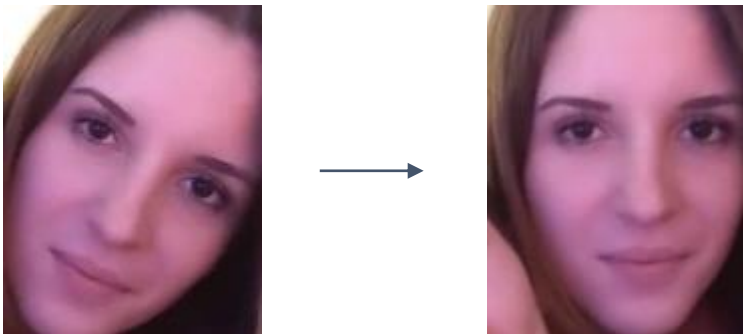
Metrics

- **Accuracy: 0.99**, Precision 0.998, Recall 0.985
- Number of epochs 20

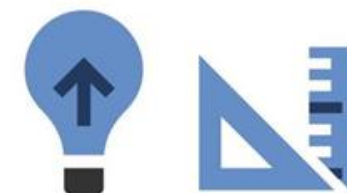
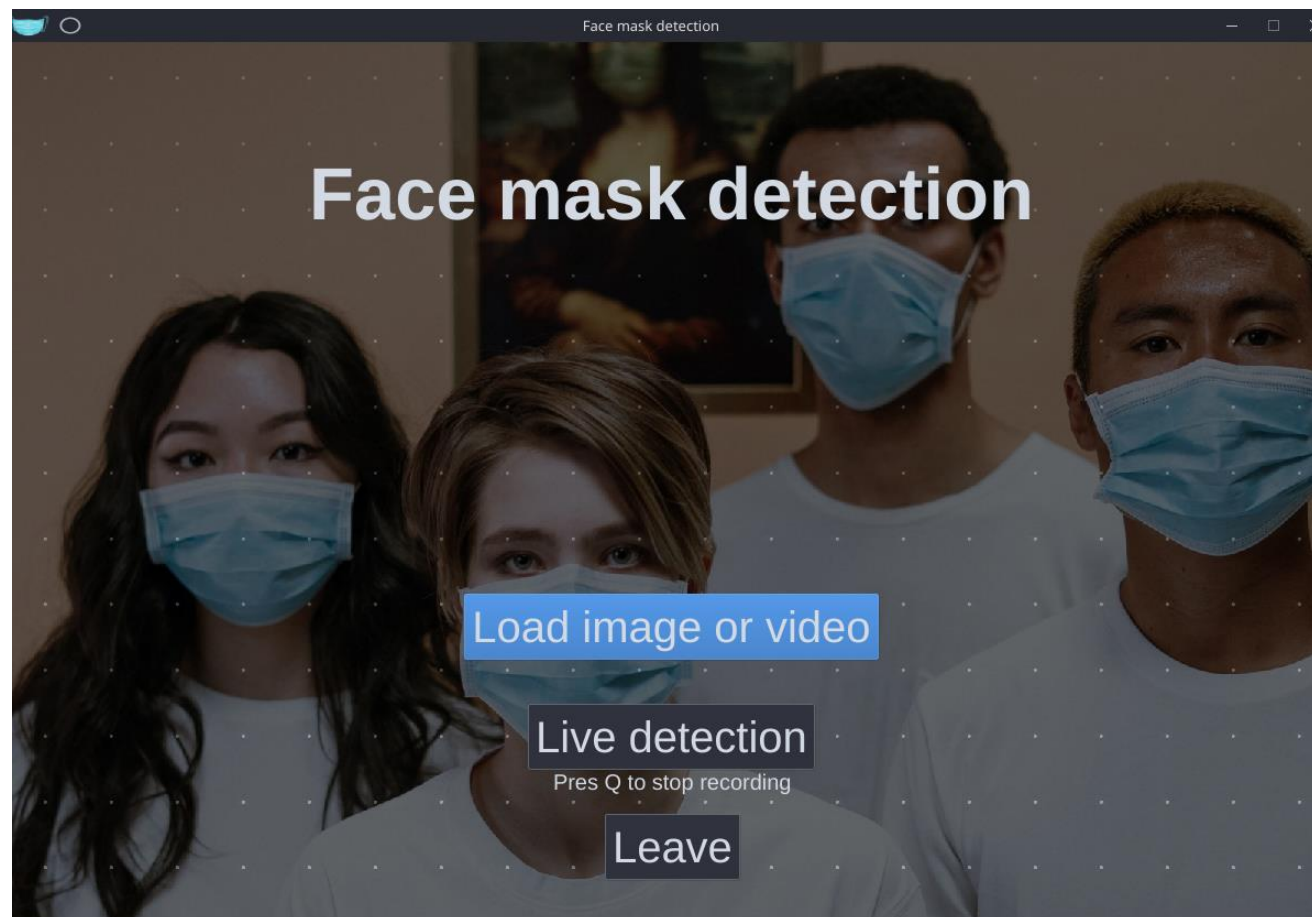


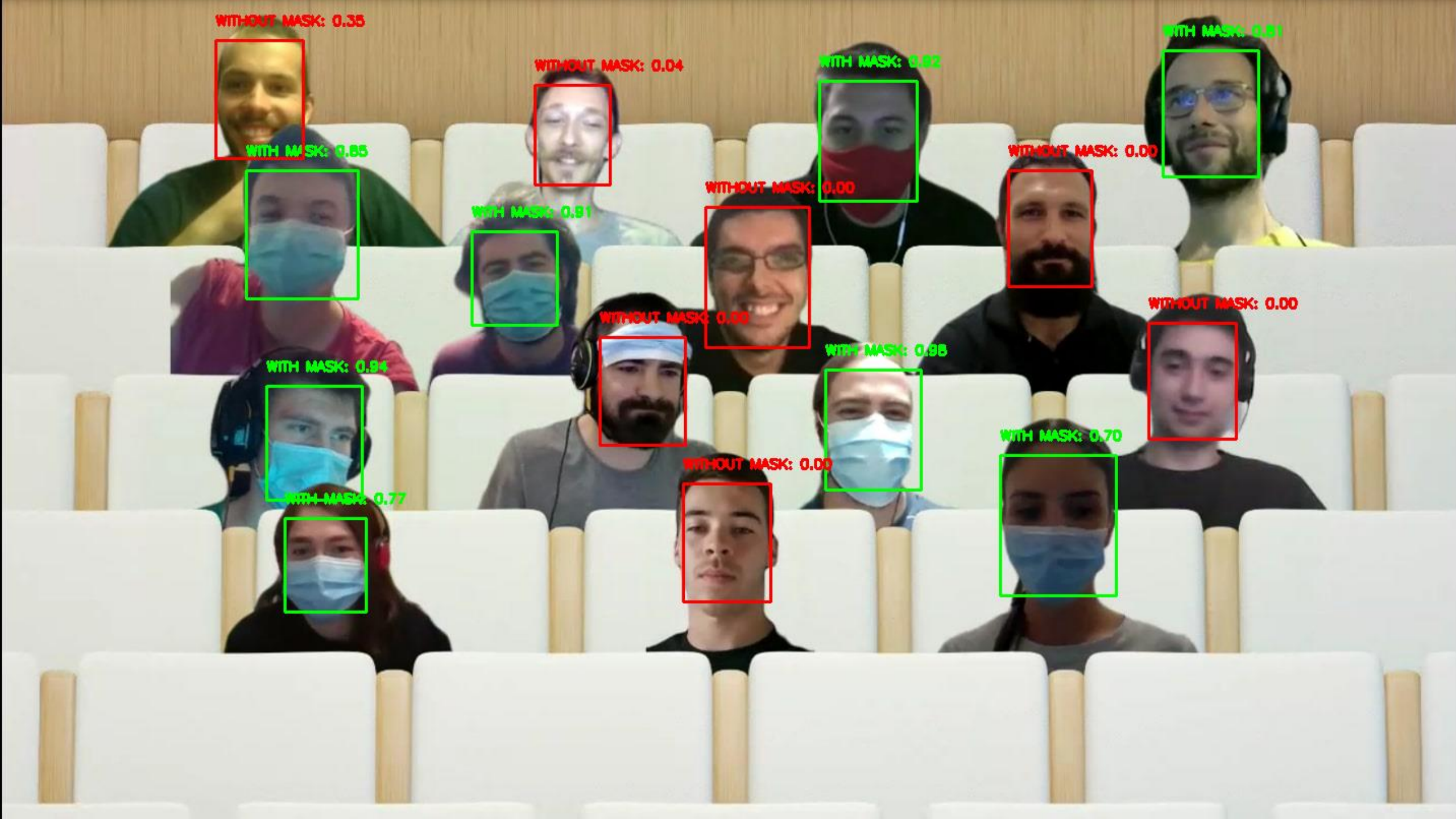
Experiments

- Tried on images, videos and camera. Conclusion:
 - Lighting is very important (model works best at daylight)
 - Model is confused with beards, covered mouth and profile view
- Model has good performance on CPU (enough for real time detection)
- Experimented with different probability thresholds
- Used landmarks for face alignment



Aplication

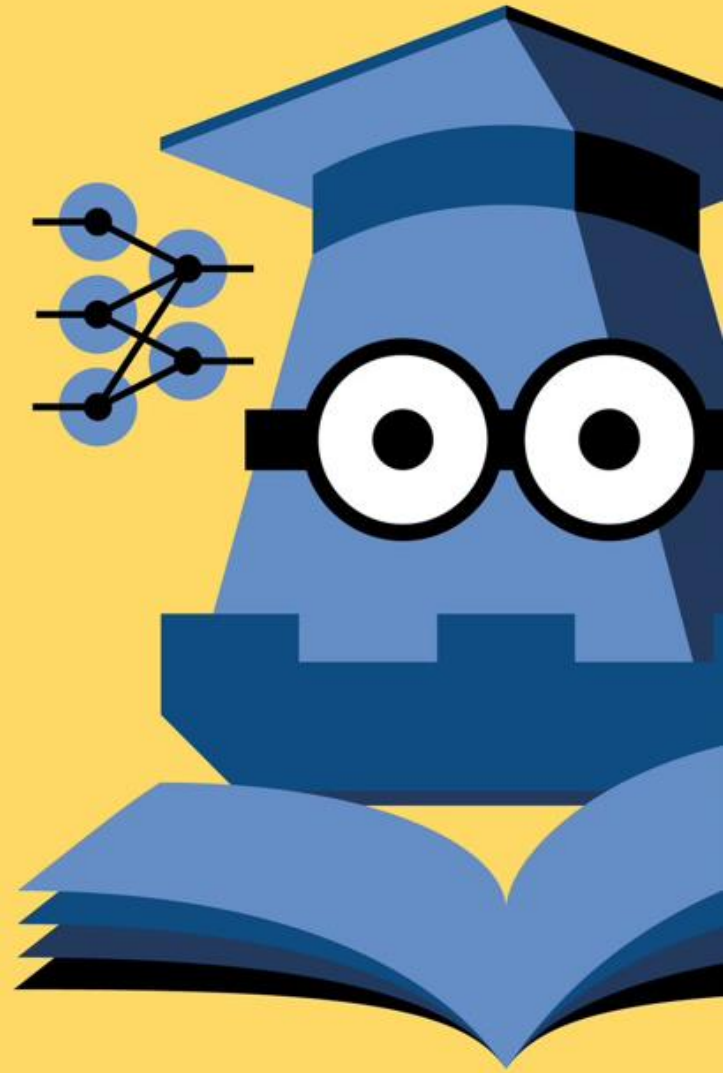




THANK YOU



ANY QUESTIONS?



Code available at: <https://github.com/popovic-olivera/face-mask-detection>