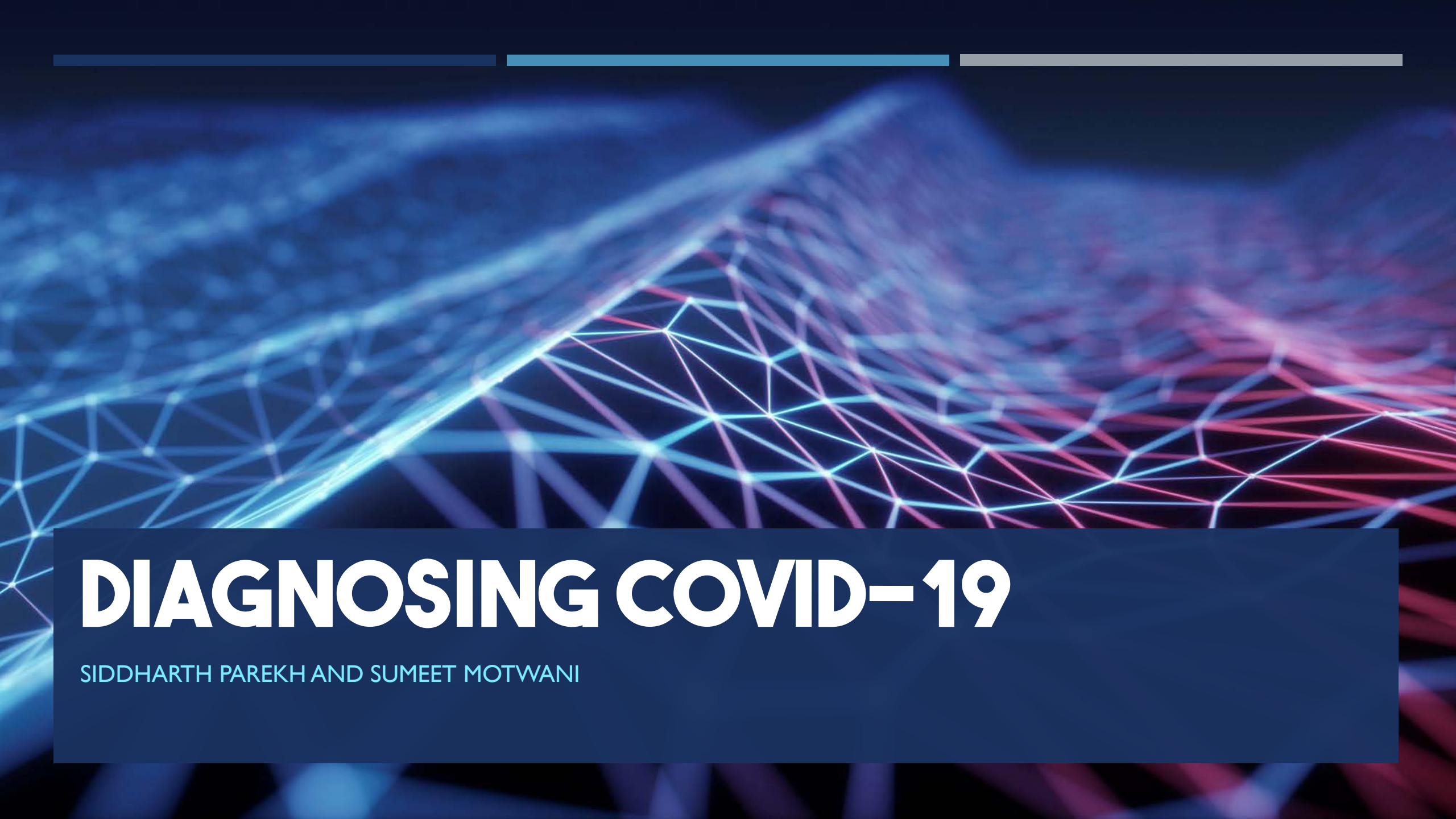
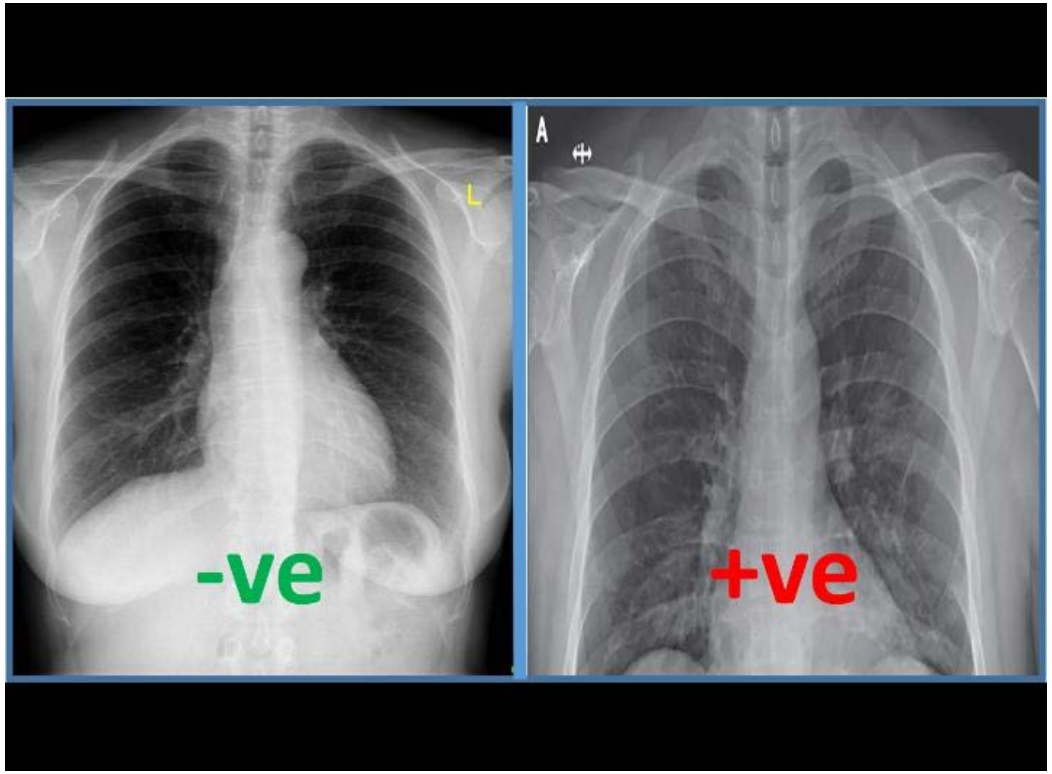


DIAGNOSING COVID-19

SIDDHARTH PAREKH AND SUMEET MOTWANI

WHAT ARE WE DOING?

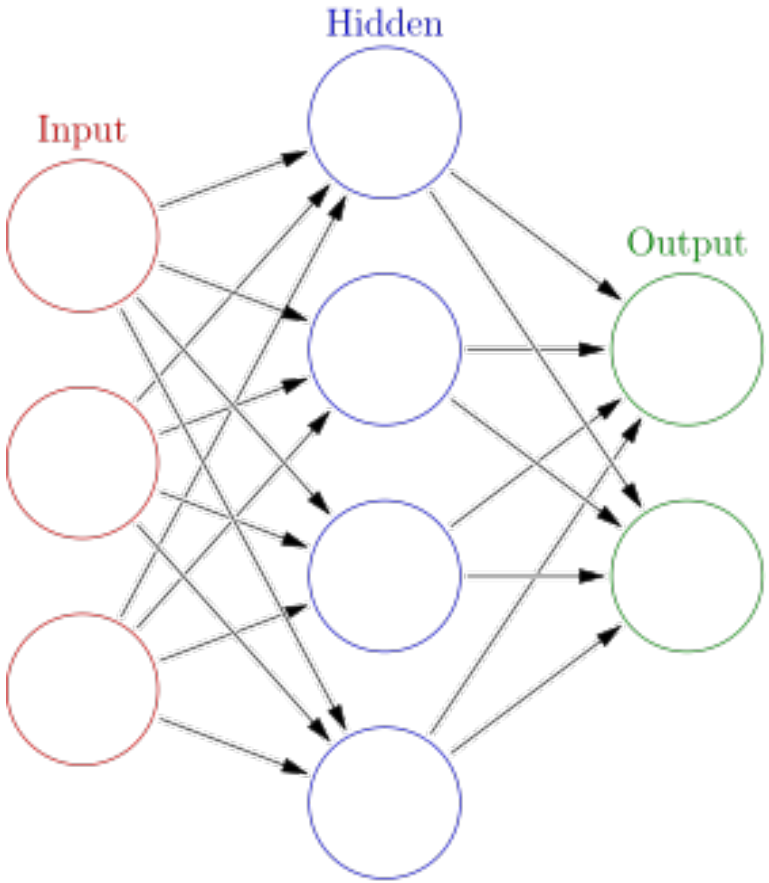


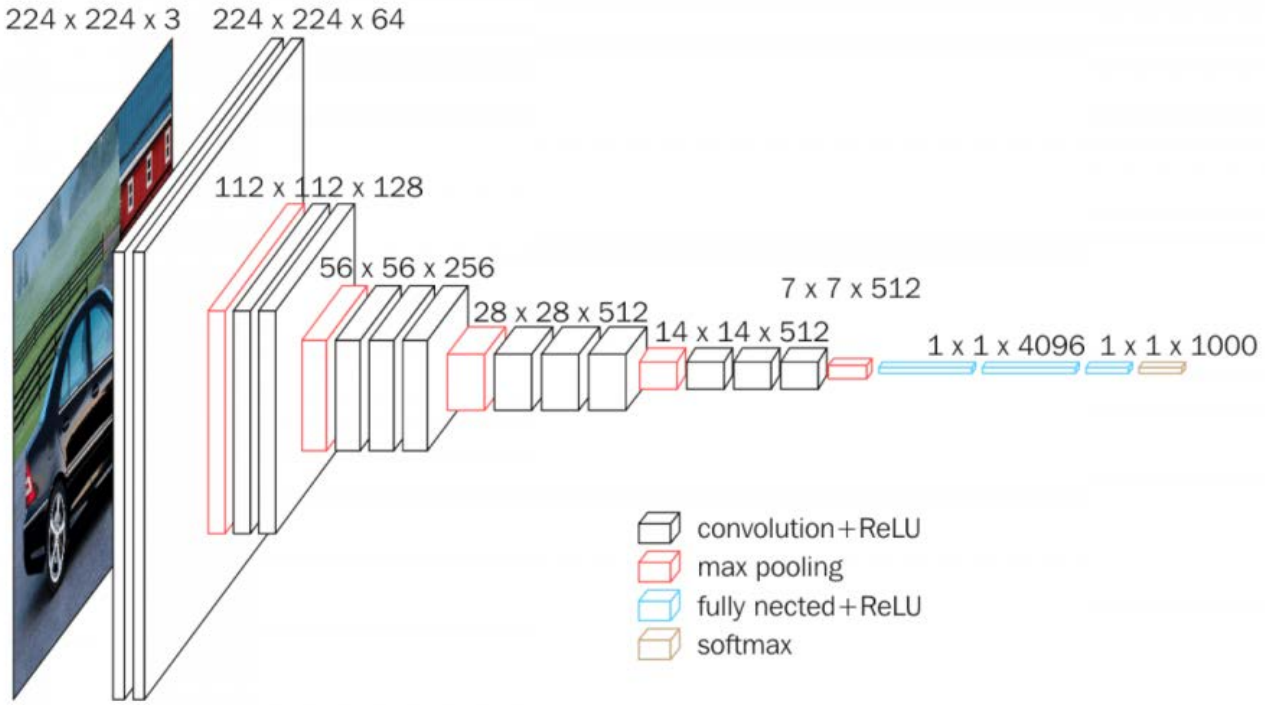
- We have made a deep learning model that can differentiate between radiographic images (X-rays and CT scans) of patients with COVID-19 and those without.
- Our model was trained on very limited open-source data and has not reached its maximum potential despite having an 89% accuracy.

HOW DOES IT WORK?

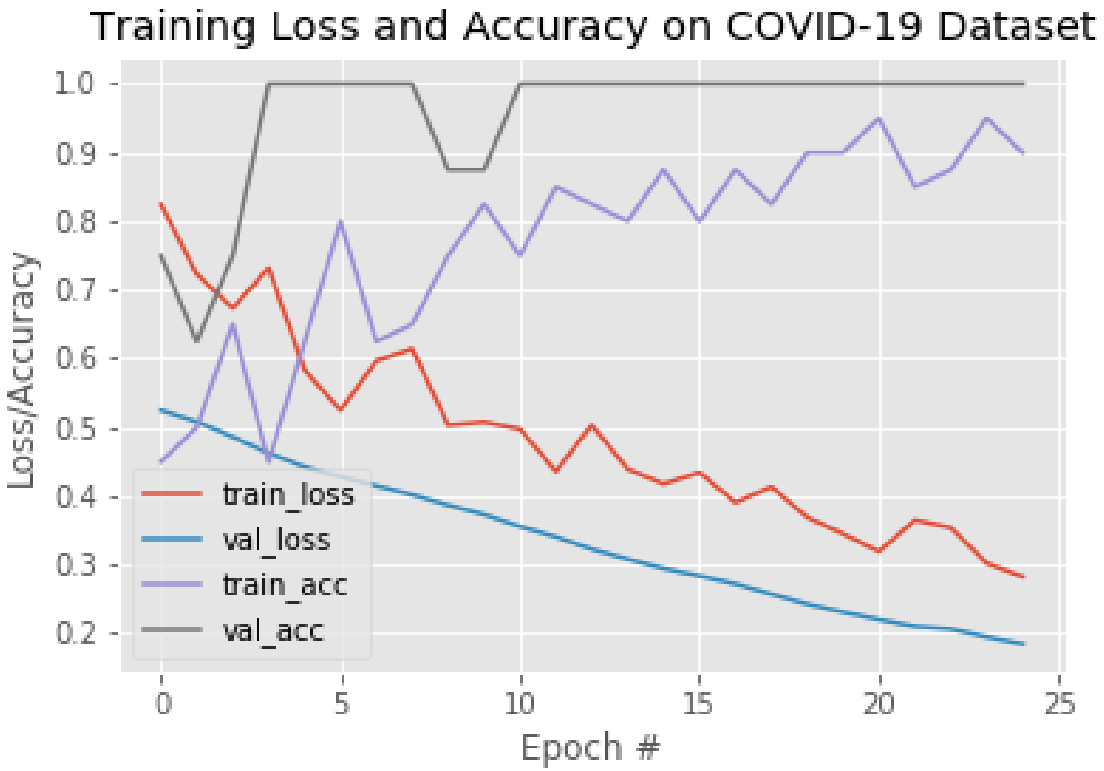
- Deep learning models are based on the human brain.
- Our brains look for features in things to be able to identify them.
- The image classification models simulate how we think but tend to notice features that may not be obvious to our eyes.

HOW DOES IT WORK?

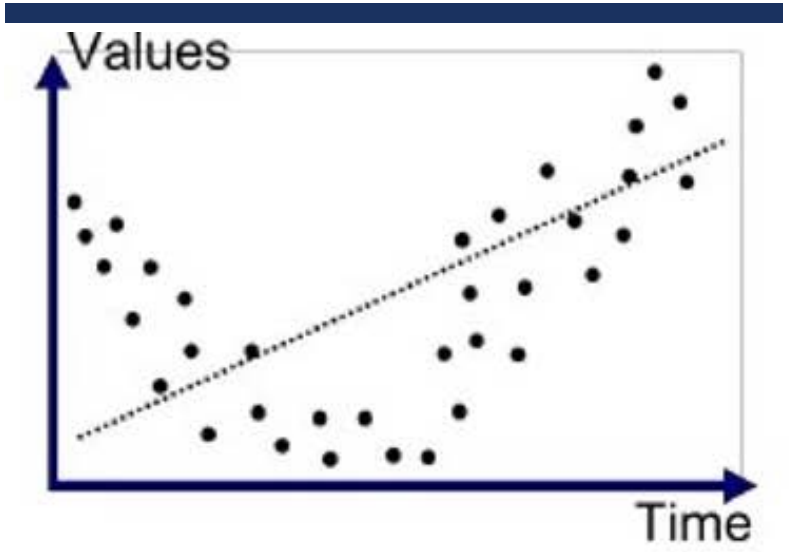




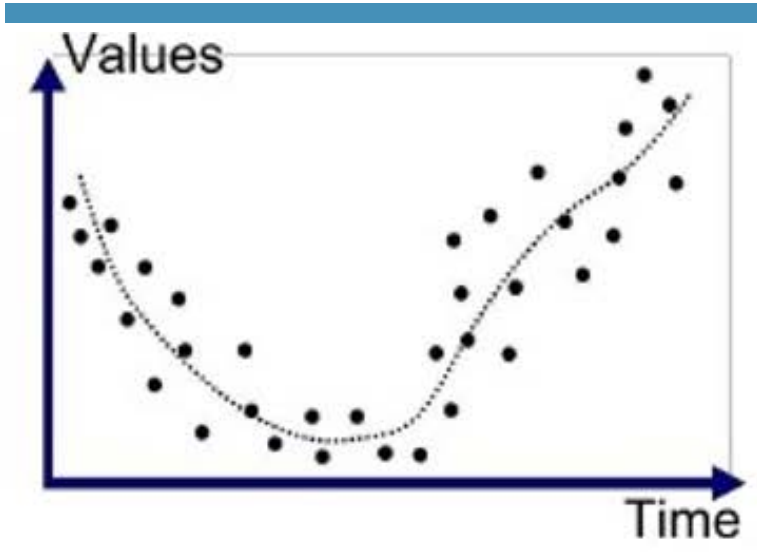
TESTING



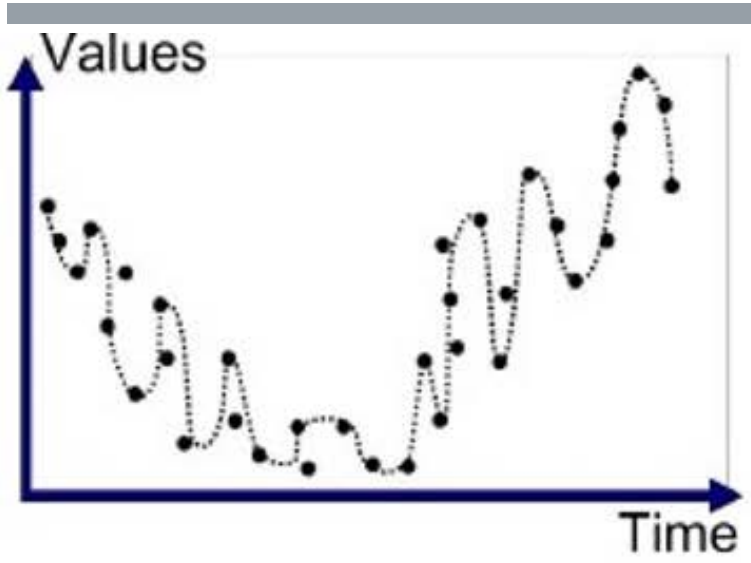
- The model was trained on 124 images of each class – COVID-19 positive and negative.
- It was tested on a separate test set of 31 images, with a validated accuracy of 89%.
- The difference between training set accuracy and test set accuracy is a phenomenon called overfitting and that is what we want to minimise.



Underfitted



Good Fit/Robust



Overfitted

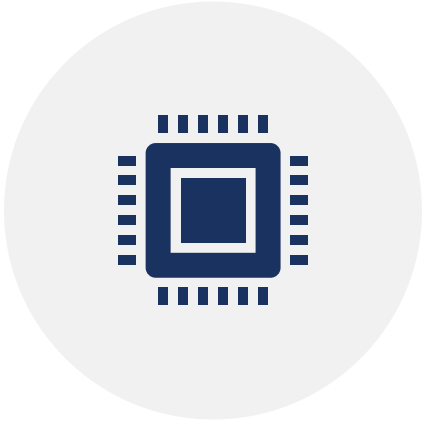
OVERFITTING – THE PRIMARY OBSTACLE

ADVANTAGES OF USING THE MODEL

- Since the current model only requires digital inputs, it gives results much quicker than the chemical test.
- It performs inference within 1-2 seconds compared to the 25-45 minutes taken by the swab test.
- The accuracies of the swab test and the model alone are 93% and 89% respectively. Combining the two brings the aggregate accuracy to 97% which is much more reliable than either of the tests individually.
- It can be used as a pre-test – those diagnosed positive by the model will be given immediate treatment and further testing whereas those diagnosed negative will be placed lower in priority for treatment.

WHAT DO WE NEED?

DATA



COMPUTATIONAL RESOURCES

MEDICAL EXPERTISE

ADDITIONAL PLANS

- Secondary model built on top of the primary classifier.
- This will enable us to factor in other kinds of data about the patient like their age, blood test results, event the results of the chemical test.
- Combining this data with the radiographic image will provide a significantly higher accuracy and make the model much more reliable.
- The chemical test will be taken into account hence, an empirical method will also be included.
- Places where the chemical test is not readily available, the model can be modified to function without it.