Project Proposal Report

Title: Hybrid model to predict arrythmia in cancer patients

Abstract:
Cardiac Arrhythmia is a disease dealing with improper beating of heart. The improper condition may be fast beating or slow beating associated with heart.This paper proposes a detection or prediction scheme in the type of cardiac arrhythmia disease.It uses a clustering approach and regression methodology.The clustering approach used is DBSCAN and for regression, multiclass logistic regression is employed.By performing DBSCAN clustering algorithm, the whole dataset is disintegrated into disjoint clusters.Those clusters which are found to contain less instances, are then taken for consideration .These clusters are subjected to multiclass logistic regression.This is because, clustering approach is an unsupervised process.Once regression is performed, we have reached at a conclusion, about what type of cardiac arrhythmia it is.The proposed method achieves an overall accuracy of 80%, when compared with various other existing approaches.

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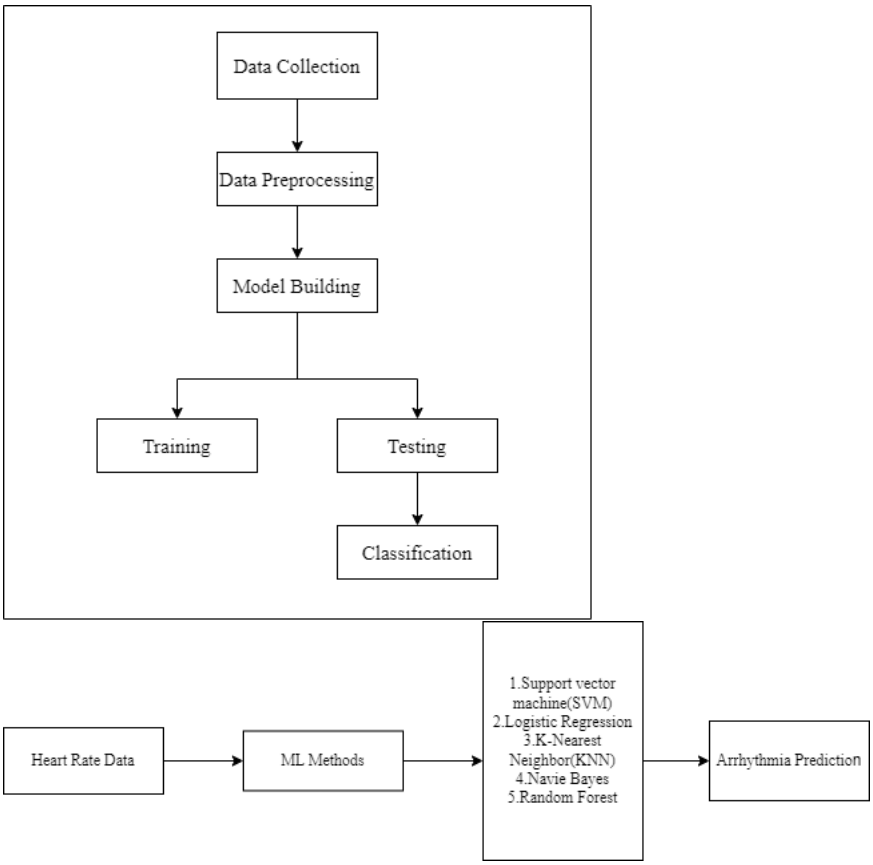
1. Introduction

Arrhythmia is irregularity in heart beat may be harmless or life threatening. Heart diseases are the important heath problem and main cause of the death of the patient. Early diagnosis and medical treatment of heart diseases can prevent sudden death of the patient.

2. Problem Statement

Cancer patients are at **high risk of cardiac arrhythmias** due to chemotherapy and radiation effects. Early detection is **crucial to prevent severe complications**, but traditional **ECG-based diagnosis is time-consuming and prone to errors**. This project develops a **hybrid deep learning + machine learning model** to improve **accuracy, efficiency, and real-time arrhythmia prediction**.

3. Project Architecture



At the first we have collected the data from Kaggle and preprocessed it to remove the noise and then we will use CNN to extract the features and apply dimension reduction techniques and after that we will use the classification algorithms to predict the accuracy.

4. Tools and Technologies

Software:

- Programming languages (Python)
- Libraries and frameworks (TensorFlow, sklearn,numpy,pandas)
- Development environments (Jupyter Notebook, PyCharm)

Hardware:

- Processor: Quad Core(preferred)

- At Least 8 GB RAM (For better and faster execution)

Software Requirements

- Windows 7 and Above (Latest versions Preferred)
- Programming Language: Python

5. Dataset

Data set reference link : https://www.kaggle.com/datasets/sadmansakib7/ecg-arrhythmia-classification-dataset?select=MIT-BIH+Arrhythmia+Database.cs

- **Applied dimension reduction techniques after feature extraction using CNN when the data cleaning is done.**

6. Methodology

- Data Collection and Preprocessing:
  - Collected the data from Kaggle
  - Removed the noise
  - Using dimension reduction techniques

- Feature Extraction:
  - Use **CNN (Convolutional Neural Networks)** to automatically learn ECG patterns.
  - Extract deep features before applying machine learning classifiers.

7. Evaluation Metrics

- Accuracy, Precision, Recall, F1-score
- Training Time (in seconds or minutes) **– Measures how long CNN + ML classifiers take to train.**
- Inference Speed (in msper sample) **– Evaluates real-time prediction speed.**

8. Expected Outcomes

We are expecting that our model will be better than many existing models that are present and we expecting an accuracy more than 95% as a final outcome with the combination of different dimension reduction techniques, classification algorithms and CNN.

9. Challenges and Risks

- Well there are more than 1 lakh test samples we mainly considered about the run time and the model have more than 15 attributes so we are trying to overcome this issue by using few dimension reduction techniques.

10. References

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