DERBI - AI FOR HEALTHCARE HACKATHON

Hash_Directors

<u>Theme 1</u>: Multiple Diseases Predicting Deep-learning Model using Chest X-Ray/CT-Scan Images

DERBI envisioned the innovation & start up activities way back in 2009 and started an e cell. This e cell grew into an IEDC and then to become a full fledged TBI with the patronage of NSTEDB, Department of Science & Technology, Government of India. In 2015, DERBI Foundation, the formal Incubation Centre was born... Since then, DERBI has been fueling the dreams of start ups by enabling entrepreneurs to gather PACE , GALLOP business and EMERGE successfully through our pre-incubation, incubation and acceleration programs

DERBI foundation provide's a platform to learn, network to grow and guidance to empower young entrepreneurs. We constantly strive to:

- Attract high quality ventures for incubation
- Leverage our capacity and strength for the start ups to upsurge.
- Mentor and guide start ups to create a significant impact on the ecosystem.
- Access to major players of Ecosystem, partners and customers.

TEAM MENTOR :

SUDIP GUPTA   (CEO OF AIVOLVED)

TEAM MEMBERS:

- Santhosh Kumar D
- Amruth Ambrish K
- Heman Phadvas P
- Balaragavesh G M
- Kumarappan T
- Hiroshith.M
- Adel Mariam A
- Hemmasri.K

GITHUB LINK:

https://github.com/Santhosh-vidhan/HASH_Directors---AI_Healthcare_HACKATHON-Chest-Xray

DISEASE 1 : PNEUMONIA :

PNEUMONIA RESOURCE:

https://www.kaggle.com/pcbreviglieri/pneumonia-xray-images

https://www.kaggle.com/thisisatharva/rsna-pneumonia-dataset-in-jpg-format

https://www.kaggle.com/paultimothymooney/chest-xray-pneumonia

https://www.kaggle.com/khoongweihao/covid19-xray-dataset-train-test-sets

https://www.kaggle.com/amanullahasraf/covid19-pneumonia-normal-chest-xray-pa-dataset

https://www.kaggle.com/tawsifurrahman/covid19-radiography-database

Kaggle Notebook Link:

https://www.kaggle.com/vidhan26/hash-directors-pneumonia-xray

Accuracy:

```
[124]:  model_2.evaluate(test_ds_base)

        56/56 [==============================] - 229s 4s/step - loss: 0.1050 - accuracy: 0.9690 - precision: 0.9856 - recall: 0.9534
[12...   [0.105015330016613, 0.9690291881561279, 0.9855595827102661, 0.9534342288970947]
```

Data Visualization:
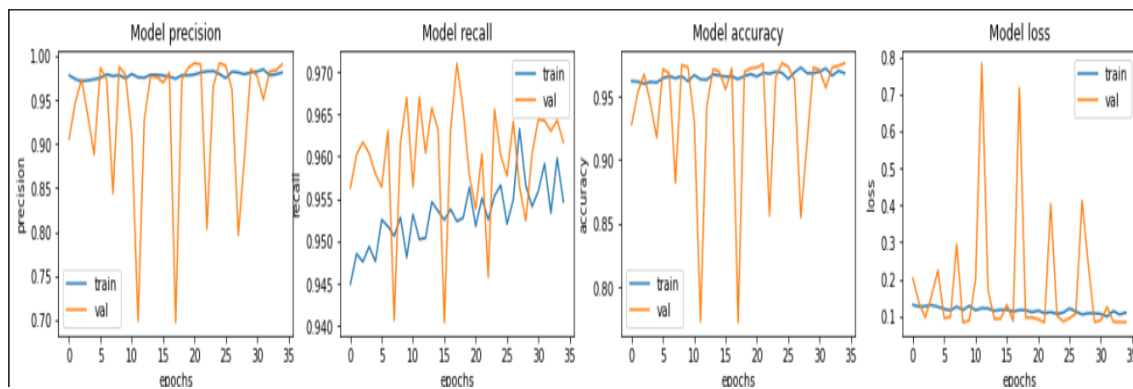
DISEASE 2 : COVID-19 :

COVID RESOURCES :

https://www.kaggle.com/gibi13/pneumonia-covid19-image-dataset

https://www.kaggle.com/amanullahasraf/covid19-pneumonia-normal-chest-xray-pa-dataset

https://www.kaggle.com/donjon00/covid19-detection

https://www.kaggle.com/tawsifurrahman/covid19-radiography-database

https://www.kaggle.com/sid321axn/covid-cxr-image-dataset-research

Kaggle Notebook Link:

https://www.kaggle.com/amruthambrish/hash-directors-covid19

ACCURACY:

```
[35]:
    loss,acc,pre,rec=model_1.evaluate(test_base)

108/108 [==============================] - 443s 4s/step - loss: 0.1337 - accuracy: 0.9525 - precision: 0.9512 - recall: 0.9468
```

LOSS : 13 %

ACCURACY : 95 %

Data Visualization:
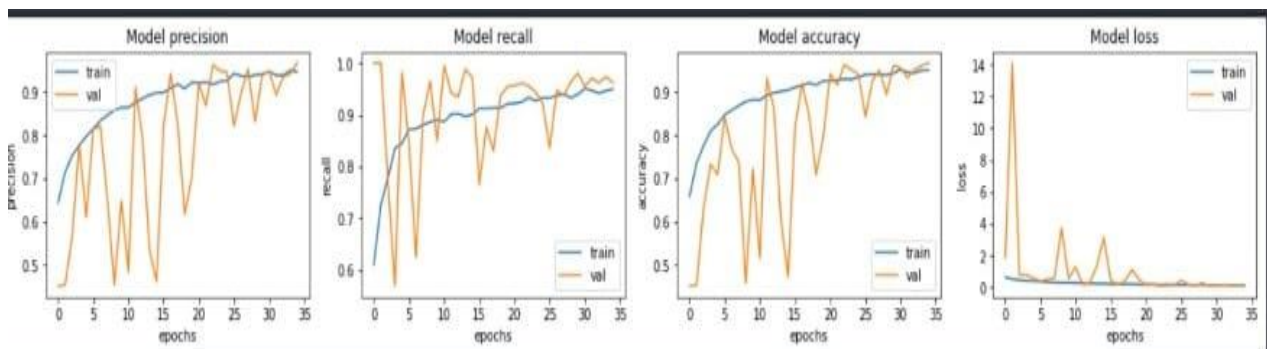
DISEASE 3 : TUBERCULOSIS :

TUBERCULOSIS RESOURCE:

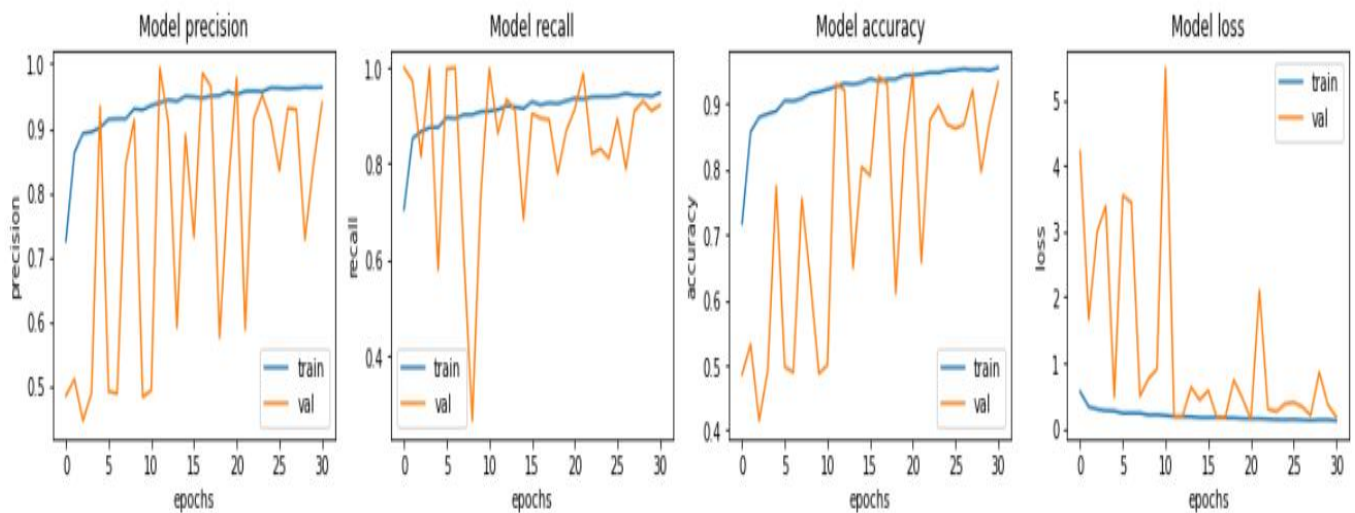https://www.kaggle.com/usmanshams/tbx-11

https://www.kaggle.com/sindalflekke/tb3000

https://www.kaggle.com/tawsifurrahman/tuberculosis-tb-chest-xray-dataset

Kaggle Notebook Link:

https://www.kaggle.com/vidhan26/hash-directors-tuberculosis

ACCURACY :

```
model.evaluate(test_ds)
```

```
36/36 [==============================] - 120s 3s/step - loss: 0.1499 - accuracy: 0.9453 - precision: 0.9764 - recall: 0.9136
[0.14986583590507507,
 0.9453197121620178,
 0.9764243364334106,
 0.9136029481887817]
```

Data visualization :

DISEASE 4 : BREAST_CANCER :

BREAST CANCER RESOURCE:

https://www.kaggle.com/anaselmasry/breast-cancer-dataset

Kaggle Notebook Link:

https://www.kaggle.com/vidhan26/hash-directors-breast-cancer

ACCURACY:

```
model.evaluate(test_ds)

32/32 [==============================] - 111s 3s/step - loss: 0.5040 - accuracy: 0.7377 - pr
ecision: 0.8964 - recall: 0.6998

[0.5039916634559631, 0.737687349319458, 0.8964143395423889, 0.699844479560852]
```

EXPLANATION:

PNEUMONIA :

Infection that inflames air sacs in one or both lungs, which may fill with fluid.

With pneumonia, the air sacs may fill with fluid or pus. The infection can be life-threatening to anyone, but particularly to infants, children and people over 65.

COVID :

Coronavirus disease (COVID-19) is an infectious disease caused by a newly discovered coronavirus.

Most people who fall sick with COVID-19 will experience mild to moderate symptoms and recover without special treatment.

TUBERCULOSIS:

Tuberculosis (TB) is a contagious infection that usually attacks your lungs. It can also spread to other parts of your body, like your brain and spine.

A type of bacteria called Mycobacterium tuberculosis causes it.

BREAST CANCER:

Breast cancer is a type of cancer that starts in the breast. Cancer starts when cells begin to grow out of control.

Breast cancer cells usually form a tumor that can often be seen on an x-ray or felt as a lump. Breast cancer occurs almost entirely in women, but men can get breast cancer, too.

PIPELINE OF THE MODEL :

- ➢ Data resources gained from the Kaggle website.

- ➢ Every data resources are collectively segregated as train, test, validation.

- ➢ Function used to check the imbalanceness in the train , test , validation set.

- ➢ Three functions have been used to resize, decrypt and give label for the particular image in the set.

- ➢ A function is used to rescale, shuffle, batch and prefetch the set according to the category as test, train and validation.

- Three functions have been used to define the convolution layer , dense layer and augmentation layer.

- A sequential model is created and complied and used for training using fit with the dataset.

- Model is evaluated and data visualization is shown.

- The model is saved and downloaded in the local device and has been added in the drive file of HASH_Directors.

COMMERCIALISATION PLAN :

My idea of deployment is not in a usual app level. Instead, we thought of adding these models in embedded system to find the occurrence of diseases and directly uploading those results in the cloud. After the hardware process the results will be directly available to the patient through QR code given to the patients.

BENEFITS :

- ❖ The model is used in a efficient way and not through apps coz patients don't know the way of how to add the image and how to make the progression.

- ❖ But with Embedded system the process is simple.

- ❖ The results of the patients is directly accessible by the particular patient in a secure way.

- ❖ Minimum of data leakage.