"BREAST CANCER CLASSIFICATION USING TENSORFLOW AND KERAS"

Sukhveer Singh
Singh.suk@northeastern.edu

ABSTRACT

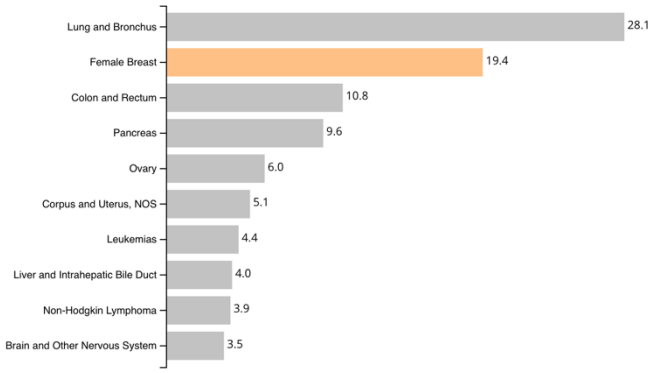
In order to forecast the aggressiveness of breast cancer cells, I intend to develop a Neural network model for this project.
Deep neural network research In order to help the neural network understand the notion of the dataset, hidden layers was created for it using Keras. Then, In an effort to increase the trained model's accuracy, several analyses of the dataset were tried. Ultimately achieved a 97.3% accuracy rate.
After comparing several activation functions Relu and sigmoid were found to be the optimum activation function combination for this dataset

INTRODUCTION

The prognosis and likelihood of survival for people with BC can be significantly improved by an early diagnosis. Therefore, it is crucial to accurately identify malignant tumors. The ACS Journal poll indicates that 83,570 persons will receive a brain tumor diagnosis in 2021. Therefore, developing such a model to detect tumors will be quite beneficial.

My basic task was to create a such Neural network where if we have the patient's data such as the radius, texture, perimeter, area, smoothness, compactness, concavity. Then predict whether this tumor is malignant or Benign.

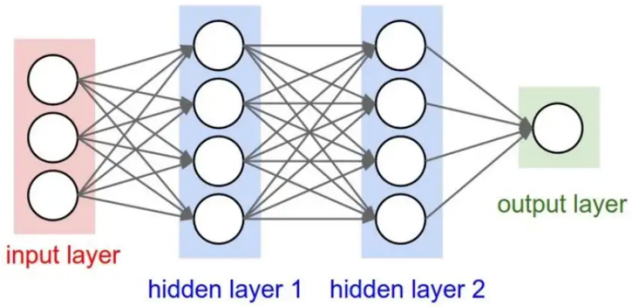
The Wisconsin dataset from UCI was utilized by me to analyze breast cancer data and train the model. While UCI's primary tumor dataset is used to research the effects of different tumors in diverse human body sections.
Divided the dataset into two halves, training and testing, with an 80:20 split.



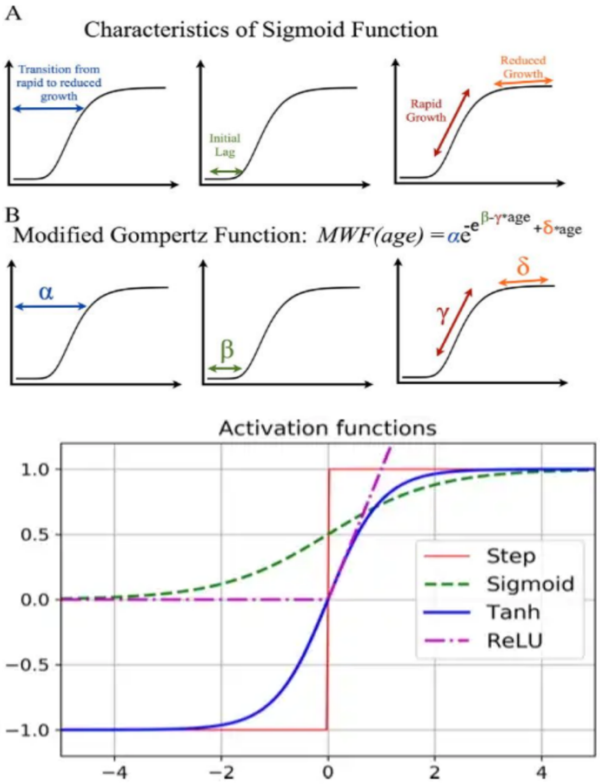
BACKGROUND

For the examination of breast cancer and locating the tumor, extensive study has been conducted. Starting treatment at an early stage is the only method to combat this illness.

I started with the Wisconsin Breast Cancer dataset and used a single layer neural network to achieve 97% accuracy.
To increase the network's accuracy, multiple layers and various activation functions must be used.



Activation function used in this project are relu and sigmoid.



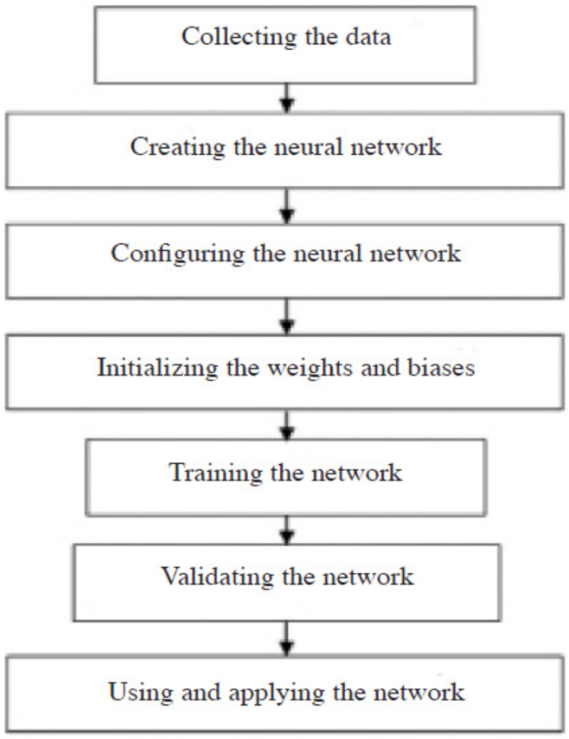
APPROACH

Step1: Preprocess dataset, and converting string to integer data for numerical processing
Used Sklearn preprocessing to convert M:1, B:0.

Step2: Building a neural network and connecting it to a fitting model to train data by splitting it into 4 different variables like X-train, Y-train, X-test, Y-test.

Step3: After compiling the model test it using prediction function.

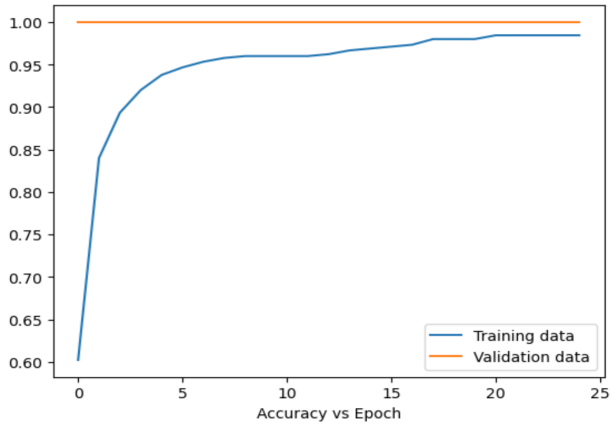
Step4: Finding the accuracy, and loss of the model. Then plot Accuracy and loss graph.

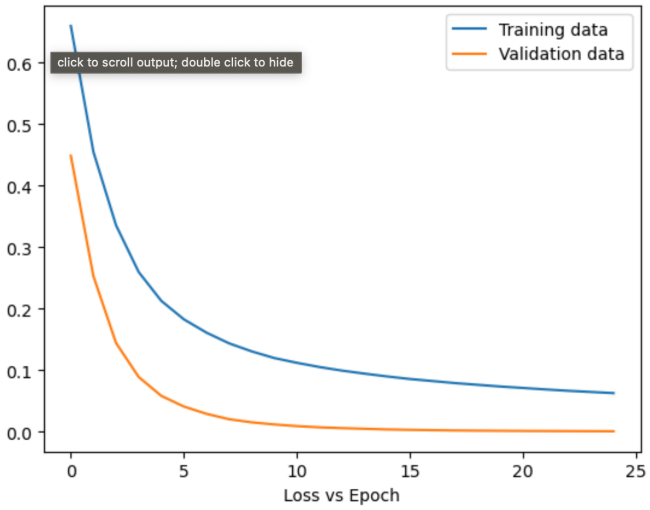


RESULTS

Created a model to predict the class of a new test image after successfully loading the dataset into training.

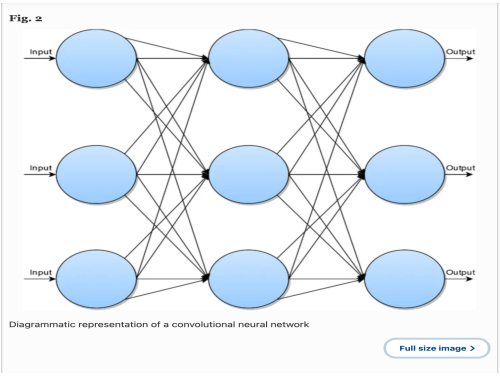
Evaluated the performance of model under two different activation functions – 'relu' and 'sigmoid" and achieved 97% accuracy.





CONCLUSION

After successfully finishing the project and conducting extensive study, I discovered that several factors, ranging from lifestyle choices to genetics, contribute to the initial development of cancer.
The treatment depends heavily on variables including radius, texture, perimeter, area, smoothness, compactness, and concavity.



REFERENCES

[1]. **https://gis.cdc.gov/Cancer/USCS/#/AtAGlance/**

[2]. **https://kinder-chen.medium.com/hidden-layer-activation-functions-6fd65489ed25**

[3]. **https://www.datasciencecentral.com/deep-learning-advantages-of-relu-over-sigmoid-function-in-deep/**

[4]. **https://www.researchgate.net/figure/Design-steps-of-Neural-Networks_fig2_351999826**

[5]. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6650350/

[6].https://insightsimaging.springeropen.com/articles/10.1186/s13244-020-00869-4