BREAST CANCER DIAGNOSIS USING IMAGE PROCESSING AND DEEP LEARNING

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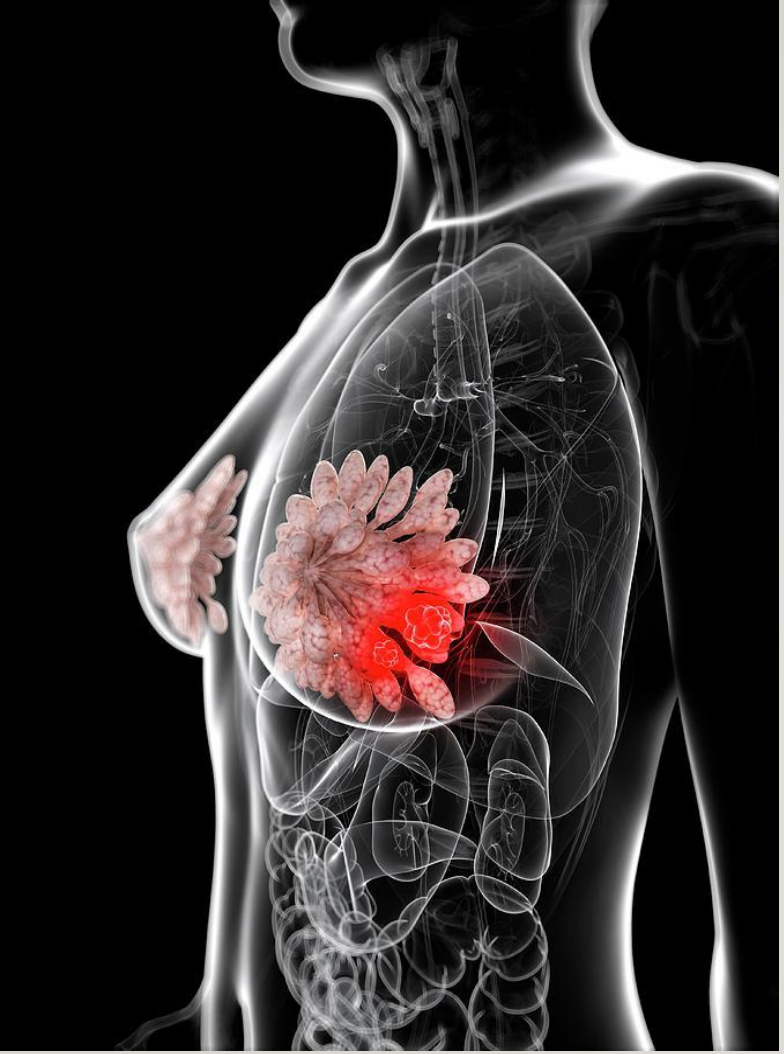
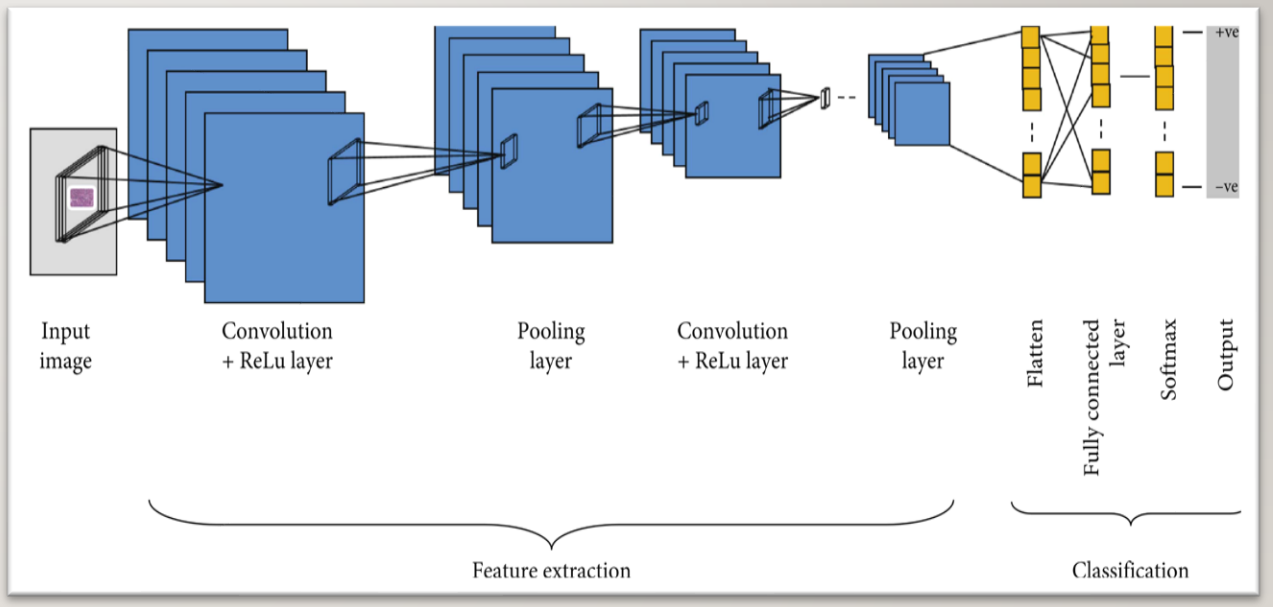


INTRODUCTION:

- Breast cancer is the most common cancer in women, occurring in the ducts and glands of the breast.
- Regular screening and early detection are vital, as they significantly increase the chances of successful treatment.
- pCR refers to the absence of invasive cancer cells in the tissue sample removed during surgery after preoperative (neoadjuvant) therapy.
- True pCR in breast cancer indicates a complete response to treatment, whereas False pCR means that residual cancer cells are present despite test results suggesting otherwise.

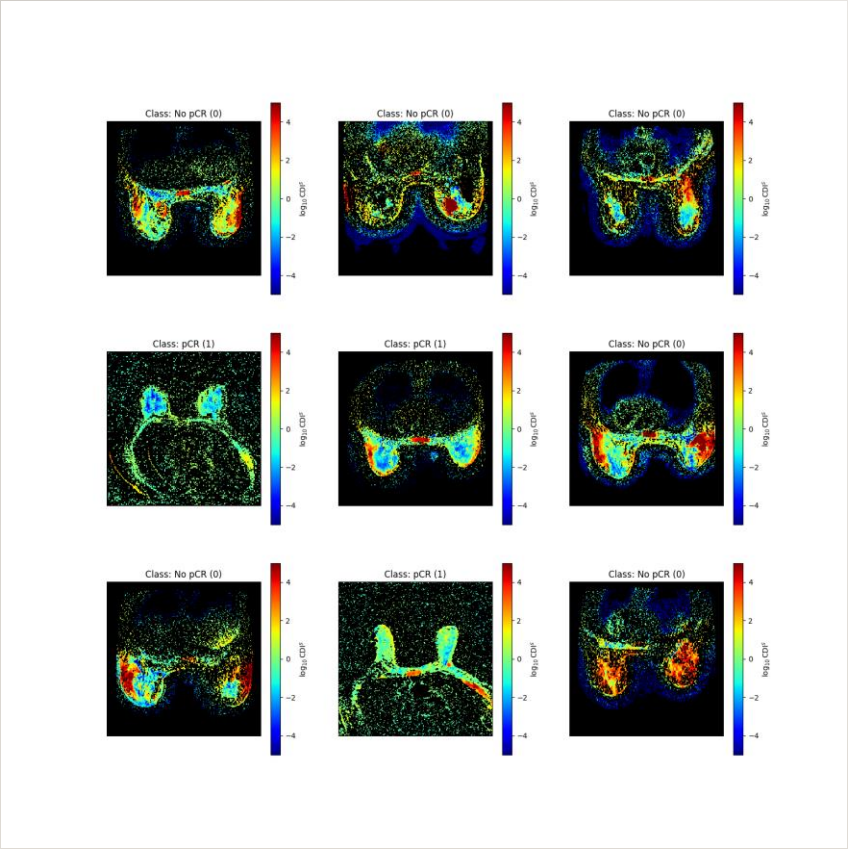
PROBLEM STATEMENT:

- Project focuses on classifying cancer MRI images into pCR (label 0) and non-pCR (label 1).
- Accurate classification helps in evaluating patient responses to treatments
- . Utilizes a neural network model to automate classification, saving time for healthcare professionals.
- Aimed at enhancing patient outcomes and optimizing healthcare through advanced image analysis.



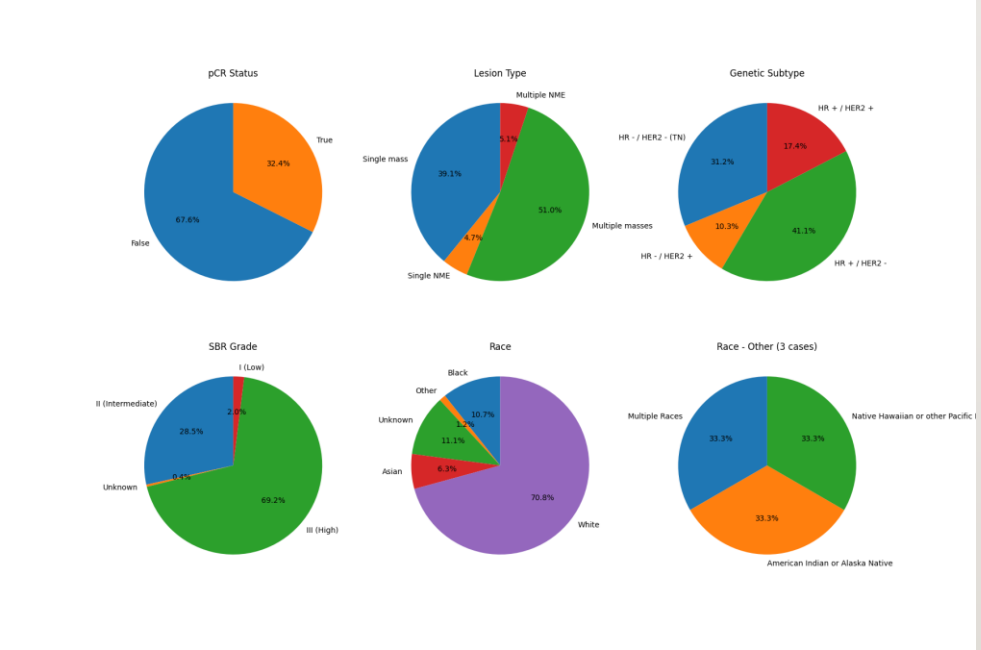
Picture from Kamruzzaman et al article

DATA COLLECTION, EXPLORATION, AND PREPROCESSING

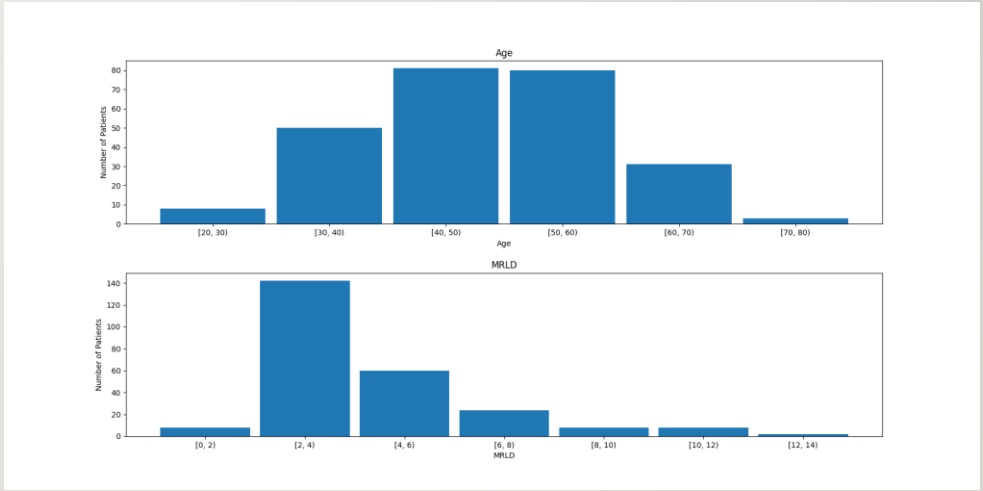


The dataset consists of two classes: No pCR (0), and pCR (1). The images are provided as a single directory, and labels for the images are provided in the metadata file.

DATA COLLECTION, EXPLORATION, AND PREPROCESSING

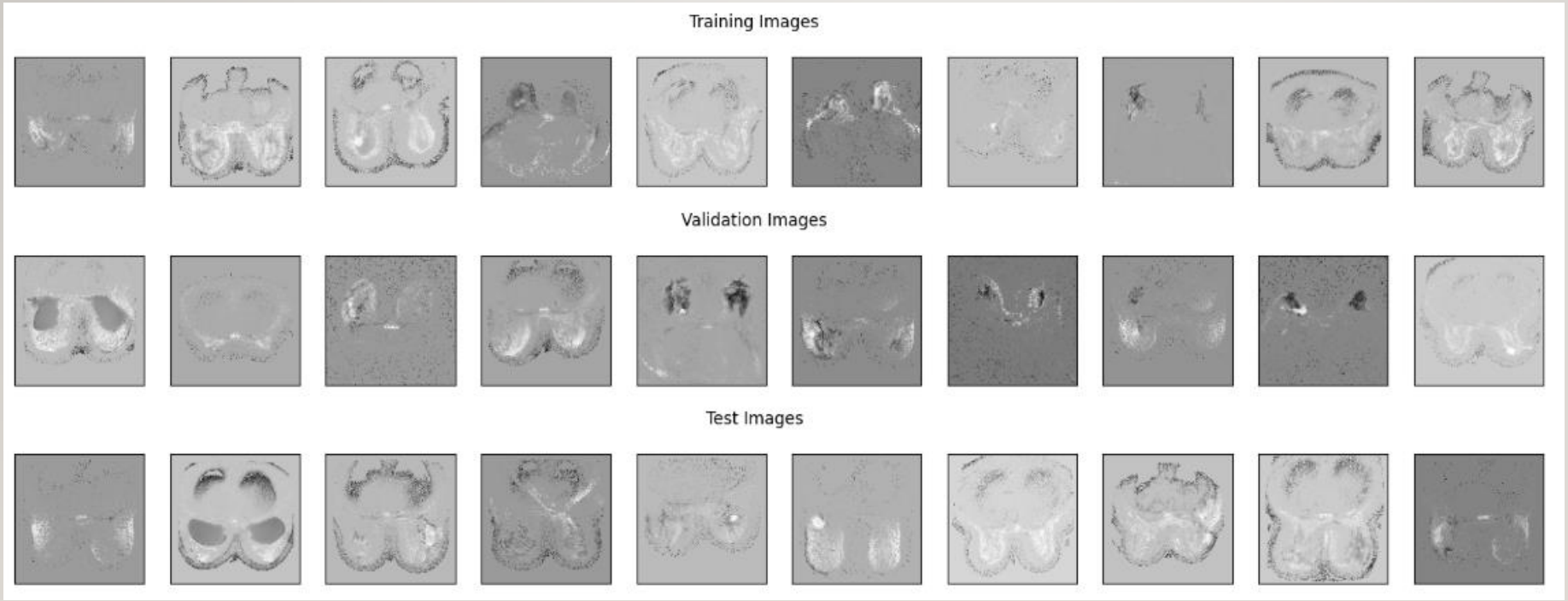


In this experiment, it is evident that the majority of participants are white women.



The experiment reveals that the largest group of participants consists of middle-aged women.

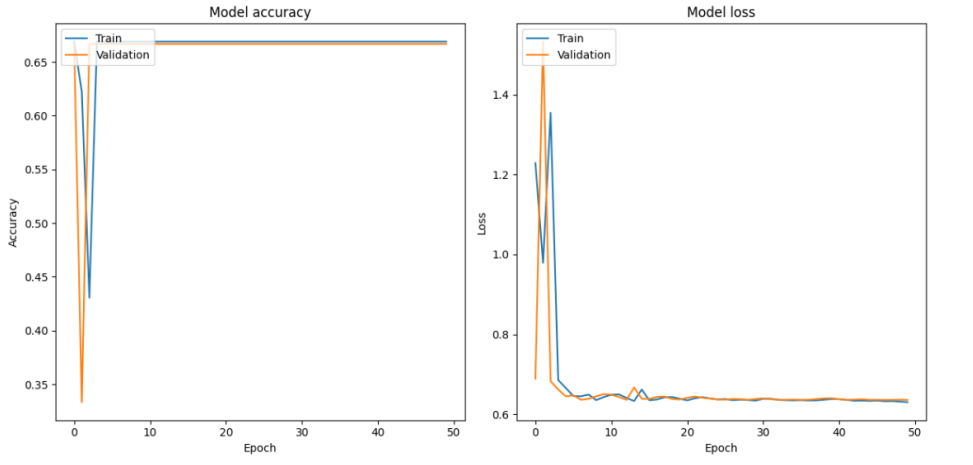
DATA COLLECTION, EXPLORATION, AND PREPROCESSING



Splitting the data to

X_train_final, X_val_final, and X_test_final with shapes (151,128,128), (51,128,128), and (51,128,128) resp

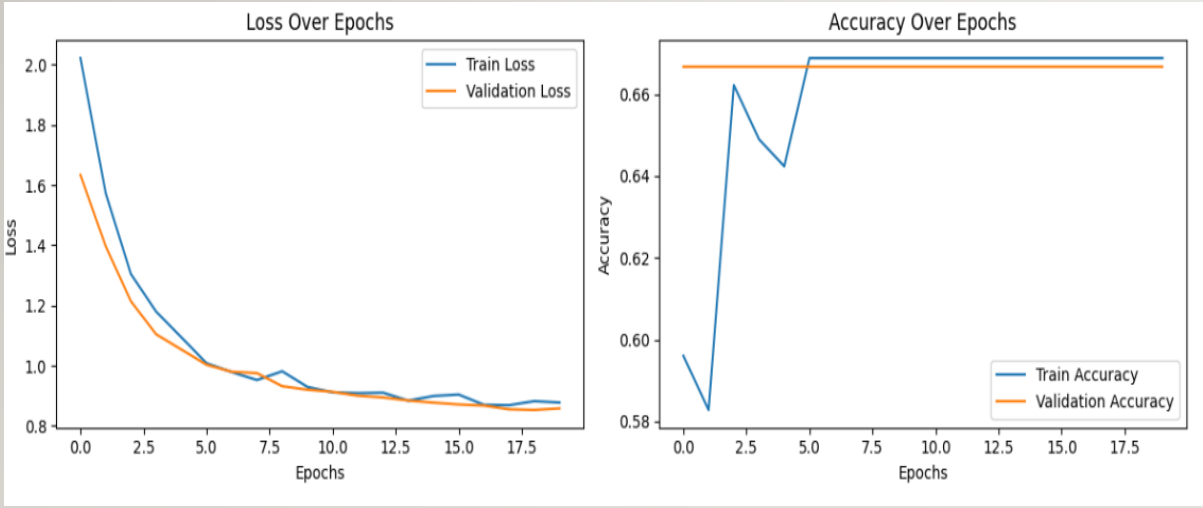
MODEL:



We get an accuracy of 0.71
(epochs=50, batch_size=128)

- Initialize the model object
- Add a convolutional layer with 32 filters, each of size 3x3.
- We use the ReLU activation function and specify the input shape to match our images.
- Add a max pooling layer with pool size 2x2
- Add another convolutional layer with 64 filters
- Add another max pooling layer
- Flatten the tensor output from the previous layer
- Add a dense layer with 64 units
- Add the output layer with 2 units (for 'No pCR' and 'pCR')
- Compile the model

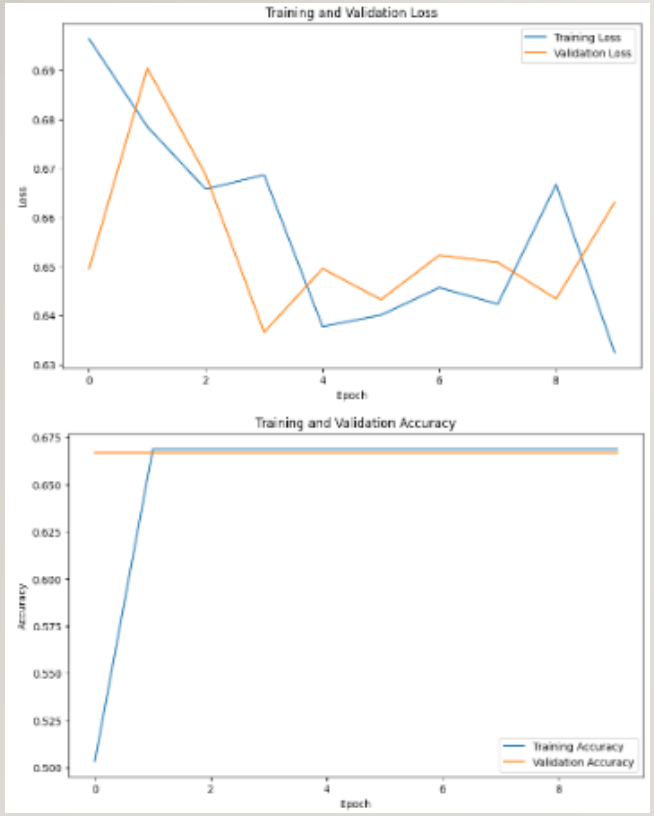
MODEL: HYPERPARAMETERS TUNING AND AUGMENTATION



- Data augmentation with Optimal hyperparameters:
- batch_size = 16
- num_epochs = 20
- dropout_rate = 0.2

With test accuracy 0.71

FUTURE WORK



- I tried to use Resent50, but I got the same accuracy. They should me some resizing and other transformations to the images to get better results.
- VGG16 and VGG19 are other methods tried and got the same accuracy.
- CycleGAN is a method could be applied to our images.


THANK YOU
FOR YOUR
ATTENTION