Project Proposal

IDENTIFICATION AND PREDICTION OF HEART DISEASE USING DEEP LEARNING ON NEURAL NETWORKS

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Introduction:

Heart-related diseases rank among the leading causes of mortality worldwide. Often, patients exhibit no symptoms until a critical event occurs, and even under observation, skilled personnel are needed to detect cardiac abnormalities. Over the past decade, there has been growing evidence of the efficacy of deep learning in identifying such anomalies, owing to the availability of Electrocardiograms (ECG) in digital formats. Recent technological advancements have facilitated the utilization of this data to construct models capable of analyzing heartbeat patterns and detecting abnormalities. This collaborative effort involves expert cardiologists from various hospitals and countries, who have identified seven types of signals: Typical, AF, Tachycardia, Bradycardia, Arrhythmia, Other, or Noisy.

In the context of contemporary medicine, diagnosing cardiac disease has grown increasingly difficult. It depends on a careful and accurate examination of the clinical test results and personal medical history of each patient. By fusing deep learning with the Internet of Things, notable advances in deep learning are aiming to develop intelligent automated systems that help physicians diagnose and predict illnesses. In healthcare contexts, confidence calibration presents a unique difficulty that is discussed here. When a neural network model predicts anything, it is important to be able to guarantee that the output will be reliable.

Using a variety of variables and a dataset, the deep learning algorithm will be used to predict heart disease.

Problem Statement:

Given the clinical parameters of the patients, Can we develop a deep neural network-based predictive model for accurately diagnosing heart disease? The model should be able to utilize patient data, such as age, gender, cholesterol levels, and other factors, to accurately predict the presence and severity of heart disease.

Objective:

The objective of heart disease identification with deep learning is to detect heart disease in the early stage itself with the available attributes. In this work, the dataset containing heart disease will be taken into consideration. The pre-processing will be applied to the dataset, and the noisy and null value data will be removed. After the data will be analyzed and visualized for further processing. The Deep learning algorithm will be chosen to make the prediction.

The dataset will be divided into two parts. The first part of the dataset is 80% taken to provide training to the Deep learning algorithm and the remaining 20% of data is taken to the testing part.

Project Execution plan:

The aim of utilizing deep learning for heart disease identification is to detect the condition in its early stages using available attributes. This project involves using a dataset containing information related to heart disease. Pre-processing techniques will be employed to clean the dataset, removing noisy and null value data. Subsequently, the data will be analyzed and visualized to facilitate further processing. A deep learning algorithm will then be selected to make predictions based on the processed data.

There will be two halves to the dataset. Thirty percent of the dataset will be kept aside for testing, and seventy percent will be used to train the deep learning system.

Contribution :

The Deep Learning program, which is built on Python, seeks to identify heart illness early on so that people may receive therapy and intervention on time. With immediate medical intervention, this application can help people identify possible cardiac problems and increase their chances of a favorable result.

Evaluation:

The project evaluation will rely on testing the prediction results of the deep learning algorithm. By utilizing the algorithm for disease prediction, the accuracy of its results becomes instrumental in evaluating the project's success. The accuracy score obtained from the

algorithm's performance in identifying heart disease serves as a crucial metric for assessing the dataset and the overall efficacy of the project.

Google Colab, a Python development tool that enables direct execution on any computer system with an internet connection, will be used to create the application. On their computers, users are not required to install any particular program. Colab makes it easier to design and run an application directly on a cloud server that already has Python library files loaded. Colab's deep learning algorithm libraries are integrated, allowing the project to use these algorithms for heart disease diagnosis.

Algorithm:

DEEP LEARNING WITH NEURAL NETWORKS

Techniques employed:

Convolutional Neural Networks (CNNs): CNNs are frequently utilized for image analysis jobs, but they may also be employed for tasks involving image data, such as the processing of pictures from MRI, CT scans, or angiograms, which are used to forecast heart disease.

Recurrent Neural Networks (RNNs): RNNs may be used for data processing in a sequential fashion. RNNs may be used to assess time-series data, such heart rate variability, ECG signals, or patient records gathered over time, in the context of cardiac disease prediction.

Long Short-Term Memory (LSTM) Networks: An RNN type that excels at learning from and predicting data sequences is the long short-term memory network. They work effectively on jobs like patient health record analysis where context and dependencies across time are crucial.

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