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**Breast Cancer Detection**

**INTRODUCTION**:

Breast cancer is known to be the most common cancers among women[*[1]*](#One). The American Cancer Society’s estimates for breast cancer in the United States alone for 2023 are that about 297,790 new cases of invasive breast cancer will be diagnosed in women and about 43,700 women will die from breast cancer[*[2]*](#Second). Since 1989, breast cancer death rates have been decreasing, believed to be as a consequence of early detection and increased awareness, as well as better treatments. This progress seems to have slightly stopped[*[2]*](#Second).

The main objective of this project is to understand and implement ways to detect the presence of cancerous, benign, or precancerous tumours in the breast in an efficient way, using machine learning. This would minimize the time doctors spend studying thousands of breast screenings to label them accordingly and aid early detection.

**THE SCIENTIFIC PROBLEM ADDRESSED**:

To be added…

**EXISTING METHODS OF SOLVING BREAST CANCER DETECTION**:

There are several articles related to studying various ways of implementing breast cancer detection using machine learning. There is “Machine Learning Techniques for Breast Cancer Prediction” by Varsha Nemade and Vishal Fegade from Mukesh Patel School of Technology Management and Engineering, NMIMS Shirpur Campus, India[*[3]*](#Third). They have documented different ML classification techniques and evaluated each of them using different performance measure, such as accuracy, precision, and recall. These techniques include Nӓive Bayes, Logistic Regression, Support Vector Machine, K-Nearest Neighbour and Decision Tree, the latter being found to have the highest accuracy, 97%.

The dataset used in their experiments was the WDBC dataset, which contain features from 569 digitized images of a fine needle aspirate of a breast mass[*[4]*](#Fourth). The algorithm implemented uses features from the image, rather than the image itself, some of which include radius, texture, area, perimeter, smoothness, compactness, concavity, concavity points, symmetry, fractal dimension. The following charts represent the performance of the classification techniques used.

Other relevant studies include “An enhanced Predictive heterogeneous ensemble model for breast cancer prediction” concluded by S. Nanglia et al. and got a 78% accuracy using KNN, SVM and DT[*[5]*](#Fifth). Islam et al. got a 98.75% using ANN on the WDBC[*[6]*](#Sixth). Amrane et al. proposed an approach using KNN and NB with 97.51% accuracy[*[7]*](#Seventh). Dhahri et al. studied the usage of genetic programming techniques for selection of best features and parameter for the machine learning classifier[*[8]*](#Eighth).

**METHODS USED IN SOLVING BREAST CANCER DETECTION**:

To be added..

**EXPERIMENTAL RESULTS OBTAINED**:

To be added..

**CONCLUSIONS AND POSSIBLE IMPROVMENTS**:

To be added..

**REFERENCES**:

*[1]https://wiki.cancerimagingarchive.net/pages/viewpage.action?pageId=64685580#6468558050a1e1bdf0de46de92128576e1d3e9b1*

*[2]* [*https://www.cancer.org/cancer/types/breast-cancer/about/how-common-is-breast-cancer.html*](https://www.cancer.org/cancer/types/breast-cancer/about/how-common-is-breast-cancer.html)

*[3] https://pdf.sciencedirectassets.com/280203/1-s2.0-S1877050923X00027/1-s2.0-S1877050923001102/main.pdf?X-Amz-Security-Token=IQoJb3JpZ2luX2VjEND%2F%2F%2F%2F%2F%2F%2F%2F%2F%2FwEaCXVzLWVhc3QtMSJIMEYCIQDxAKL4y0Xm%2BHJzUPSHCVR15oXTBa9205GGOPdBJIPunAIhANeFDFRWX*

*[4] https://archive.ics.uci.edu/dataset/17/breast+cancer+wisconsin+diagnostic*

*[5] Nanglia, S., Ahmad, M., Khan, F. A., & Jhanjhi, N. Z. (2022). An enhanced Predictive heterogeneous ensemble model for breast cancer prediction. Biomedical Signal Processing and Control, 72, 103279*

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