Automated Classification of Electrocardiogram Data With Machine Learning

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Introduction

Background

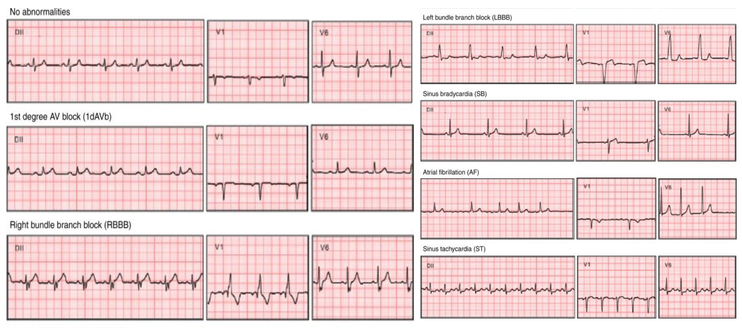
- Deep neural networks (**DNNs**) are **machine learning algorithms**
  - Models trained on **multivariate time series data** to diagnose anomalies in electrocardiogram (**ECG**) data

Issue

- Analyzing **medical data** is **time-consuming** and delays care
  - ML-based anomaly detection can support doctors for greater efficiency

Goal

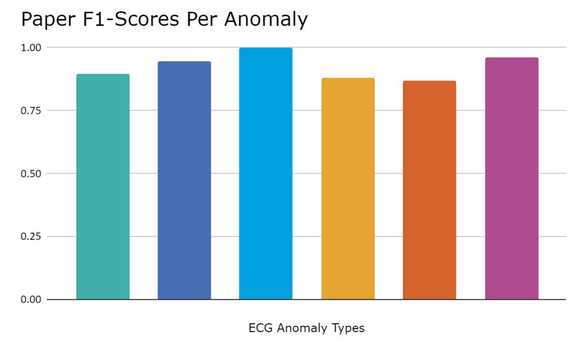
- Determine if **ECG anomalies** (1dAVb, RBBB, LBBB, SB, AF, ST) are present in patients' heart exam data



Results

DNN Model 1 Classification Results Per Anomaly

Ribeiro et al., NC'20 Paper Results



Utilizes CODE Dataset: **2,305,193 ECG Samples**

Discussion/Conclusions

- Ribeiro et al., NC'20 Paper reported higher F1-scores for each anomaly other than SB, implementing the same model

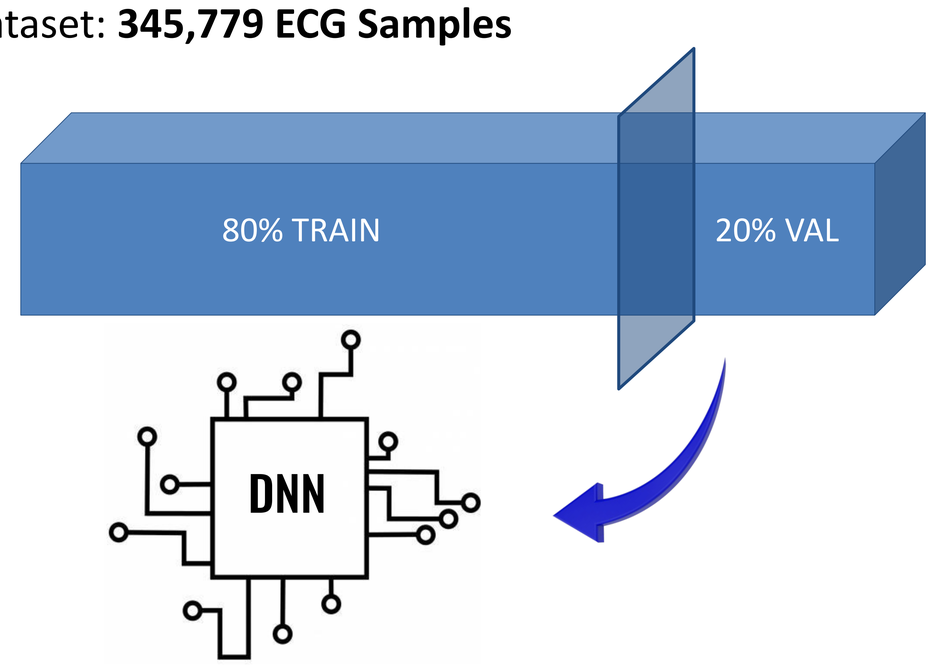
Future Work

- Train on larger dataset
  - Entire CODE dataset: **over 2 million** ECG exam tracings
- Experiment further with hyperparameter tuning
- **Tree-based** classifiers, like the Random Forest model, can be quicker and require **fewer resources** than **deep learning** models

Methods

Model Training

CODE-15% Dataset: **345,779 ECG Samples**



Model Testing & Evaluation

- Compare the predicted labels and true labels for each of 6 anomaly types for
- Determine **specificity**, **precision**, **recall**, and **F1-score** for each anomaly type

References

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