Spotle.ai

COVID-19 HACKATHON

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MEDICAL IMAGING
PROJECT

TEAM - 7

OUR TEAM

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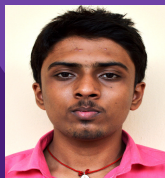
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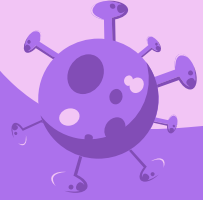
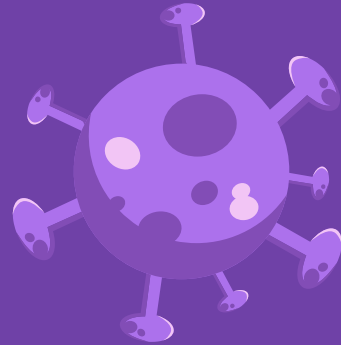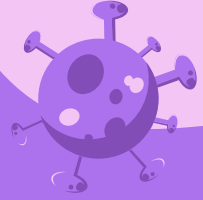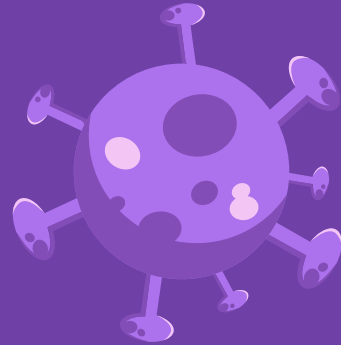# PROBLEM

To detect the possibility of a SARS-CoV-2 (Coronavirus) infection in a person using their chest X-Ray scans.
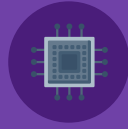
OBJECTIVE

To use deep learning techniques to create a classifier on the data of chest X-Ray images to detect if a patient is infected or not.

METHODOLOGY

Framework
Keras API with tensorflow backend

Data
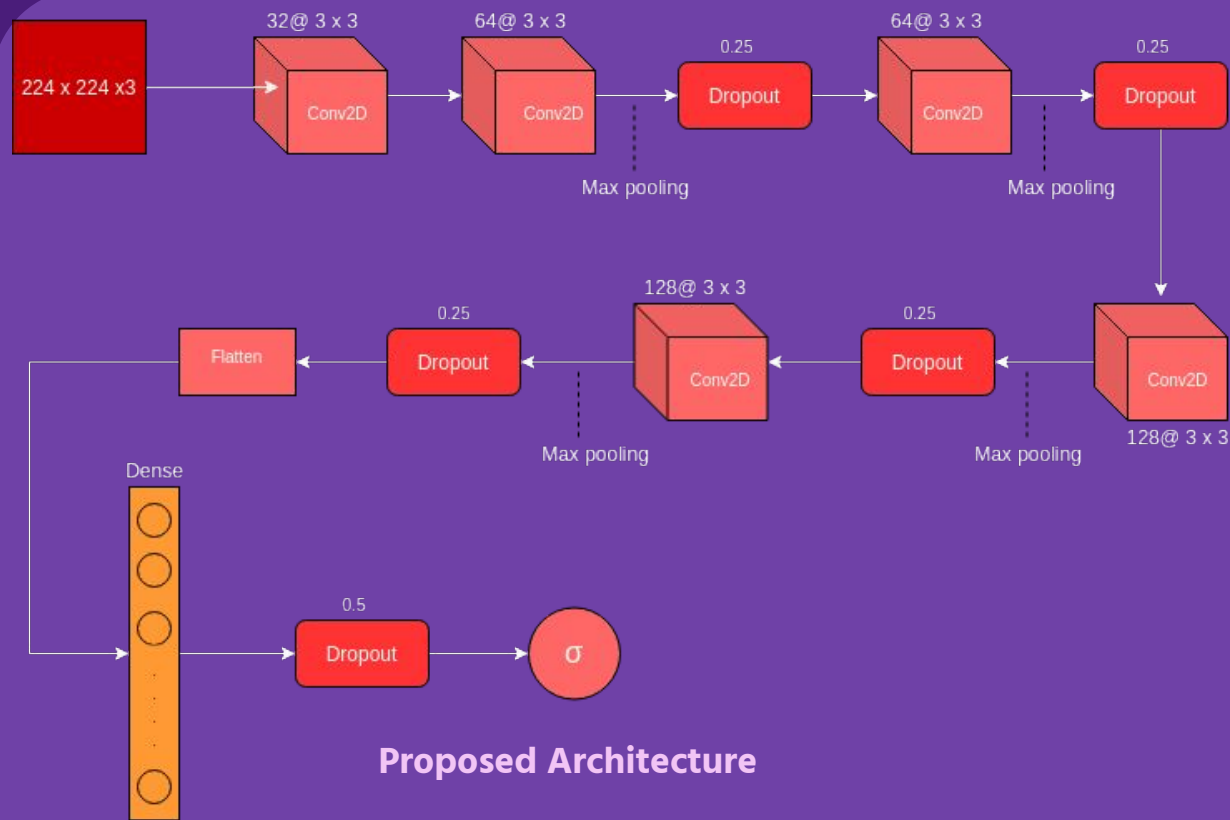Data is gathered from multiple sources

Data Augmentation
To increase the diversity of data and to increase the training samples

Architecture
A custom 17-layered CNN architecture is defined for this problem
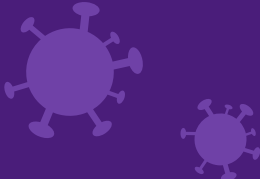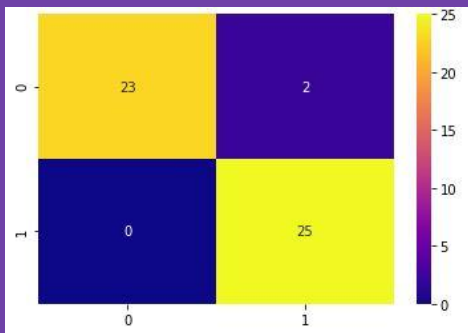
SOLUTION

Proposed Architecture

RESULT

Metric	Training set	Testing set
Accuracy	95.22 %	96.00 %
AUC	0.95	0.96

** AUC stands for 'Area under the curve'. For a random model AUC score is 0.5 & anything greater than that is good. Our model is obtaining approximately 96% accuracy on testing dataset solely based on X-Ray images. We have also obtained *100% sensitivity and 98% specificity*.
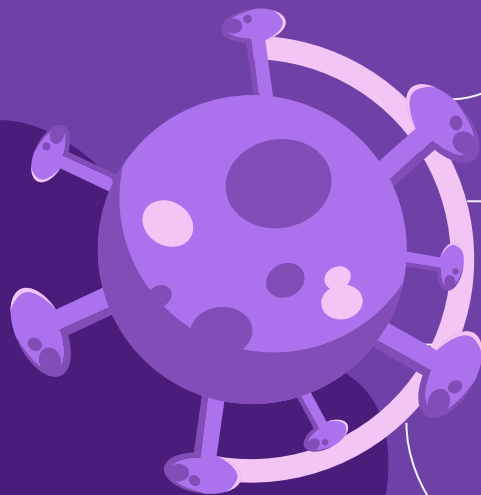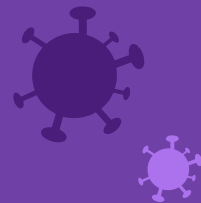
(i) Confusion Matrix

" From confusion matrix, we can say that no person who is actually normal is predicted to be infected "

	precision	recall	f1-score	support
0	1.00	0.92	0.96	25
1	0.93	1.00	0.96	25
accuracy			0.96	50
macro avg	0.96	0.96	0.96	50
weighted avg	0.96	0.96	0.96	50

(ii) Precision, recall and f1-score

IMPACT

01

Faster detection
Proposed model would have an edge over covid blood tests

02

Assist
Helps Radiologists in better diagnosis

03

Economical
Model is easier to deploy, and to retrain whenever necessary

04

Second opinion
An X-Ray scan can be taken to ensure decisions are taken carefully

PRODUCTIONIZING OUR MODEL

- Model can be further improvised and then deployed to any of the cloud platforms.
- This can be offered as a service to the hospitals and diagnostic centers, assisting radiologists.
- People with access to the service, can use it with a simple API call.

REFERENCES

- Kaggle–Coronavirus dataset : https://www.kaggle.com/tags/covid19
- Positive Cases :https://github.com/ieee8023/covid-chestxray-dataset
- Normal Cases : https://www.kaggle.com/paultimothymooney/chestxray-pneumonia
- Ministry of Health and Family Welfare : https://www.mohfw.gov.in/

We would like to thank Spotle.ai for giving us this opportunity to participate in the hackathon and doLoopTech for sponsoring the event. We would like to express our sincere gratitude towards Mr Mousum Dutta for guiding us through the hackathon.

THANK YOU