STUDY ON DEEP LEARNING MODELS FOR CARDIO-VASCULAR HEALTH PREDICTION USING ECG IMAGES

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INTRODUCTION

Cardiovascular disease (CVD) is one of the leading causes worldwide. In the united states, approximately 1 in 3 adults have one or more risk factors. In order to help people accurately predict their risk of developing heart disease. Early detection and prediction of CVD are crucial factors in mitigating its effects. Researchers have developed various methods to predict CVD risk. These methods include:

- Clinical data such as,
  - Measurement of Blood Pressure.
  - Measurement of Cholesterol levels.
  - Measurement of Triglycerides.
- ECG, PCG (Electrocardiogram and Phonocardiogram) and Echocardiogram.

OBJECTIVES

- The primary goal is to accurately classify patients into those with and without CVD based on their ECG images, to improve early detection and prevention of CVD.
- To investigate the features and patterns in the ECG images most predictive of CVD and compare the performance of different deep-learning models in this study.
- The significance of this study lies in its potential to provide a practical and accurate tool for clinicians to detect and diagnose CVD using ECG images.

SCOPE OF THE PROJECT

The scope of the project is to develop and evaluate deep learning models for predicting CVD using ECG images, aiming to improve early detection and prevention of CVD.

METHODOLOGY

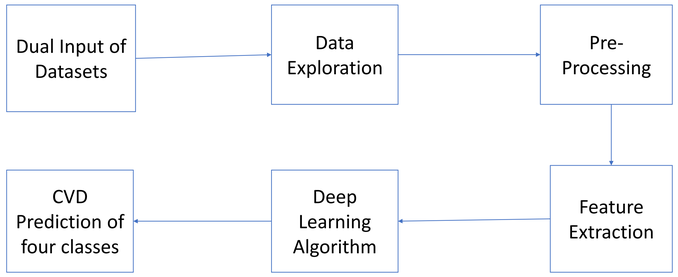
Preprocessing

In preprocessing technique segmentation, filtration, Resizing and Data augmentation are used.

Feature Extraction

A modified Neural Networks technique is used for extracting features to detect the waveform patterns in the specific segments to predict the different classes of cardio-vascular health of the patients.

ARCHITECTURE

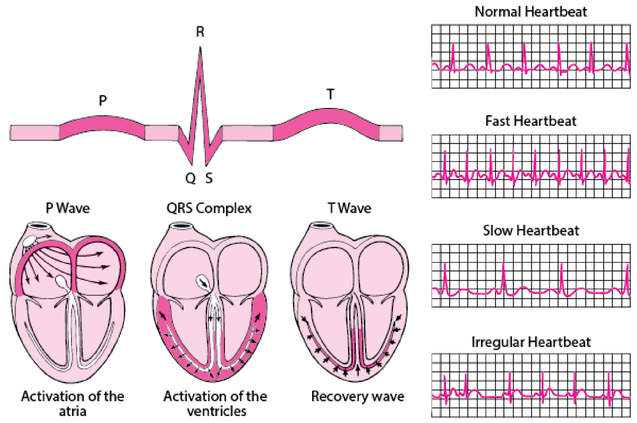


Used 2 datasets of ECG images

- ECG Image Dataset of Cardiac Patients – 929 ECG Images.
- Cardiovascular ECG Images Dataset – 448 ECG Images.

Both Dataset contains the Myocardial Infarction, History of Myocardial Infarction, Normal Heartbeat and Abnormal Heartbeat.

Hybrid Neural Networks is employed to extract features and Deep learning algorithms such as CNN, and combined CNN models are experimented to compare the classification accuracy.



CONCLUSION

- The use of AI technologies, ML, and DL, are becoming increasingly popular in the field of CVD diagnosis and prediction.
- These approaches can analyze huge amounts of data and recognize patterns that could be invisible to humans.
- This research implies that the utilization of deep learning techniques could be beneficial in determining and treating CVD and that there is a need for further research to improve the performance of these models.

REFERENCES

- H. Li et al., "Dual-Input Neural Network Integrating Feature Extraction and Deep Learning for Coronary Artery Disease Detection Using Electrocardiogram and Phonocardiogram," in IEEE Access, vol. 7, pp. 146457-146469, 2019.
- Khan, A.H., Hussain, M., and Malik, M.K., 2021. “Cardiac disorder classification by electrocardiogram sensing using deep neural network”. Complexity, 2021, Article ID 5512243, 8Pages, 2021.