**Deep Learning Proposal**

**Detecting Breast Cancer using deep learning techniques (convolution neural network)**

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# **INTRODUCTION**

Breast cancer is an uncontrolled growth of breast cells. To better understand breast cancer, it helps to understand how any cancer can develop.

Cancer occurs because of mutations, or abnormal changes, in the genes responsible for regulating the growth of cells and keeping them healthy.

The genes are in each cell’s nucleus, which acts as the “control room” of each cell.

Normally, the cells in our bodies replace themselves through an orderly process of cell growth: healthy new cells take over as old ones die out.

But over time, mutations can “turn on” certain genes and “turn off” others in a cell.

That changed cell gains the ability to keep dividing without control or order, producing more cells just like it and forming a tumor.

A tumor can be benign (not dangerous to health) or malignant (has the potential to be dangerous).

Benign tumors are not considered cancerous: their cells are close to normal in appearance, they grow slowly, and they do not invade nearby tissues or spread to other parts of the body.

Malignant tumors are cancerous. Left unchecked, malignant cells eventually can spread beyond the original tumor to other parts of the body.

The term “breast cancer” refers to a malignant tumor that has developed from cells in the breast.

Usually, breast cancer either begins in the cells of the lobules, which are the milk-producing glands, or the ducts, the passages that drain milk from the lobules to the nipple.

Less commonly, breast cancer can begin in the stromal tissues, which include the fatty and fibrous connective tissues of the breast.

Over time, cancer cells can invade nearby healthy breast tissue and make their way into the underarm lymph nodes, small organs that filter out foreign substances in the body. If cancer cells get into the lymph nodes, they then have a pathway into other parts of the body. Breast cancer is always caused by a genetic abnormality (a “mistake” in the genetic material). However, only 5-10% of cancers are due to an abnormality inherited from your mother or father.

Instead, 85-90% of breast cancers are due to genetic abnormalities that happen because of the aging process and the “wear and tear” of life in general.

Deep learning techniques can be used to detect breast cancer before it becomes malignant. Therefore, detecting breast cancers before they are malignant can save lives.

# **PROPOSED METHOD**

In my proposed method, I will use the IDC\_regular dataset (the breast cancer histology image dataset) from Kaggle. This dataset holds 2,77,524 patches of size 50×50 extracted from 162 whole mount slide images of breast cancer specimens scanned at 40x. Of these, 1,98,738 tests negative and 78,786 tests positive with IDC.

I will be using deep learning techniques for the classification of the breast cancer datasets. Deep learning techniques are better than machine learning techniques at attaining a more accurate and refined result. I will be making use of Keras to build a CNN (Convolutional Neural Network), and train it on the images. I am using CNN because it is adequate for tasks, including image recognition, image analyzing, image segmentation, video analysis, and natural language processing. Then I will derive a confusion matrix to analyze the performance of the model.

Also, I will be using the RELU (Rectified Non-Linear unit) which combats the vanishing gradient problem occurring in sigmoids. ReLU is easier to compute and generates sparsity. I expect to achieve a better than average results from the training of the neural network over the next weeks of training and testing.

## **FUTURE PLAN**

1. Week 1 [Jan 24-28]

Investigation of relevant research literature for this topic.

1. Week 2 [Feb 1-Feb 6]

Dataset analyzing and pre-processing, data cleaning.

1. Week 3 [Feb 8-Feb 13]

Implementation of the pipeline to train the convolutional neural network.

1. Week 4 [Feb 15 - Feb 20]

Testing different convolutional neural architecture.

1. Week 5 [Feb 22 - Feb 27]

Choosing the appropriate neural network.

1. Week 6 [Mar 1 - Mar 6]

Comparing previously trained convolutional networks for a performance analysis.

1. Week 7 [Mar 8 - Mar 13]

Training the chosen convolutional neural network.

1. Week 8 [Mar 15 - Mar 20]

Creating graphs and charts for presentation of findings/results.

1. Week 9 [Mar 22 - Mar 27]

Preparing presentation slides.

### **REFERENCES**

[1] W. Zou, H. Lu, K. Yan and M. Ye, "Breast Cancer Histopathological Image

Classification using Deep Learning," 2019 10th International Conference on Information Technology in Medicine and Education (ITME), Qingdao, China, 2019, pp. 53-57, doi: 10.1109/ITME.2019.00023.

[2] N. Khuriwal and N. Mishra, "Breast Cancer Detection From Histopathological

Images Using Deep Learning," 2018 3rd International Conference and Workshops

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