

A Performance Based Study on Deep Learning Algorithms in the Efficient Prediction of Heart Disease

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Abstract— Heart disease is the leading cause of death worldwide, nearly accounting for one-third of deaths. Heart disease describes a range of conditions that affect your heart. Most of these symptoms are dependent on the type of heart disease and their risk factors, such as high blood pressure, high cholesterol, and smoking. It is important to control the conditions before they become severe, it can save countless lives. Especially in remote areas and underdeveloped countries where there's no access to necessary medical systems and medical experts at the right time. Therefore, it is important to develop a 'medical system' that can provide heart disease assessments classifications from the clinical data, so that a clinician at a faraway location can reach a decision quickly, allowing them to manage a large number of patients. To do so, collecting clinical data related to heart disease is crucial. An open source dataset that consists of 1,190 samples and multivariate features is collected from UCI machine learning repository. A total of 14 features are selected for this research. Data normalization is performed on these features to take care of irrelevant values, so that better results can be achieved by the trained models. This research uses three deep learning algorithms, namely Radial Basis Function Network (RBFN), Convolutional Neural network (CNN) and Artificial Neural Network (ANN) to train, validate, and test them with the selected, normalized, and separated data features. Various evaluation metrics were generated to understand the performance of the classification. This research has achieved classification scores of 98.24% and 98.49% for RBFN and ANN, respectively. Overall, the CNN model has achieved higher accuracy than the other models, with 98.75%.

Keywords— *Classification, CNN, Deep Learning, Heart Disease, UCI Machine Learning Repository*