

# AIJC | AI IN HEALTHCARE

**Team: Matrix Maneuver**

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## OVERVIEW

- AI Algorithm Summary
- Sample Prediction
- Summary of Development
- Dataset
- Data Preprocessing
- Model
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## AI ALGORITHM SUMMARY

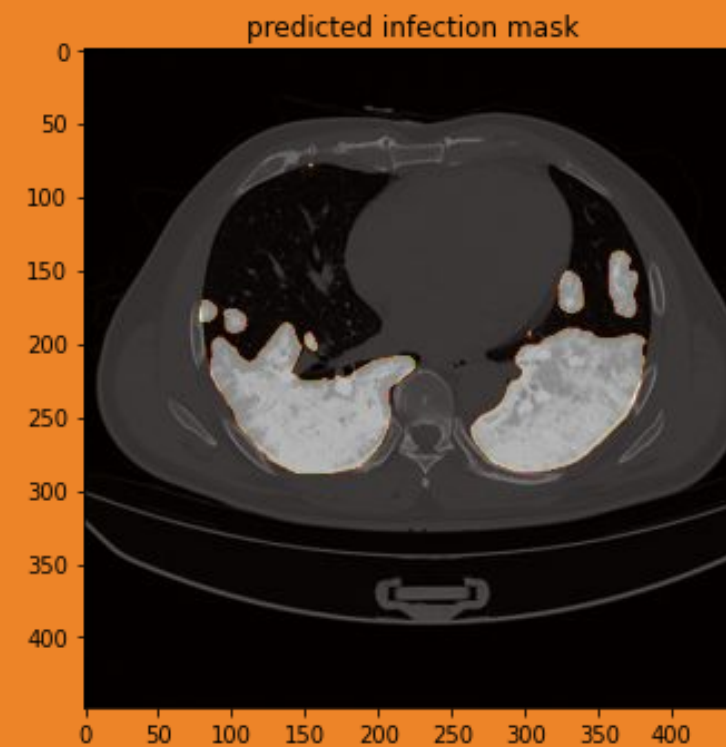
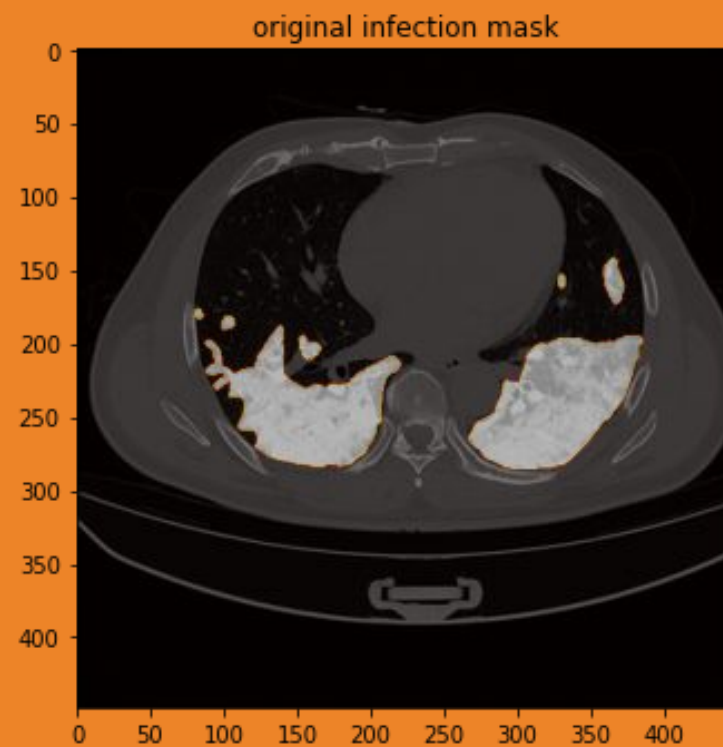
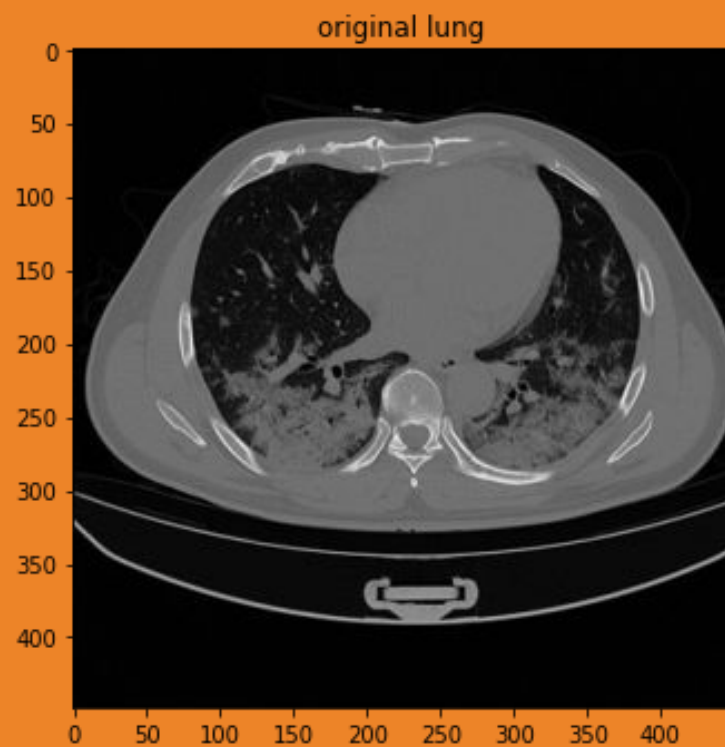
Uses CT scans to detect Lung Pneumonia

Predicts 1 image under 1 second

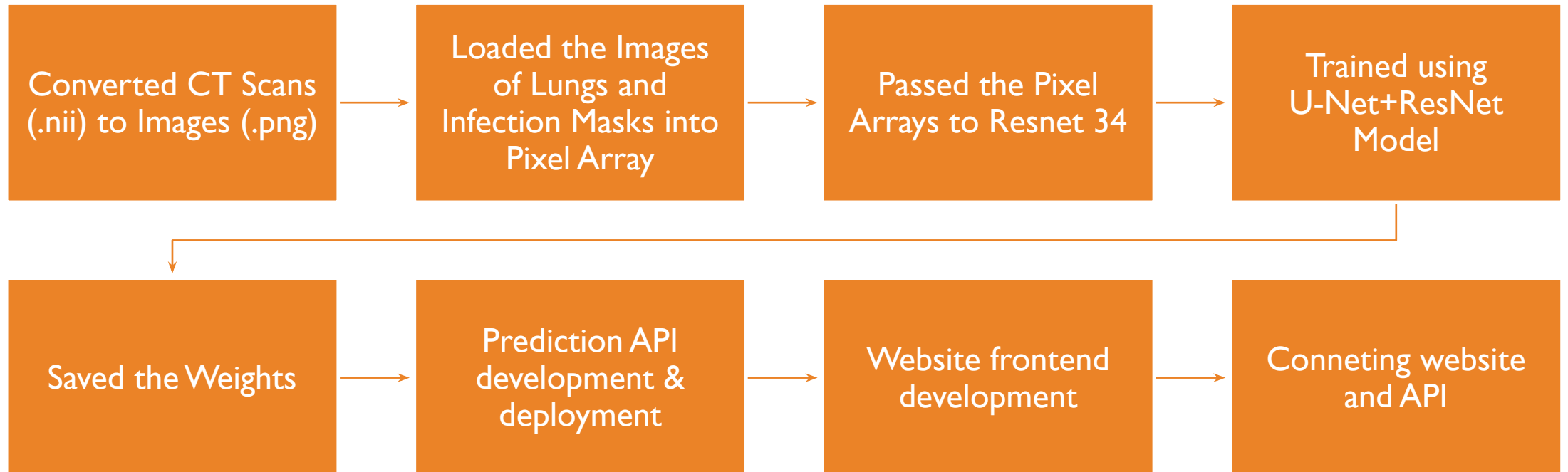
Average IoU score is 0.96

Segmentation is filled with color

# SAMPLE PREDICTION



## SUMMARY OF DEVELOPMENT



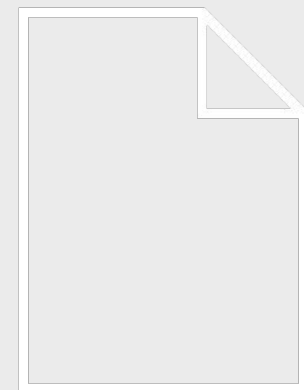


## DATASET

- MosMedData: Chest CT Scans with COVID-19 Related Findings
- Contained 50 CT Scans Of Lungs and Infection Masks
- Obtained around 2000 Images Of Lungs and Infection Masks
- [https://mosmed.ai/datasets/covid19\\_1110](https://mosmed.ai/datasets/covid19_1110)

### Citation:

Morozov, S.P., Andreychenko, A.E., Pavlov, N.A., Vladzimirskyy, A.V., Ledikhova, N.V., Gomboleviskiy, V.A., Blokhin, I.A., Gelezhe, P.B., Gonchar, A.V. and Chernina, V.Y., 2020. MosMedData: Chest CT Scans With COVID-19 Related Findings Dataset. arXiv preprint arXiv:2005.06465





## DATA PREPROCESSING

- Used med2image library to convert .nii files to .png
- Converted the grayscale version of the images into pixel arrays (Lungs and Infection Mask)
- Lung – X, Infection Mask – Y
- Used 448x448 image size for training





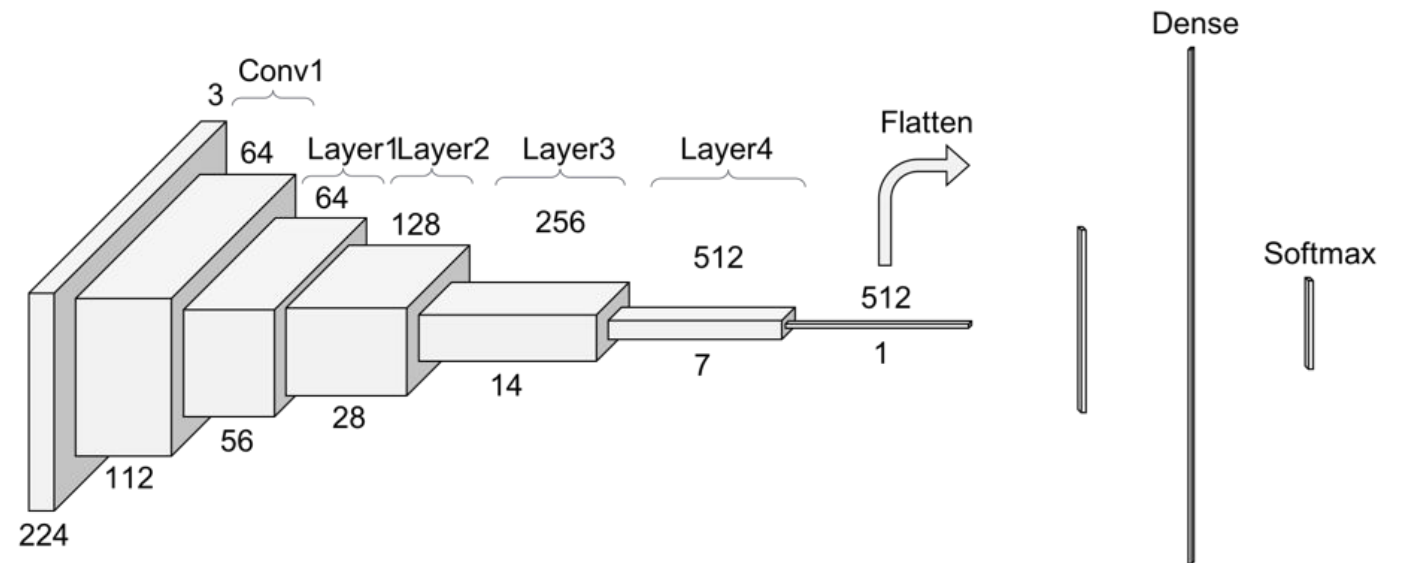
## MODEL

- First part of the model is processing the images into 34 layer Residual Neural Network( Resnet34 )
- Second Part is U-Net with 199 layers integrated with ResNet32 to minimize loss function



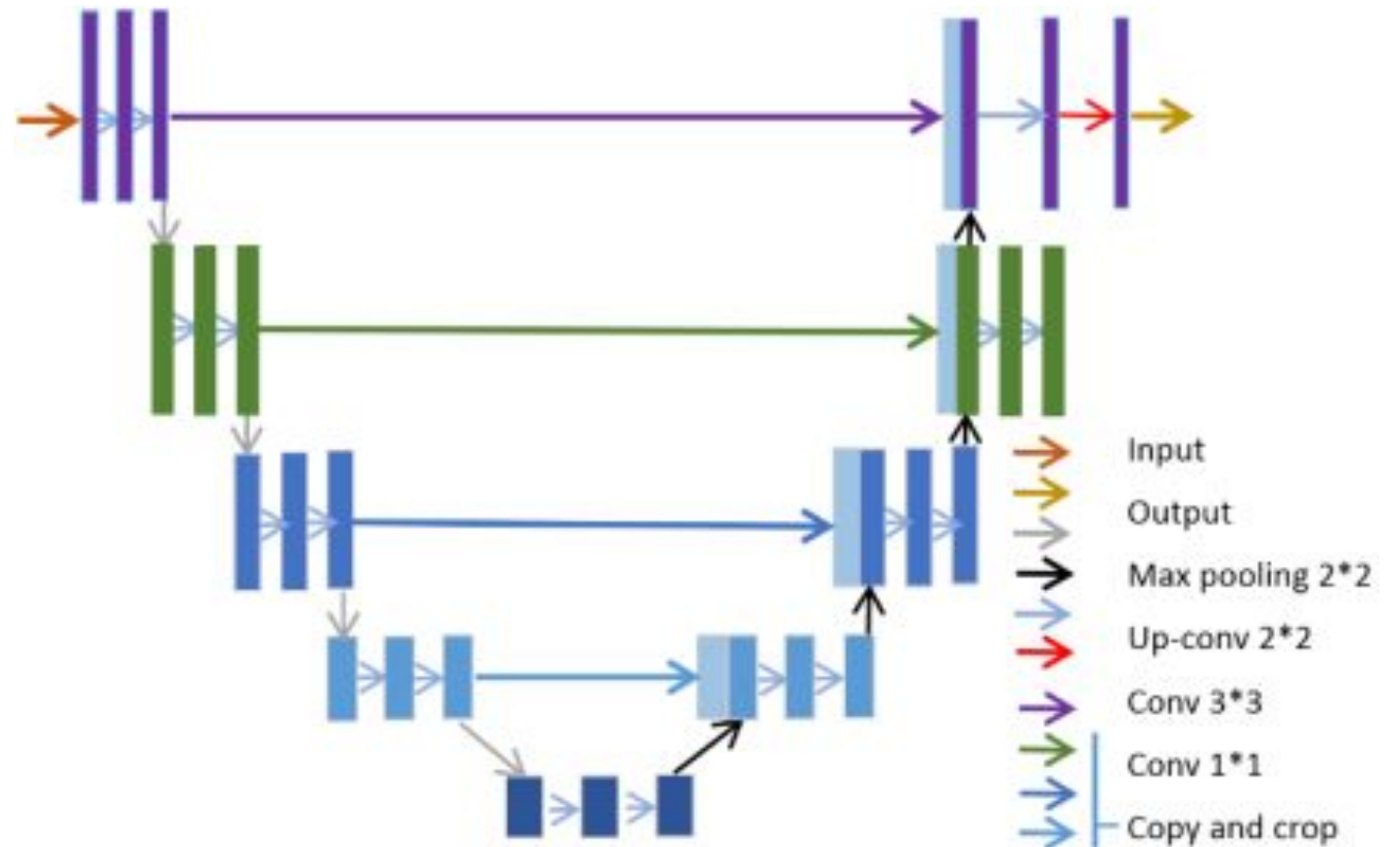
# RESNET 34 MODEL

A residual neural network (ResNet) is an artificial neural network (ANN) of a kind that builds on constructs known from pyramidal cells in the cerebral cortex. Residual neural networks do this by utilizing skip connections, or shortcuts to jump over some layers. Typical ResNet models are implemented with double- or triple-layer skips that contain nonlinearities (ReLU) and batch normalization in between. An additional weight matrix may be used to learn the skip weights; these models are known as HighwayNets. Models with several parallel skips are referred to as DenseNets. In the context of residual neural networks, a non-residual network may be described as a plain network. - Wikipedia



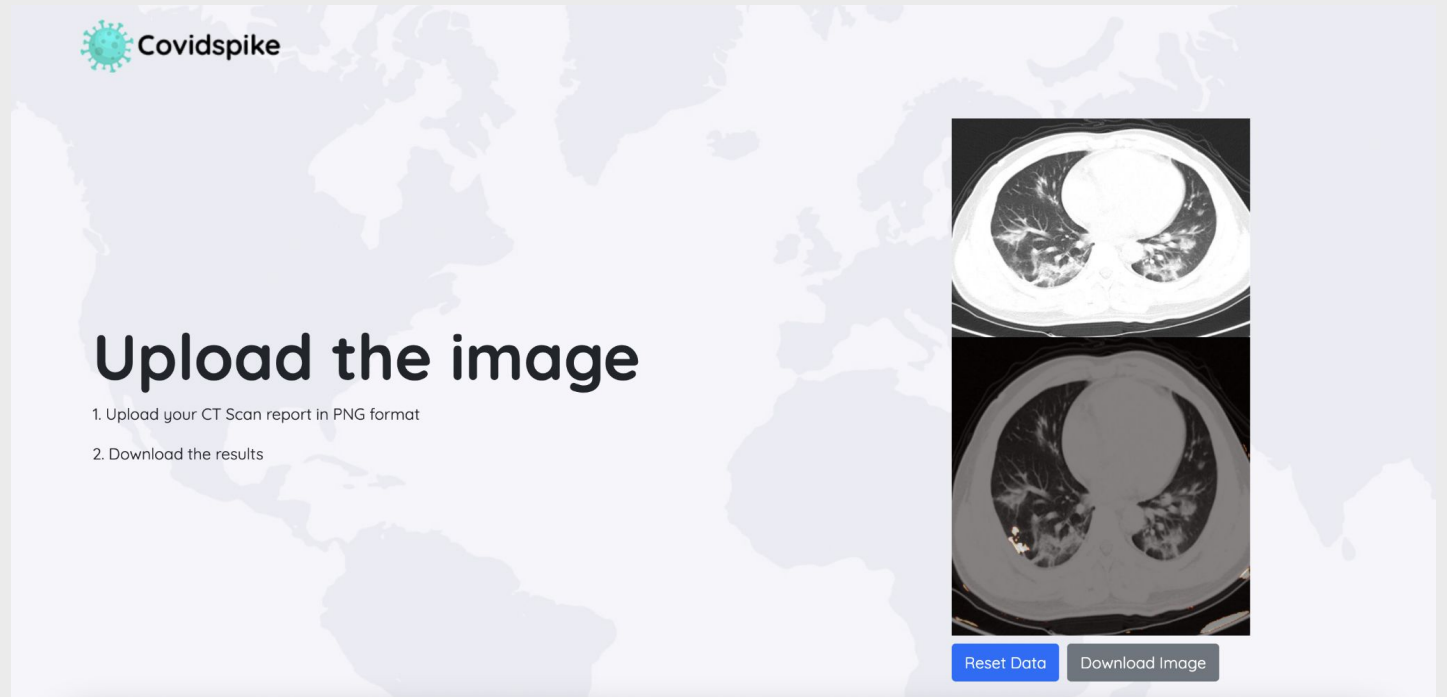
## U-NET MODEL

U-Net is a convolutional neural network that was developed for biomedical image segmentation at the Computer Science Department of the University of Freiburg. The network is based on the fully convolutional network and its architecture was modified and extended to work with fewer training images and to yield more precise segmentations. Segmentation of a  $448 \times 448$  image takes less than a second on a modern GPU. – Wikipedia



# THE WEBSITE

- Interactive frontend build on ReactJs through which user can upload the CT Scan and download the results



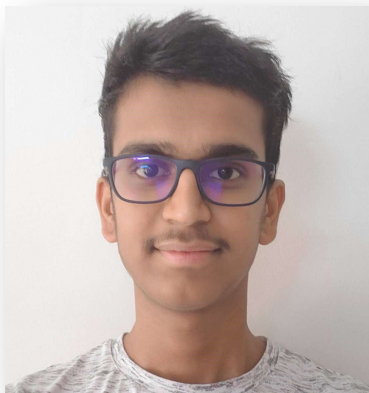
# OUR TEAM



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THANK YOU