Title: Leveraging Neural Networks for Early Detection and Diagnosis of Heart Disease

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PROPOSAL

The rapid expansion of healthcare data has underscored the need for intelligent diagnostic systems to enhance early detection of heart diseases. Neural networks, especially deep learning architectures such as particularly Convolutional Neural Networks (CNNs), Long Short-Term Memory (LSTM) networks, K-Nearest Neighbour (KNN) and Extreme Gradient Boosting (XGBoost) have exposed high efficiency in processing clinical, demographic and imaging data for accurate prediction. The models similar to ML-CHDPM have successfully predicted congenital heart disease (CHD) among pregnant women, whereas hybrid CNN-LSTM models decide better concert in diagnosing wider cardiovascular conditions. Such models allow for early intervention through revealing intricate patterns lost to conventional diagnostics providing better accuracy and modified treatment. In addition, neural networks can be taught to recognize preclinical markers of heart disease, classify disease subtypes and predict patient outcomes with high accuracy. Despite these advances, various challenges persist in the clinical application of deep learning models. These are the need for large interpreted datasets, model transparency and interpretability, removal of bias in training data and generalizability to other populations and health care environments.

Early diagnosis of heart disease is important to enhance patient outcomes and minimize mortality rates. Conventional diagnostic techniques tend to find it difficult to identify early-stage symptoms, especially when they are imprecise or have overlapping circumstances. Sophisticated machine learning algorithms like SVM, KNN, RF and XGBoost have been found to be effective in processing structured clinical data for the identification of risk patterns. Integrating these models into health systems facilitates continuous monitoring and immediate alerting, making it possible for physicians to initiate preventive measure or treatment rules at an early detection. Accurate diagnosis of heart disease remains a central challenge due to the multifactorial nature of cardiovascular diseases. Contemporary diagnostic systems driven by artificial intelligence integrate clinical knowledge with computational capability to support better decision-making. They do not only increase diagnostic accuracy but also decrease false positives and false negatives, enabling clinicians with evidence-based evaluation and enabling personalized treatment.

We invite scholars, researchers and practitioners working in the domains of biomedical engineering, data science and healthcare technology to contribute original research articles to this special issue on Leveraging Neural Networks for Early Detection and Diagnosis of Heart Disease. This issue is looking for cutting-edge research using these smart techniques on actual medical data, making it possible to detect heart ailments early and making practical clinical interventions possible. We especially encourage submissions that discuss concrete challenges, model interpretability, hybrid systems and clinical validation.

Contributions are Invited that Provide Perspectives Including, but Not Restricted to,

- Integrated CNN-LSTM Architectures for Predicting Cardiovascular Risk.
- Reasonable Artificial Intelligence in Heart Disease Diagnosis: Improving Model Transparency and Trust.
- Rapid Diagnosis of Congenital Heart Failure employing ML-CHDPM and Deep Neural Pipelines
- Holistic Heart Disease Diagnosis utilizing Convolutional Recurrent Networks and EHR Integration.
- Instantaneous risk stratification of heart events employing Extreme Stochastic Boosting Models
- Combining Medical and Imaging Information with Transformer-Based Neural Learning Networks for Cardiovascular Prediction.
- Automatic Detection of Heart Exceptions in Pregnant Women Employing BiLSTM and Clinical Features
- A Comparison of SVM, KNN and Random Forest Technology for Predictive Cardiovascular Risk Classification.
- Using Graph Neural Networks to Model Temporal and Spatial Patterns in Heart Health Information
- A Federated Learning Method for Predicting Cardiovascular Risk while Protecting Privacy
- AI-Powered Wearable ECG Tracking and Predictive Analysis with Attention Mechanisms
- Forecasting Sudden Cardiac Arrest employing Temporal Deep Learning Methods on Ambulatory Medical Data.
- Comprehensible Ensemble Learning Structures for Cardiac Risk Subtype Classification.
- Multiple goals reinforced learning for Individualized Heart Disease Treatment Suggestions