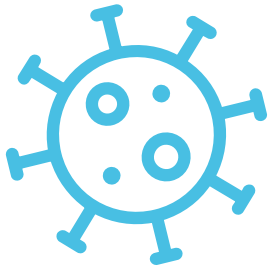
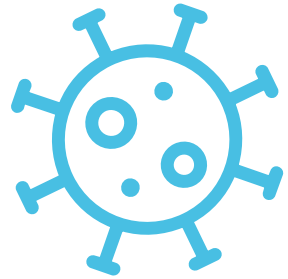
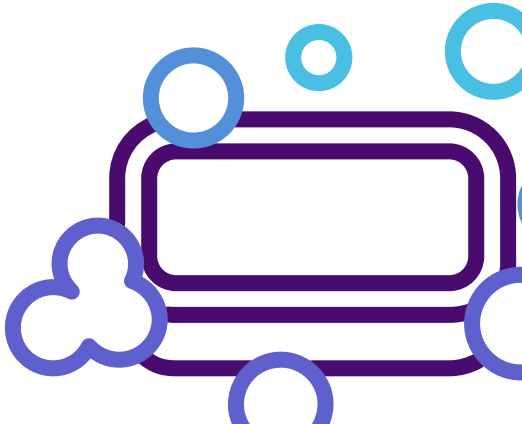



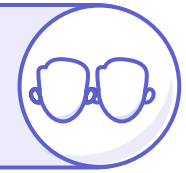
Machine Learning and COVID-19



Agenda

01 The Problem 

02 ML and COVID 

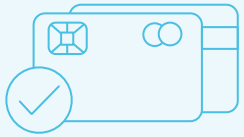
03 Findings 

04 Discuss Opportunities 

A Public Health Crisis

The virus

SARS coronavirus, first reported Dec 2019

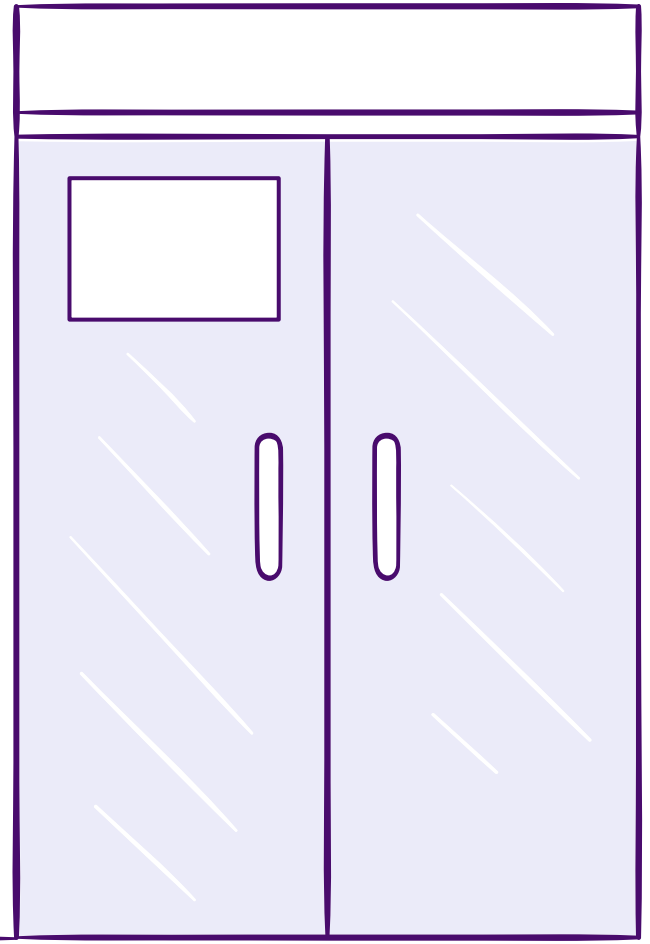


What we know

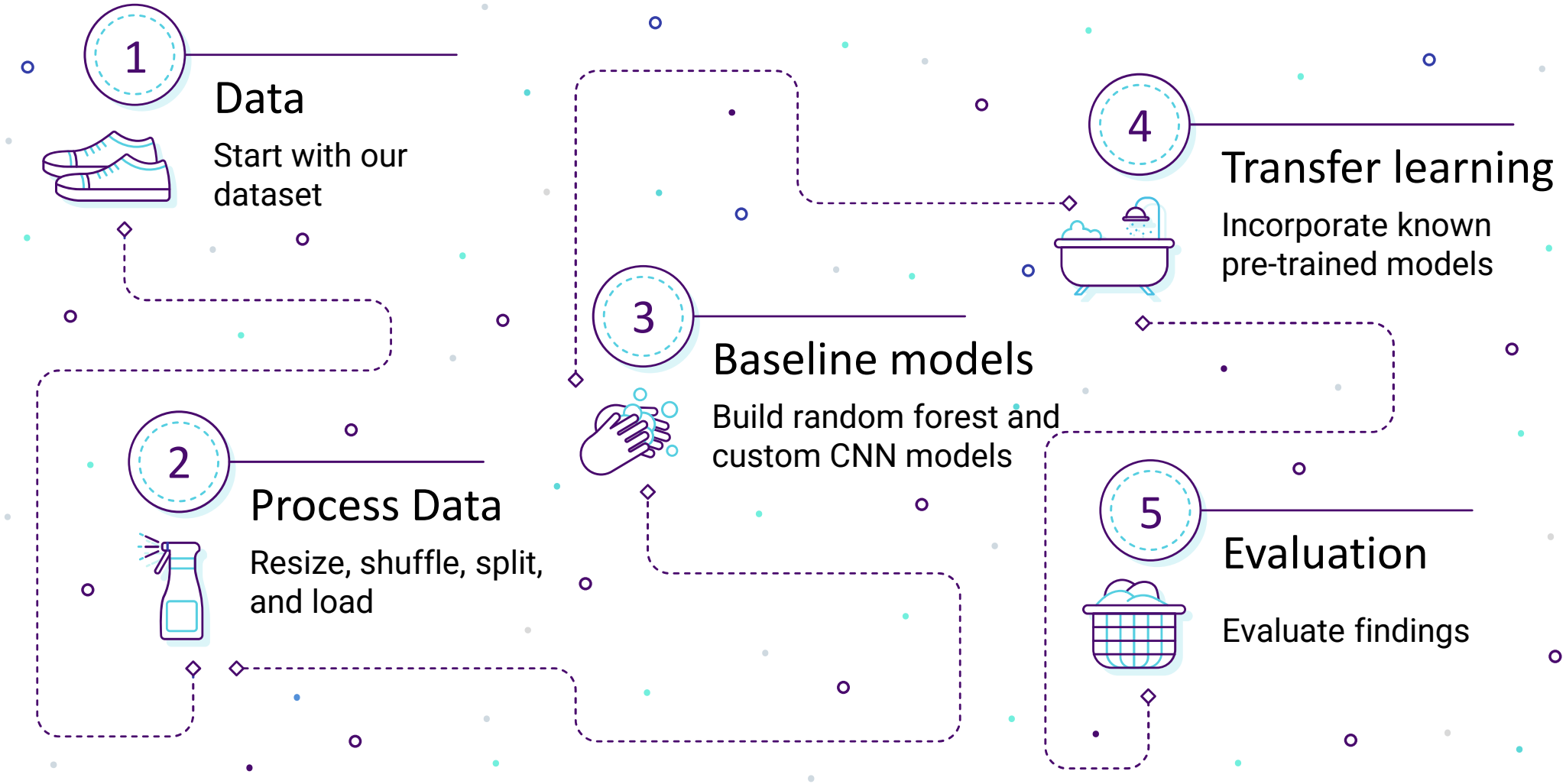
Developed vaccine, effective testing

What we don’t

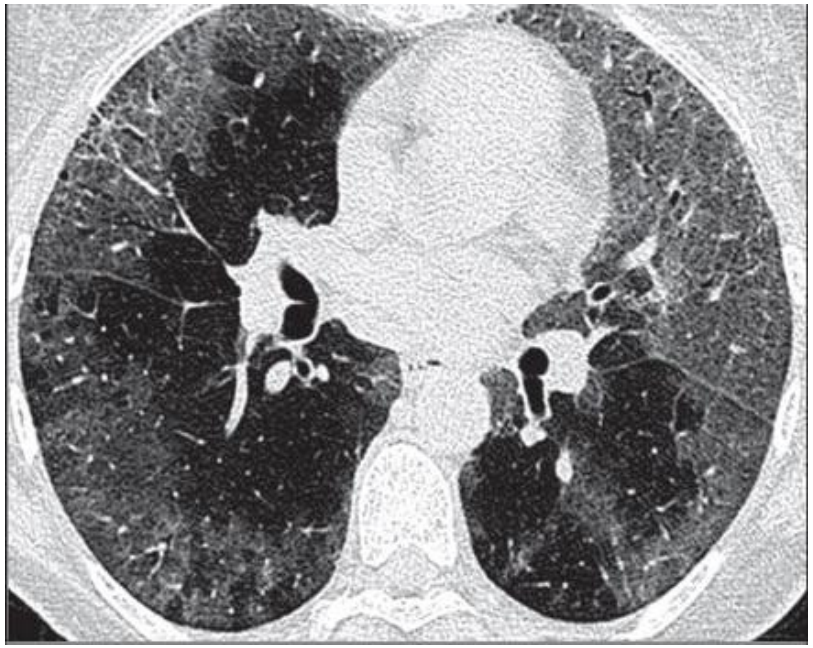
Human responses to virus are varied, not fully understood



Machine Learning Solution



The Data



746 CT-scans of lungs from research papers

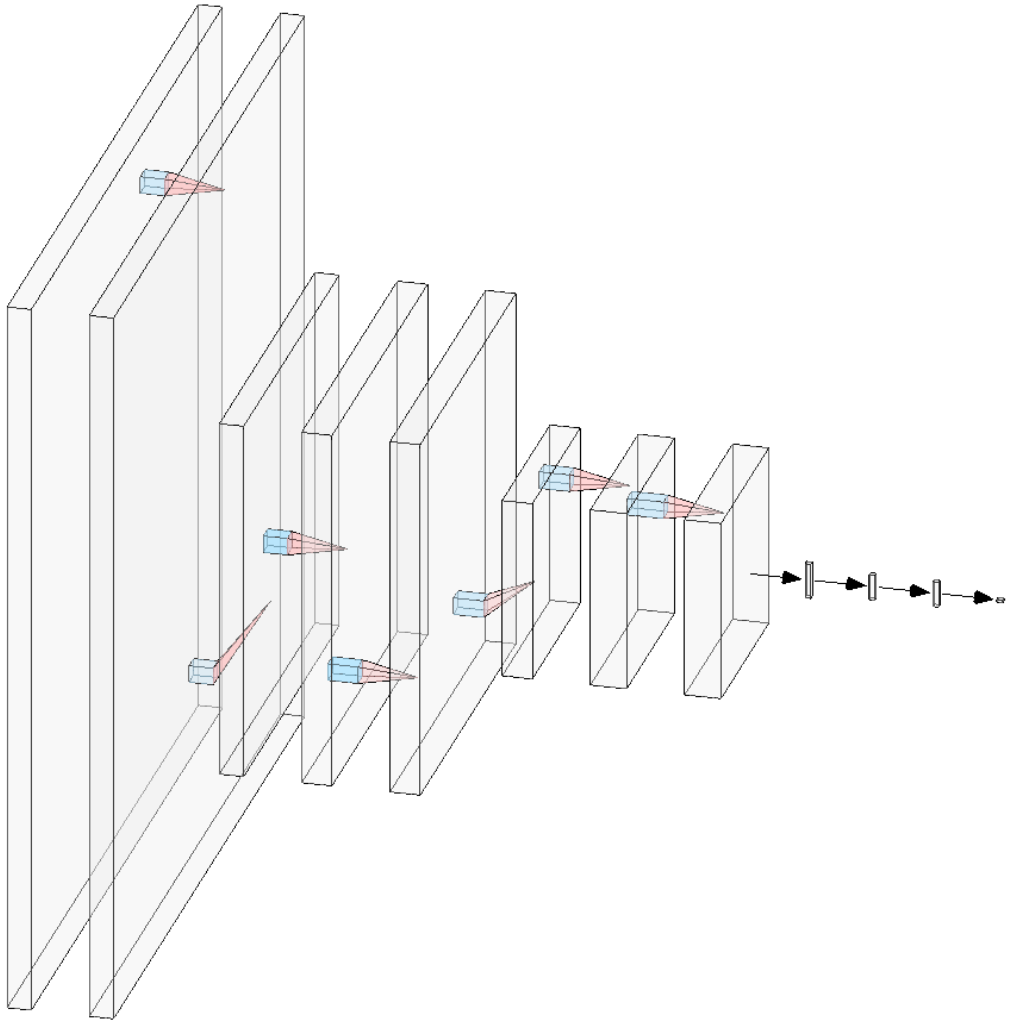
349 COVID positive, 397 COVID negative

Png format, image sizes varied

COVID Negative

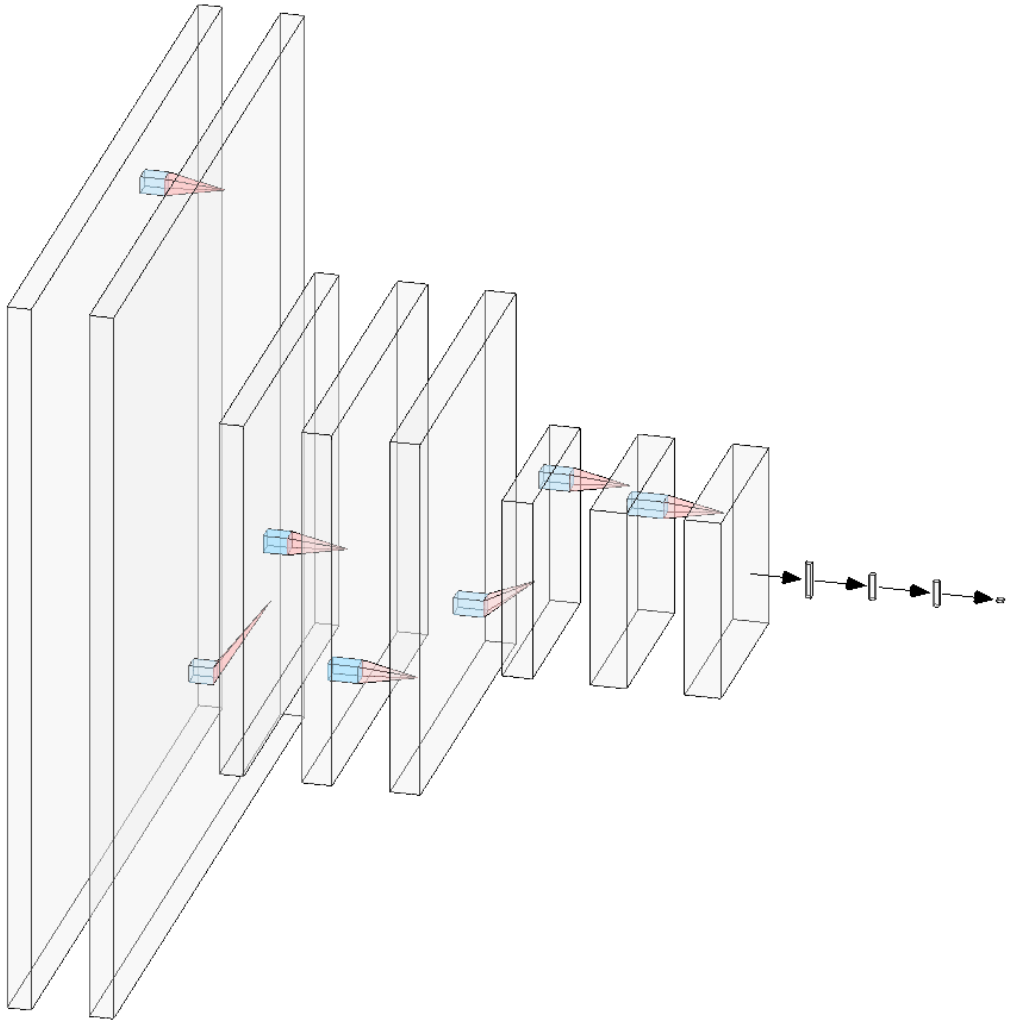
COVID Positive

Building a base CNN model



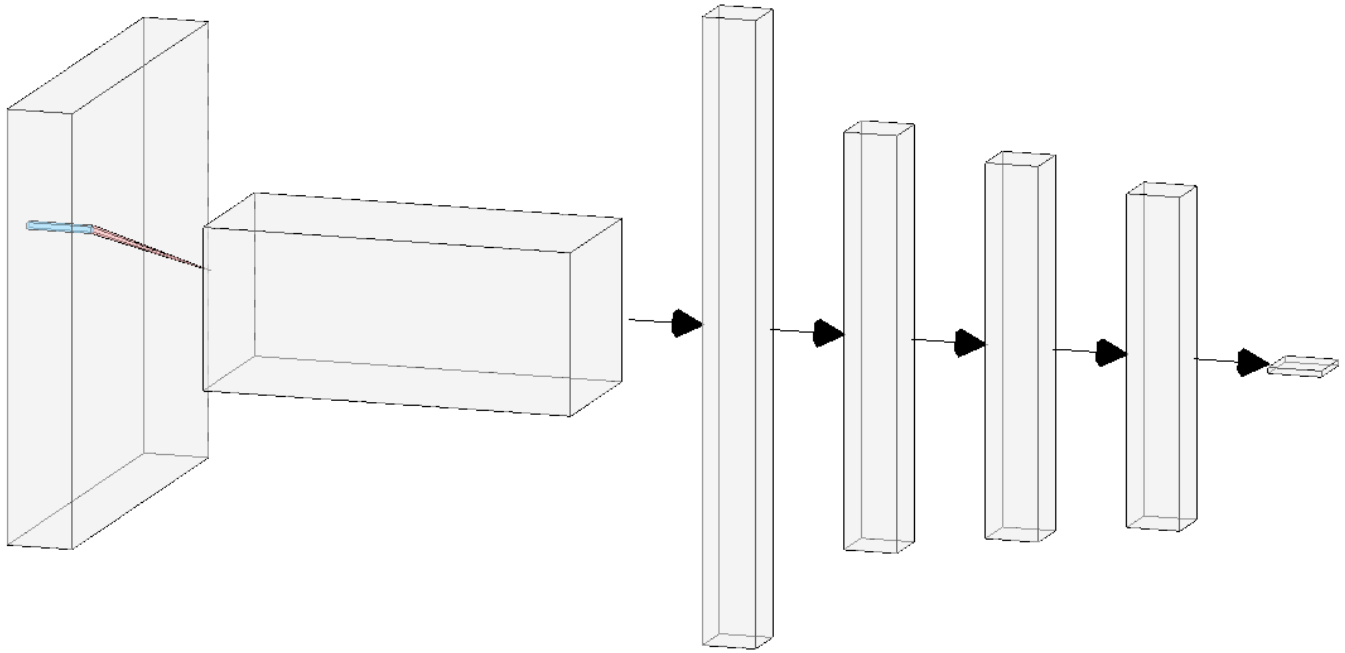
1. Convolutional block
   - 2 convolutional layers w/ 2 dropout layers
2. Convolutional block
   - 2 convolutional layers w/ 2 dropout layers
3. Convolutional block
   - 2 convolutional layers w/ 2 dropout layers
4. Fully connected block
   - 3 dense layers of decreasing size

Building a base CNN model



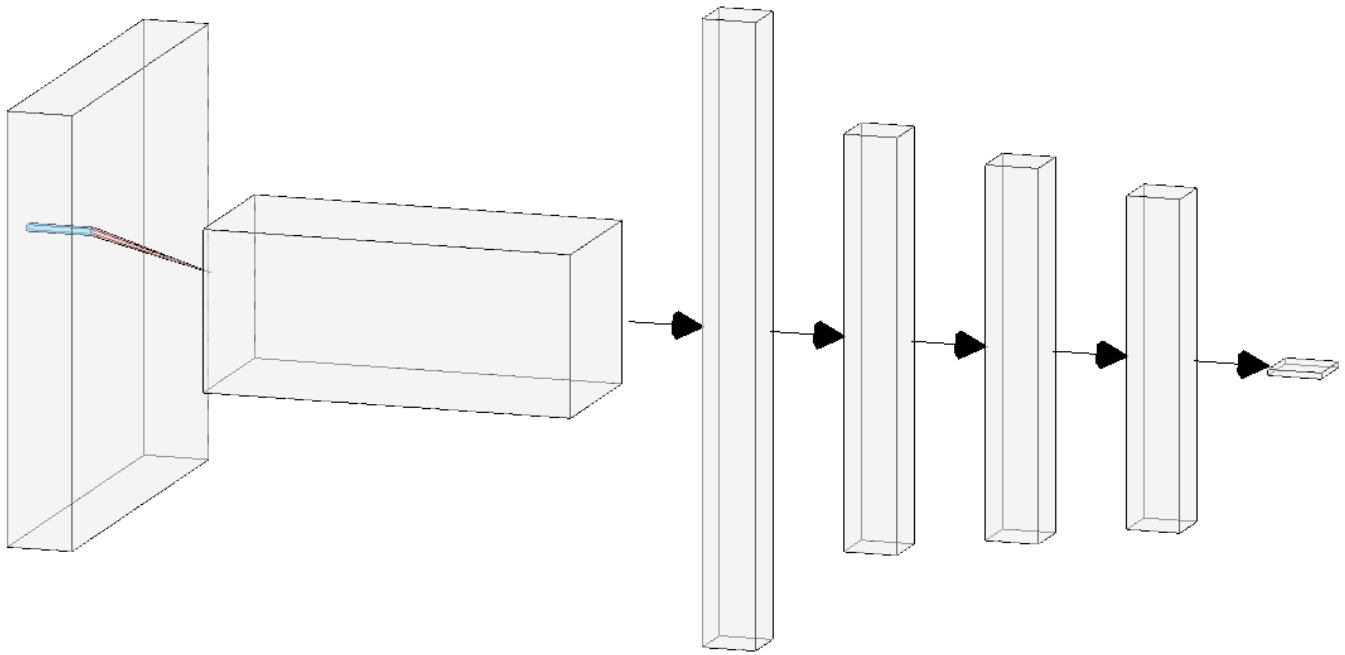
63.1%

Applying Transfer Learning



1. VGG16 Block
2. Fully connected block
   - 3 dense layers of decreasing size
   - 2 dropout layers
3. Output layer
   - Sigmoid activation

Applying Transfer Learning



72.2%

Takeaways

Current model is NOT a valid diagnostic tool

ML shows promise in interpreting COVID image data

Incorporate better preprocessing, more diverse data

Thank you!


matthewryan33@gmail.com


/maneaterrbug


/matt-mcg-ryan

Instructions for use (free users)

In order to use this template, you must credit **Slidesgo** by keeping the Thanks slide.

You are allowed to:

- Modify this template.
- Use it for both personal and commercial purposes.

You are not allowed to:

- Sublicense, sell or rent any of Slidesgo Content (or a modified version of Slidesgo Content).
- Distribute this Slidesgo Template (or a modified version of this Slidesgo Template) or include it in a database or in any other product or service that offers downloadable images, icons or presentations that may be subject to distribution or resale.
- Use any of the elements that are part of this Slidesgo Template in an isolated and separated way from this Template.
- Delete the “Thanks” or “Credits” slide.
- Register any of the elements that are part of this template as a trademark or logo, or register it as a work in an intellectual property registry or similar.

For more information about editing slides, please read our FAQs or visit Slidesgo School:

https://slidesgo.com/faqs and https://slidesgo.com/slidesgo-school

Appendix

Layer (type)	Output Shape	Param #
conv2d_17 (Conv2D)	(None, 256, 256, 16)	448
dropout_16 (Dropout)	(None, 256, 256, 16)	0
conv2d_18 (Conv2D)	(None, 256, 256, 16)	2320
dropout_17 (Dropout)	(None, 256, 256, 16)	0
max_pooling2d_6 (MaxPooling 2D)	(None, 128, 128, 16)	0
conv2d_19 (Conv2D)	(None, 128, 128, 32)	4640
dropout_18 (Dropout)	(None, 128, 128, 32)	0
conv2d_20 (Conv2D)	(None, 128, 128, 32)	9248
dropout_19 (Dropout)	(None, 128, 128, 32)	0
max_pooling2d_7 (MaxPooling 2D)	(None, 64, 64, 32)	0
conv2d_21 (Conv2D)	(None, 64, 64, 64)	18496
dropout_20 (Dropout)	(None, 64, 64, 64)	0
conv2d_22 (Conv2D)	(None, 64, 64, 64)	36928
dropout_21 (Dropout)	(None, 64, 64, 64)	0
global_average_pooling2d_3 (GlobalAveragePooling2D)	(None, 64)	0
flatten_3 (Flatten)	(None, 64)	0
dense_7 (Dense)	(None, 20)	1300
dense_8 (Dense)	(None, 20)	420
dense_9 (Dense)	(None, 1)	21

Total params: 73,821
Trainable params: 73,821
Non-trainable params: 0

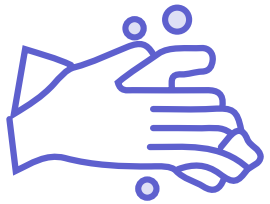
Layer (type)	Output Shape	Param #
vgg16 (Functional)	(None, 8, 8, 512)	14714688
flatten (Flatten)	(None, 32768)	0
dense (Dense)	(None, 1000)	32769000
dropout (Dropout)	(None, 1000)	0
dense_1 (Dense)	(None, 500)	500500
dropout_1 (Dropout)	(None, 500)	0
dense_2 (Dense)	(None, 250)	125250
dense_3 (Dense)	(None, 1)	251

Total params: 48,109,689
Trainable params: 33,395,001
Non-trainable params: 14,714,688

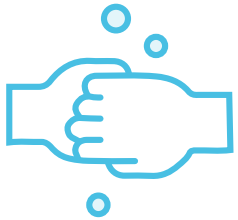
Take-aways

60+% Alcohol

Palm to palm



Fingers interlaced



Finger nails

Wrists

Thumbs

Rub until dry

Disinfected hands