Bifaceted Breast Cancer Examination via Logistic Regression Model

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Abstract

In this machine learning initiative, our focus revolves around the development of a robust breast cancer categorization system using Python, emphasizing the utilization of logistic regression models. The data set, derived from the fine needle aspiration test, encompasses essential metrics like radius, texture, perimeter, area, and smoothness. Our methodology encompasses meticulous stages of machine learning development, from data collection to model evaluation. The paramount challenge addressed by our research work is the accurate classification of breast tumors as benign or malignant. Early detection is crucial for timely medical intervention, and the existing diagnostic methods sometimes lack the precision required for expedited and precise diagnoses. This work aims to enhance the diagnostic accuracy of breast cancer, thereby contributing to improved patient outcomes. Our systematic approach involves comprehensive data collection and prepossessing, ensuring the dataset's suitability for machine learning analysis. We employ data visualization techniques to gain insights into feature distribution and relationships, a pivotal step for well-informed model development. The selection of an appropriate machine learning algorithm is a critical phase, with rigorous evaluation based on performance metrics and dataset compatibility. Model training, implemented with a focus on optimizing hyper parameters, occurs next, followed by the distinctive utilization of Amazon Sage Maker for efficient model development and training in a cloud-based environment. The machine learning model achieved an impressive accuracy of 97.08%, affirming its proficiency in correctly categorizing tumors as either benign or malignant.

Keywords

Breast Cancer, Bifaceted, Regression Model Evaluation