International Journal of Scientific Research in Engineering and Management (IJSREM)
Volume: 08 Issue: 06 | June - 2024 SJIF Rating: 8.448 ISSN: 2582-3930

A BREAST CANCER DETECTION SYSTEM

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ABSTRACT- The "Breast Cancer Detection System" is a comprehensive clinical information system designed to improve breast cancer screening through data collection, image analysis, patient management, and reporting. The program uses machine learning specifically Logistic Regression algorithms, this project aims to improve early detection, ensure patient safety, and reduce healthcare costs. By developing a user-friendly web application for medical professionals to input clinical data and diagnostic images, the system provides accurate and timely diagnostic results, minimizing false positives and negatives. This initiative seeks to advance early breast cancer detection, improve treatment outcomes, and potentially save lives, aligning with broader goals of enhancing patient care and medical diagnosis.

Index Terms- Breast Cancer Detection, Logistic Regression, Automated Diagnosis, Early Detection

I. INTRODUCTION

The "Breast Cancer Detection System" is a comprehensive medical information system tailored specifically for breast cancer detection, encompassing critical aspects such as data collection, image analysis, patient management, and reporting. The system is designed to improve patient care through early detection, ensure patient safety, protect information privacy, optimize resource utilization, reduce healthcare costs, and provide decision-makers with valuable insights. By offering seamless access to essential medical data and diagnostic information, the "Breast Cancer Detection System" empowers healthcare professionals to make timely and informed decisions promptly, supporting medical practitioners, radiologists, and healthcare administrators in their efforts to combat breast cancer effectively. The research project uses the power of Machine Learning, specifically the Logistic Regression algorithm, to generate a robust and reliable system for breast cancer diagnosis to create a model that can help doctors better diagnose cancer patients.

II. LITERATURE REVIEW

Breast cancer remains a significant global health concern, necessitating the development of effective detection methods. "Breast Cancer Detection and Classification" introduces a comprehensive approach employing pre-processing and Random Forest classification, achieving a commendable classification accuracy of 95%. This paper provides insights into pre-processing techniques and Random Forests for breast cancer detection.[1]

In "SIFT-Based Feature Extraction and SVM Classification for Breast Cancer Detection," M. A. Nasser presents a robust methodology using SIFT feature extraction and SVM classification, demonstrating high specificity, sensitivity, and accuracy. This paper is particularly relevant for feature extraction using SIFT and SVM-based classification approaches.[6]

"Texture-based Feature Extraction and SVM Classification in Mammograms" by MA Berber

explores texture-based feature extraction and SVM classification in mammograms, shedding light on the potential of texture features for breast cancer detection.

F. Ting's "Neural Network-Based Breast Cancer Ranking Using MLNN" showcases a self-regulated perceptron neural network (MLNN) achieving impressive sensitivity, specificity, and accuracy. This paper is pertinent for those interested in neural network-based classification methods.

"N. Tariq's "Texture Feature Extraction and ANN Classification for Breast Cancer Detection" focuses on texture feature extraction using GLCM and ANN classification, achieving exceptional specificity, sensitivity, and accuracy. This work demonstrates the effectiveness of texture-based feature extraction combined with ANN for breast cancerdetection.[7]

"Support Vector Machine Based Diagnosis of Breast Cancer" by Mingqi Chen and Yinshan Jia applies Support Vector Machine (SVM) methodology to breast cancer diagnosis, achieving a remarkable classification accuracy of 98.25%. This method offers improved auxiliary diagnosis capabilities for breast cancer, aiding patients and medical institutions in quicker and more effective disease detection. This paper contributes valuable insights into the efficacy of SVM in breast cancer diagnosis and classification, offering guidance for SVM-based approaches in breast cancer detection.

PROBLEM STATEMENT

The main goal of the project is to create a system for breast cancer diagnosis using advanced machine-learning techniques, with special emphasis on Logistic Regression. This measure aims to shorten the time it takes to recognize breast cancer, ultimately improving treatment outcomes and increasing hope for individuals affected by the disease. This project involves the development of an easy-to-use web application that allows physicians to access patient information, such as medical records and diagnostic images. The system then uses selected machine learning techniques to quickly and accurately analyze this data and provide diagnostic results, reducing human error and improving the efficiency of breast cancer diagnosis by automating the diagnostic process. Additionally, the system is designed to minimize false positives and false negatives, which are important in patient care. Accurately distinguishing between benign and malignant cases is essential for timely medical intervention, making this project a significant contribution to the early detection of breast cancer and its investment quality saves people's lives.

III. PROPOSED METHODOLOGY

The methodology used in the Breast Cancer Diagnosis System includes the following steps:

1. **Data Collection and Pre-processing:**
   Collect relevant medical data and patient information, such as clinical examination, patient medical history, and diagnostic information.
   Apply data pre-processing techniques to clean, format, and standardize the data.
2. **Feature Extraction:**
   Extract relevant features for analysis.
3. **Model Selection:**
   Select a machine learning algorithm (e.g., SVM, logistic regression).
4. **Model Training and Validation:**
   Split data for training and validation.
   Tune hyperparameters and optimize models.
5. **Performance Evaluation:**
   Evaluation of the model using indicators (actual, expected, etc).
6. **Backend Development (Spring Framework):**
   Integration of machine learning model for instant prediction. Use MySQL Workbench for data storage.

7. **Frontend Development (React):**
   Create user-friendly interfaces for access, data entry, and result display.

IV. CONCLUSION

In summary, the development of advanced breast cancer detection screening technology is a major advance in the fight against breast cancer. The project aims to achieve several key goals by leveraging advanced machine learning techniques, particularly logistic regression. Focusing on improving early detection of breast cancer has the potential to change the course of the disease, thereby improving treatment outcomes, reducing adverse events, and improving good care outcomes. The development of the web application enables doctors to easily use the technology, improving the diagnostic process and ultimately providing better outcomes for patients. The program is in line with the overall goal of improving the quality of life of breast cancer patients by bringing early diagnosis, timely treatment, and good treatment. As the program progresses, the potential to save lives, reduce the burden of breast cancer, and detect early detection will emerge; this represents an important step toward the future, where early detection is normal and breast cancer detection is better and more effective.

V. REFERENCES

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