Breast Cancer Detection using Deep Learning

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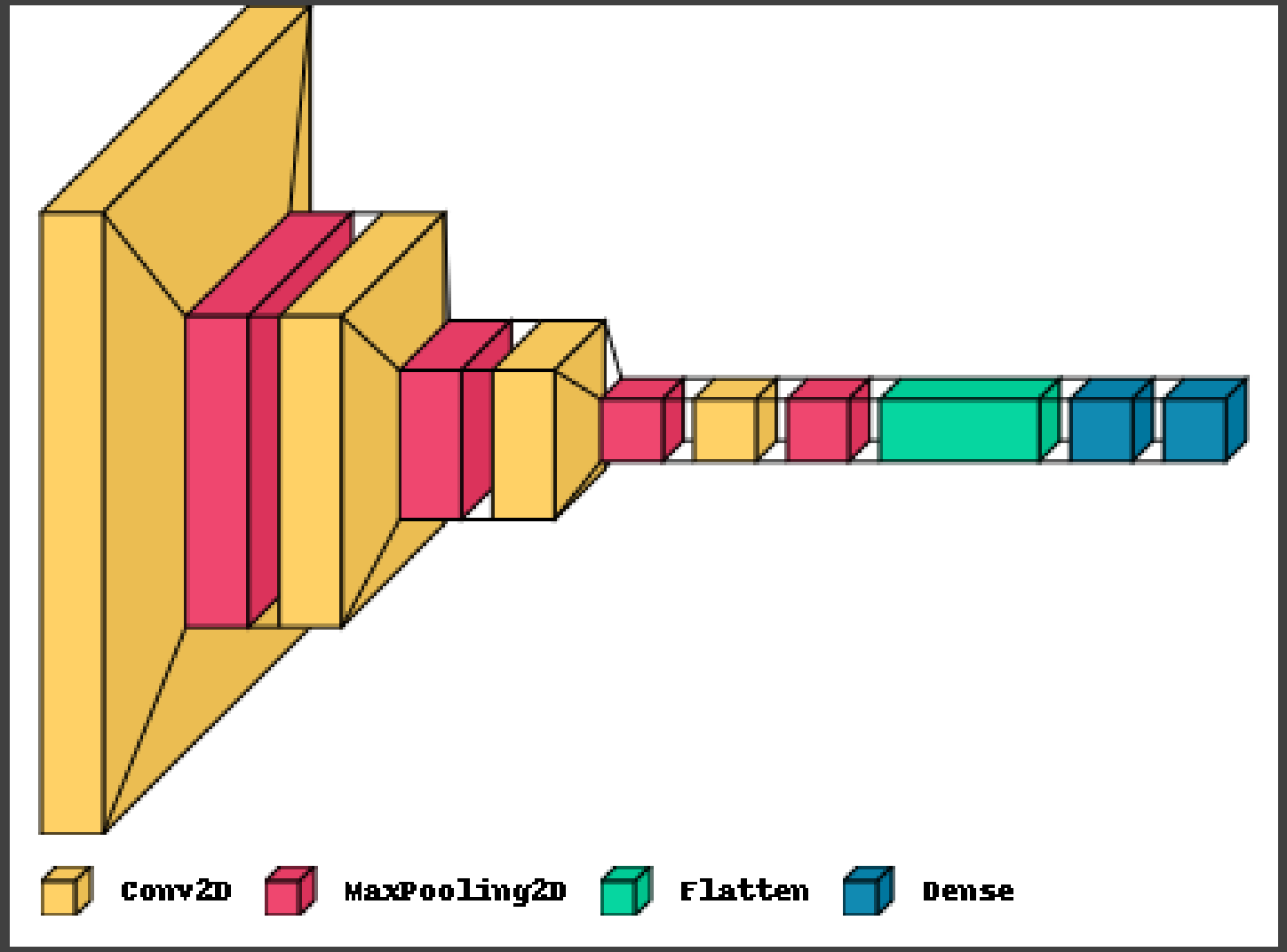
INF 412

Neural Network

In order to present a solution for the problem, I decided to build a Convolutional Neural Network (CNN). The CNN :

- Was built using Tensorflow.Keras module
- Contains successive Convolutional - MaxPooling layers, each of which directs the information to the next levels, followed by a Flatten and a Dense layer. In the last Dense layer, the final decision is calculated.
- Has optimized it's performance using Adam optimizer, ReLU activitation function and binary crossentropy loss function

Model's Structure Visualization

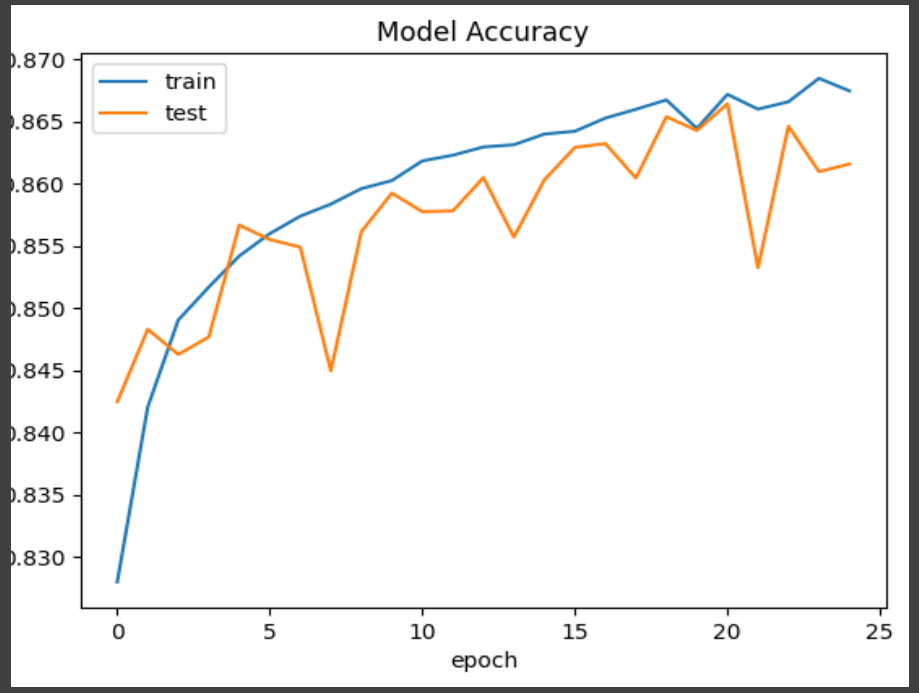


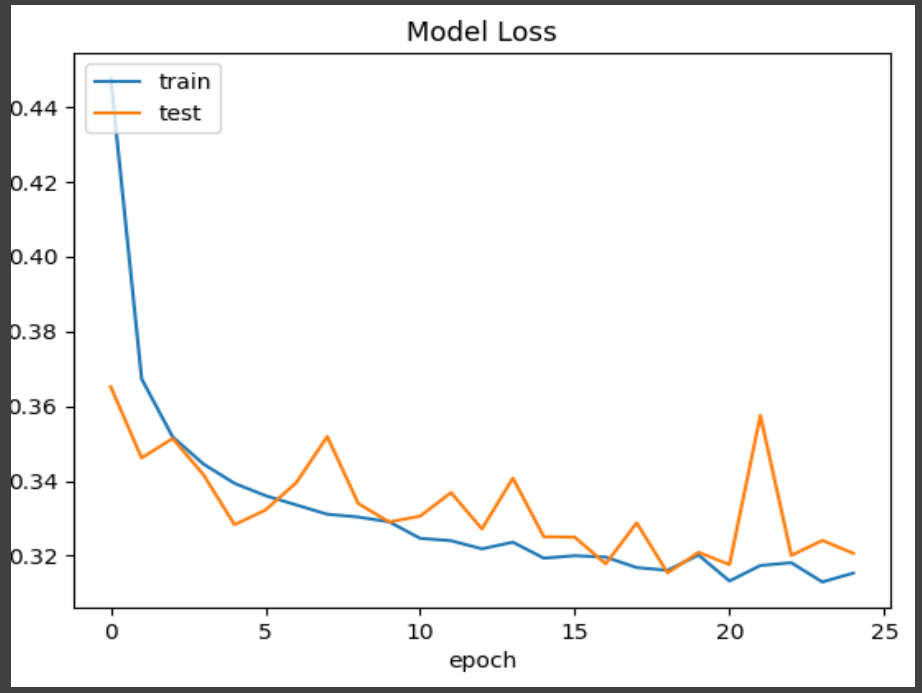
Model's Training

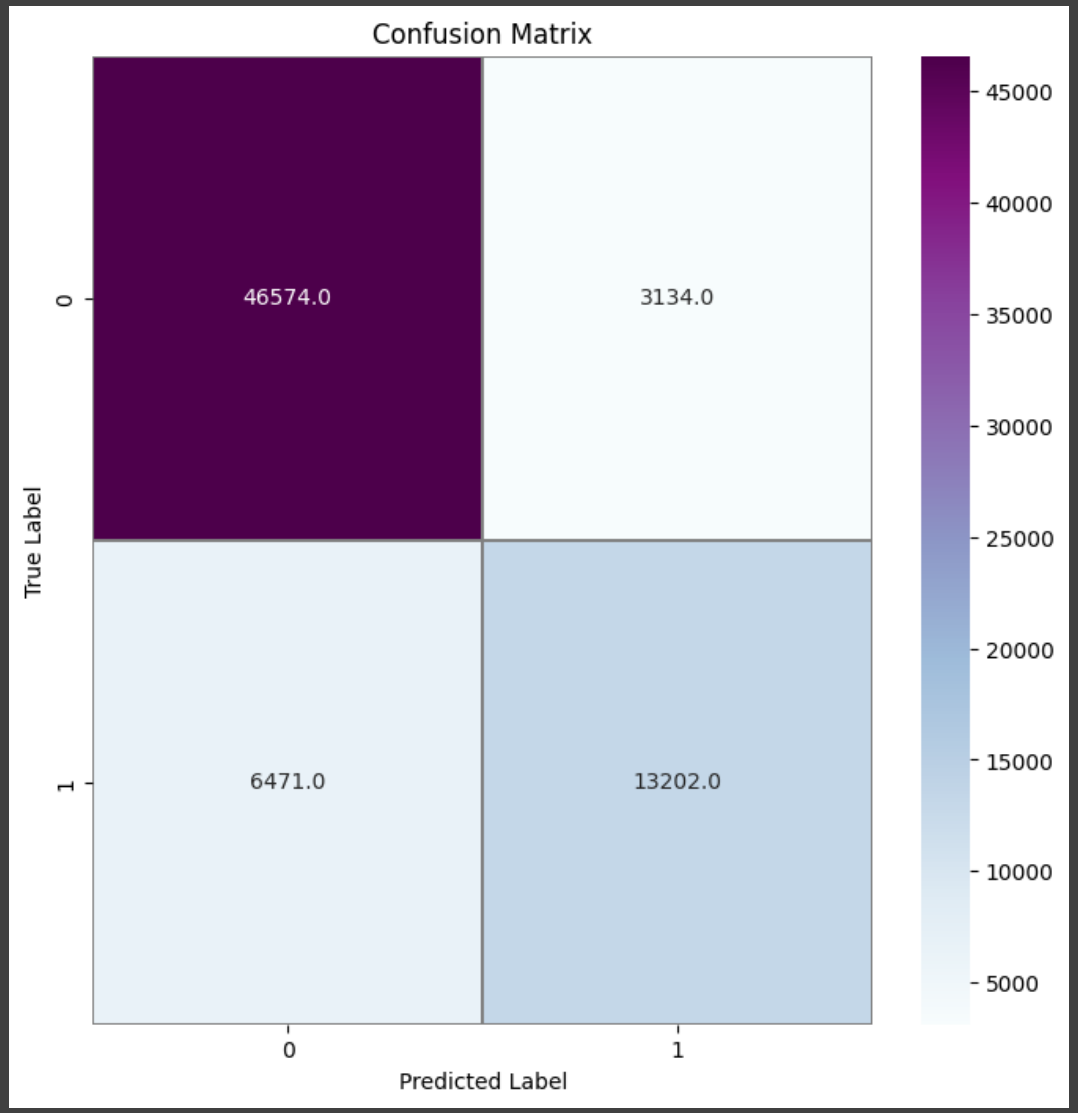
The model was trained in a Kaggle notebook, in order to have more available resources and easily manage the dataset that was from the same website. To train the model:

- A dataset that contains 277,524 labeled images was used
- The data was processed properly so it can be used as imput to the model
- It took 25 epochs (training cycles), in each epoch the input was a batch of 75 images
- The results were monitored and the parameters of the model properly redifiened

Model's Training Visualization







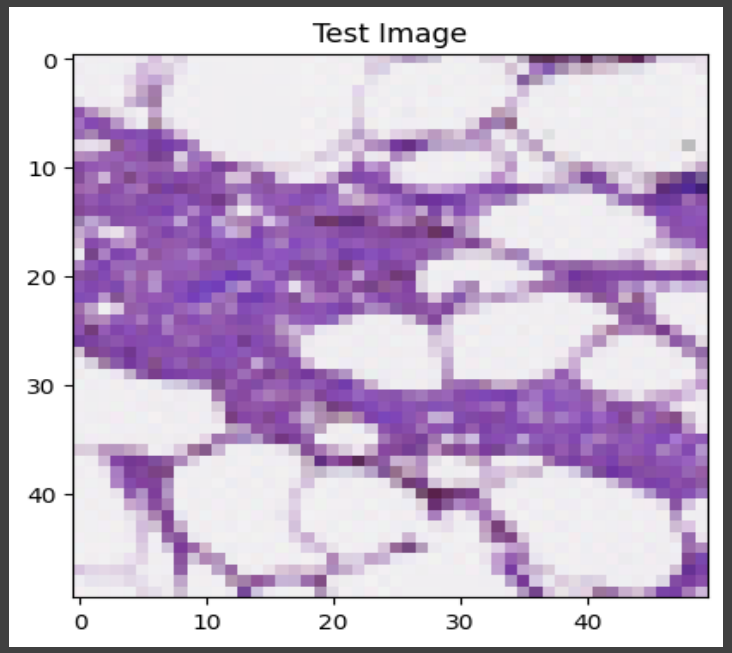
Model's Testing and Evaluating

After the training procedure the model was tested and a confusion matrix was plotted to view the results. As we can see the model makes the correct prediction 84,9% of the times

Mention worthy is also the fact that the dataset was quite inequal so we see the model predicting much better the negative state, the state that has the most training samples

App

To present a final solution I decided to make a small example of how it could be used by taking an image printing its label and comparing it with the predicted label.

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Predicted Value using  cnn model 0
True Value 0
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Thank you for your attention

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