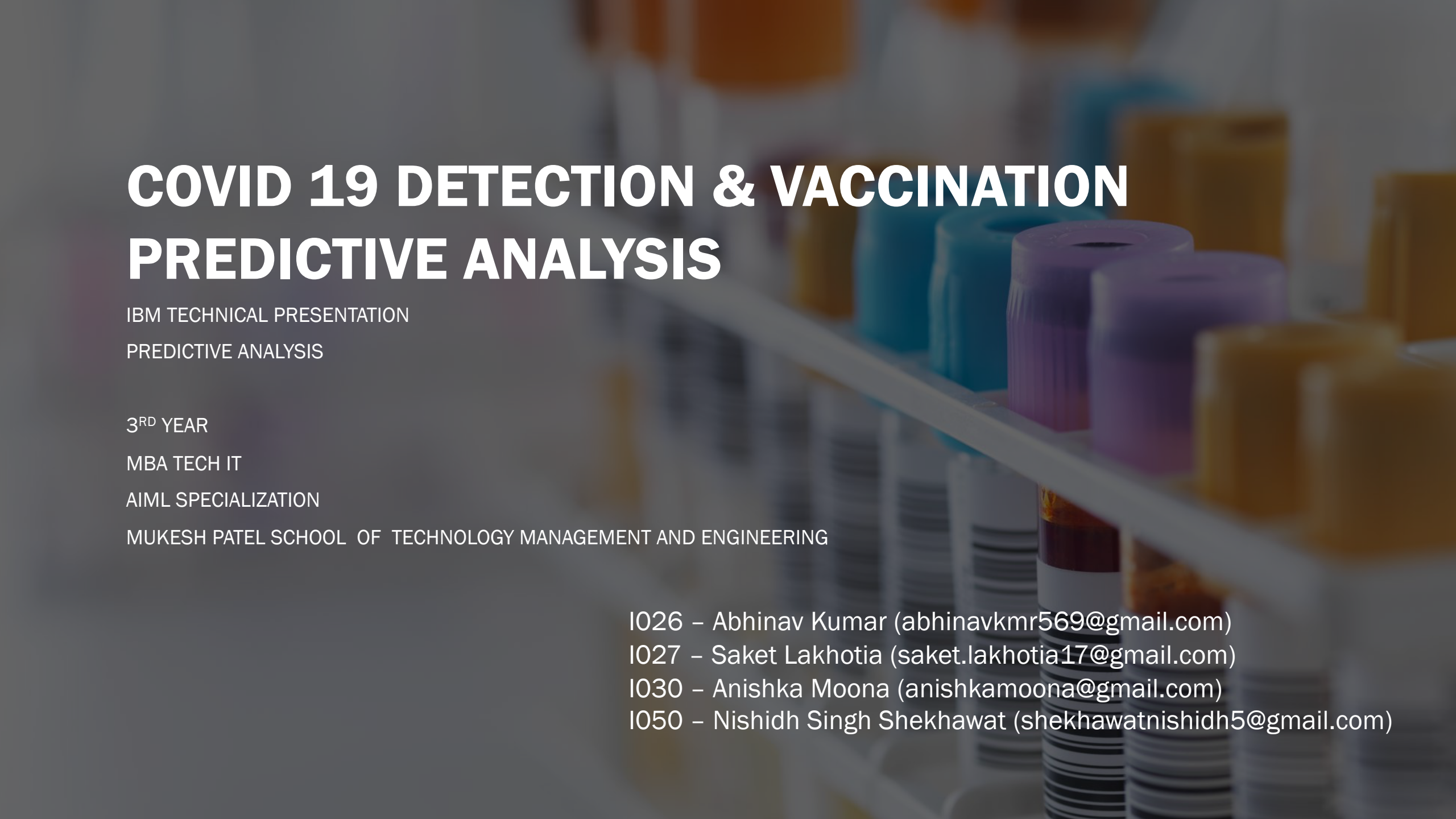

COVID 19 DETECTION & VACCINATION PREDICTIVE ANALYSIS

IBM TECHNICAL PRESENTATION

PREDICTIVE ANALYSIS

3RD YEAR

MBA TECH IT

AIML SPECIALIZATION

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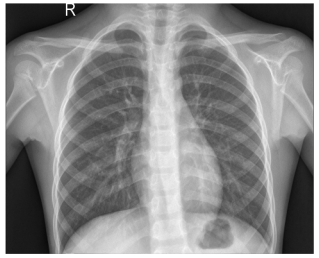
INTRODUCTION

- This project is divided into 2 parts
  1. Pneumonia detection from lung x-rays: COVID19 virus affects the respiratory system of healthy individual & Chest X-Ray is one of the important imaging methods to identify Pneumonia caused due to corona virus. With the Chest X - Ray dataset, developed a Deep Learning Model to classify the X-Rays of Healthy vs Pneumonia (Corona) affected patients.
  2. Monitoring the progress of Vaccination: Monitoring and comparing and forecasting the progress of Vaccination with the COVID19 cases per day.

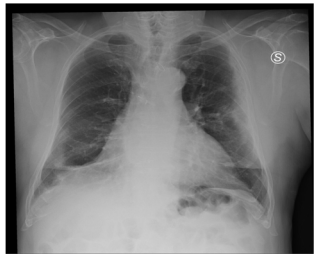
- This model also powers a web application to classify the Corona Virus (Pneumonia) X-rays.

DATASETS USED

Dataset 1: Chest X-ray dataset[1]



Normal



Covid Positive/
Pneumonia

Dataset 2: Vaccinations in India[2]

date	total_vaccinations	daily_vaccinations
2021-01-15	0.0	NaN
2021-01-16	191181.0	191181.0
2021-01-17	224301.0	112150.0
2021-01-18	454049.0	151350.0
2021-01-19	674835.0	168709.0
2021-01-20	806484.0	161297.0
2021-01-21	1043534.0	173922.0
2021-01-22	1390592.0	198656.0
2021-01-23	1582201.0	198717.0
2021-01-24	1615504.0	198743.0
2021-01-25	2023809.0	224251.0
2021-01-26	2029480.0	193521.0

Dataset 3: Covid'19 case counts[3]

	day	total	deaths	discharged
0	2020-03-10	47	0	0
1	2020-03-11	60	0	0
2	2020-03-12	73	0	0
3	2020-03-13	82	2	10
4	2020-03-14	84	2	10
...	...	...	...	...
320	2021-01-24	10654533	153339	10316786
321	2021-01-25	10667736	153470	10330084
322	2021-01-26	10676838	153587	10345985
323	2021-01-27	10689527	153724	10359305
324	2021-01-28	10701193	153847	10373606

X-RAY CLASSIFICATION

Classification Model:

- **Input Data :**

  80-20 split
  Augmented - rescale the image 1./255, rotate by 90 degrees, shift width and height by 0.15,flip horizontally, zoom by 0.5.

- **Convolutional neural network :**

  4 Conv layers with 3x3 strides, ReLU Non-Linearity , Max Pooling, Batch Normalization
  4 Dense Layers with Dropout
  Softmax layer

DIAGRAM: GRAPH SHOWING NEW COVID'19 CASES AND THE VACCINATED CASES

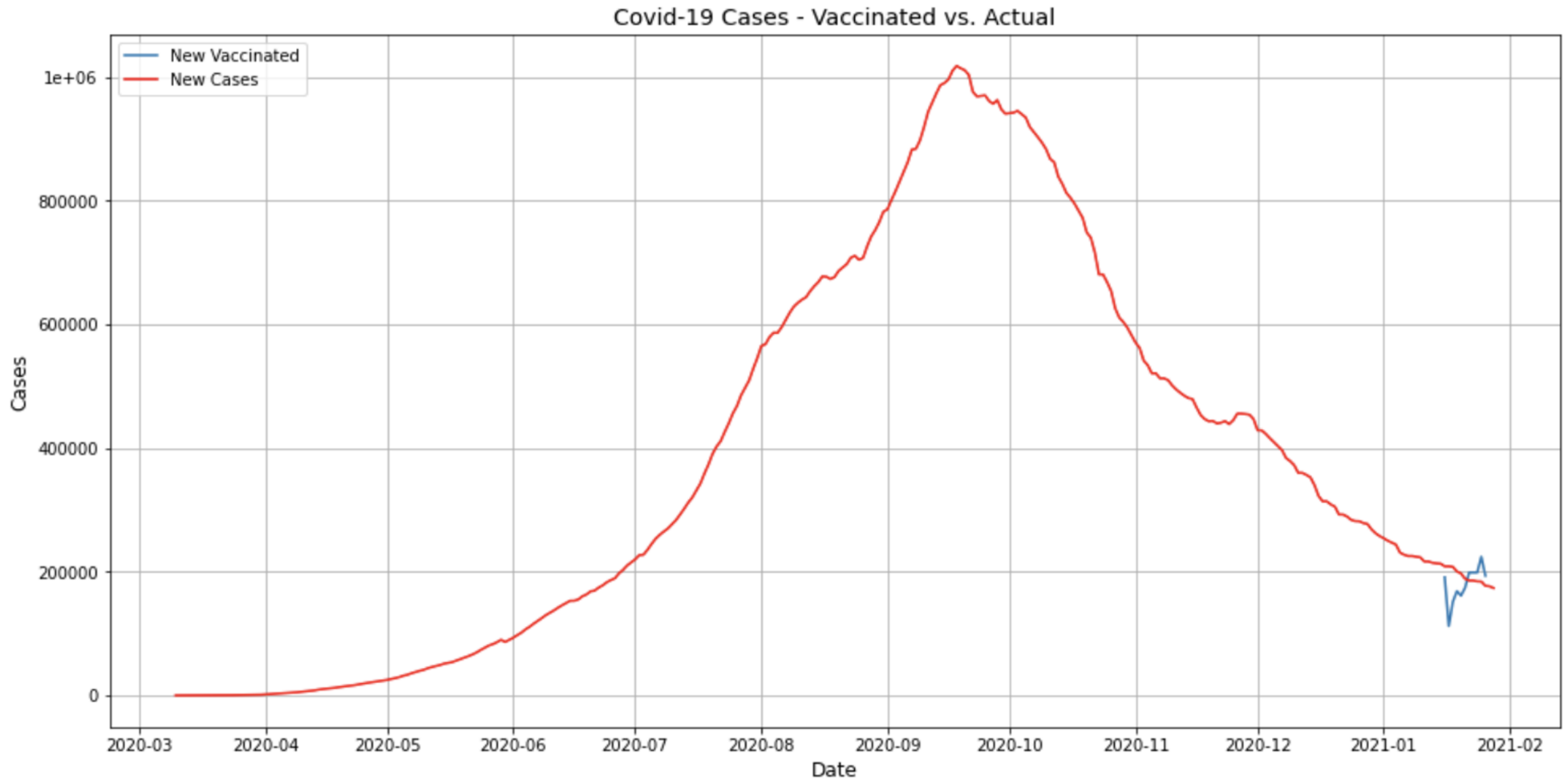
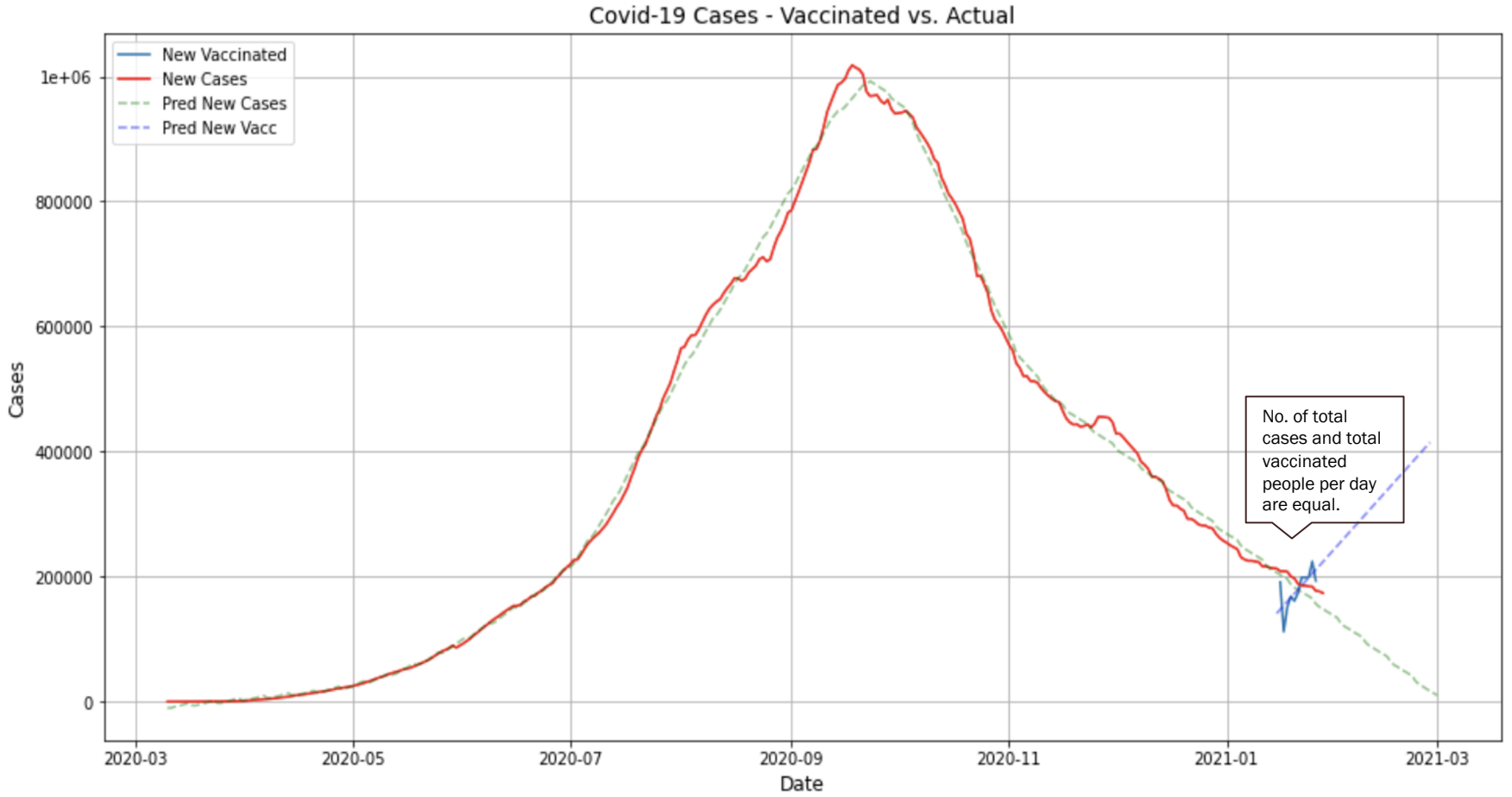


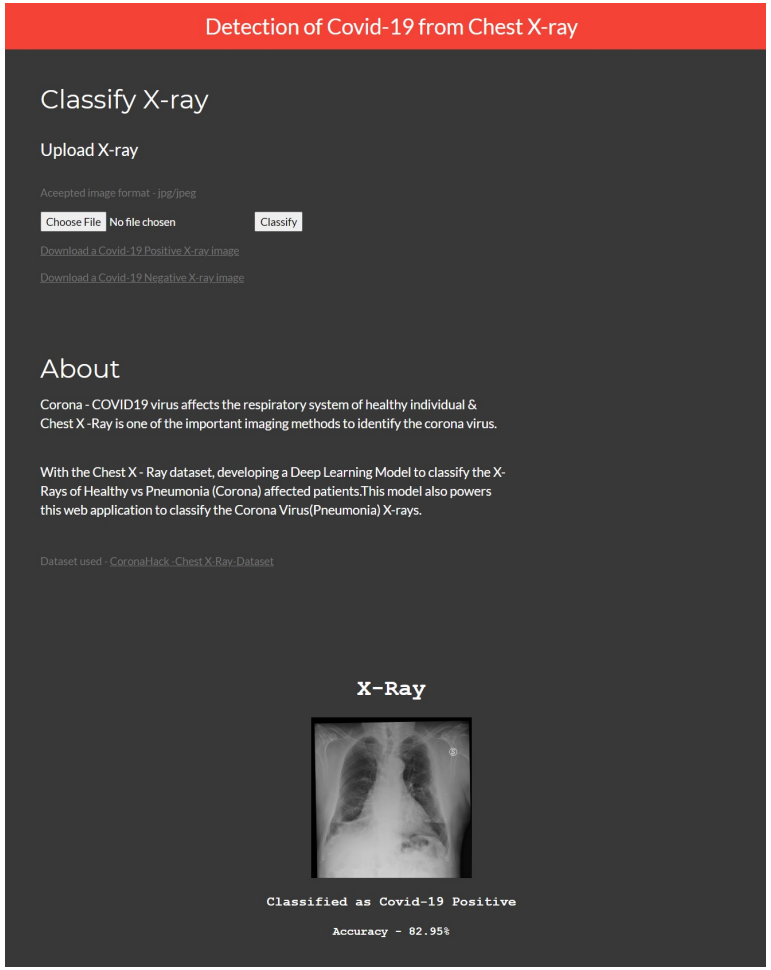
DIAGRAM: GRAPH SHOWING PREDICTION OF COVID'19 CASES AND THE VACCINATED CASES TILL MARCH



HOW IS THIS INNOVATIVE

- This Model is inspired by the famous AlexNet [4] and the FastRCN [5] paper.
- The inputs are 224x224 images, which are passed through a total of four convolution layers, then flattened for classification.
- This model powers a web application to classify the Corona Virus(Pneumonia) X-rays.

Web Application UI



CONCLUSION

- According to current situation, vaccination is provided to approx 2 lakh people per day. If we go in accordance with this, then it would take around 19 years to vaccinate 136 crore people.

- Our future work would include:
  - Get more data
  - Improve model accuracy
  - Refresh the front-end design
  - Deploy the pneumonia detection model on heroku

REFERENCES

[1] Chest X-Ray: https://www.kaggle.com/praveengovi/coronahack-chest-xraydataset.

[2] Vaccination Dataset: https://ourworldindia.org/

[3] Covid Data: https://api.rootnet.in/

[4] https://proceedings.neurips.cc/paper/2012/hash/c399862d3b9d6b76c8436e924a68c45b-Abstract.html

[5] https://arxiv.org/abs/1504.08083v2

THANKYOU