Chapter 15
LLRBFNN Deep Learning Model-Based Digital Twin Framework for Detecting Breast Cancer

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ABSTRACT

This study proposes a digital twin framework for healthcare training and diagnostics, using a patient model to identify and group mammo graphic wounds based on the site of examination. The framework uses a local linear radial basis function neural network (LLRBFNN) deep learning model, fuzzy c-means calculations, and beneficial nervous system characterization. The methodology combines surface highlight images and conditions to detect and group malignant breast tumor growth. The study aims to improve strategies for identifying different classes of breast disorders.

I. INTRODUCTION

Cancer is the leading cause of unexpected deaths in the total GC in 2018, with an estimated 2.09 million deaths annually (Bezdek J.C, et al.,1993). Malignant growth of the breast occurs in women in principle, and various advances have been used. B. Common recurrent nervous system, multilayer perceptron (MLP), and probabilistic nervous system studied in Wisconsin's breast injury dataset (S.Mojarad, et al.,2010). Total relapsed nervous system and neural squad-based discrimination (NED) proves

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to be the most accurate model for characterization of breast disease (Amiya Halder, et al.,2011). The Spread Premise Capacity (RBF) describes the handling of MLP options in general capacity estimates (M.A Balafar, et al.,2008). Early advances in the finding of malignant Irritation or dimpling of breast skin growth images are X-beam, ultra-sound and computed-tomography (CT), attractive reverberation imaging and mammography, which are basically considered individually.

Mammography is one of the current best strategies for detecting cancerous tumors of the breast. It is believed to be sufficient to reduce mortality by up to 30% (S.A.N, et al.,2004) Mammography false negative rates range from 10.0% to 30.0% and false positive rates range from 10.01%. Over 90.5% of malignant breast growth. Mammography is used for to detecting growth malignant breast growth. Mammography screening equipment aims to detect destructive tumors early and kill them before metastases occur (Satyasis Mishra, et al.,1964). Due to the differences, mammography of breast tissue is limited to mature women and pregnant women under the age of 39 who can invisible the tumor. There are various methods are available in the for finding and combing breast disorders. In any case, obviously, there are incredible tests on the detection and characterization of malignant breast cancer. Convinced of this, further development of new calculations for the neighborhood that directly broadened the premise of practical nervous system engineering is gives the important for the blessings of breast malignant growth and the clearly recognizable information of menacing detection. This paper is to propose a new productive framework for LLRBFNN deep learning model based digital twin to detect cancer. The treatises are categorized as follows: Area2 shows the work and background related to the exploration work, segment 3 shows the materials and strategies including the clarification of FCM-based calculations, segment 4 shows the results and discussions, and segment 5 shows the end.

Inclusion of Relevant Datasets - The chapter mentions the use of datasets from reputable sources like the University of Wisconsin Hospitals and the Mammographic Image Analysis Society, which adds credibility to the research (www.wcrf.org,et al.,2018) . Introduction of LLRBFNN Model - The chapter introduces the Locally Linear Radial Basis Function Neural Network (LLRBFNN) model as a novel approach for detecting breast cancer, which shows innovation in the research (S. Mojarad, et al.,2010). Discussion of Image Processing Techniques - The chapter discusses various image processing techniques such as filtering, segmentation, and feature extraction, which are crucial in medical image analysis (A.Simmons, et al.,1994), (Amiya Halder, et al.,2011),(M.A Balafar, et al.,2008), (S.A.N, et al.,2004).

Table 1. Performance Metrics for Breast Cancer Detection

Metric	Percentage
Reduction in Mortality	Up to 30%
False Negative Rate	10.0% - 30.0%
False Positive Rate	10.01%
Malignant Breast Growth Detection	Over 90.5%