**BREAST CANCER PREDICTION**

* **using Fine Needle Aspirate (FNA)**

Early detection of disease has become a crucial problem due to rapid population growth in medical research in recent times. With the rapid population growth, the risk of death incurred by breast cancer is rising exponentially. Breast cancer or breast carcinoma is the uncontrolled growth of epithelial cells in the breast. The uncontrollable division of one cell results in a visible mass named tumor. A tumor can be benign or malignant. By Johns Hopkins Pathology, benign tumors are non-malignant/non-cancerous tumors and malignant tumors are cancerous growths. Cancer is another word for a malignant tumor. Most benign tumors respond well to treatment. But malignant tumors are often resistant to treatment, may spread to other parts of the body and they sometimes recur after they were removed. It is 2nd most common cancer in women. But, in the rare scenario can also happen to men. It is 2nd leading cause of death of women after lung cancer. With early diagnosis of breast cancer, patients can be isolated for early treatment for a better chance of survival.

Common biopsies for breast cancer diagnosis include fine-needle aspiration (FNA), core needle biopsy, and MRI-guided biopsy. A fine needle biopsy is an effective tool in evaluating and diagnosing suspect lumps or masses. In this analysis, we have used ten features of tumor cell nuclei extracted from the digital image processing of an FNA of a breast mass to predict breast cancer. The data was collected from the UCI Machine learning repository.

Machine Learning (ML) is one of the core branches of Artificial Intelligence. It’s a system that takes in data, finds patterns, trains itself using the data, and outputs an outcome. We have developed a classification model that will identify breast cancer using the FNA diagnosis label with 96.4% accuracy. This model will be great for predicting cancer in advance, because classification algorithms make boundaries between data points classifying them as a certain group, depending on their characteristics matched against the model’s parameters.

At present, you perform clinical tests, either at a clinic or at home. Data is inputted into a pathological ML system. A few minutes later, you receive an email with a detailed report that has an accurate prediction about the development of your cancer. While you might not see AI doing the job of a pathologist today, in the future of cancer biopsy you can expect ML to replace your local pathologist in the coming decades, and it’s pretty exciting!