

Introduction

Background

- Deep neural network (DNN) and **Random Forest** are **machine learning algorithms**
- Models trained on **multivariate time series data** to diagnose anomalies in electrocardiogram (ECG) data

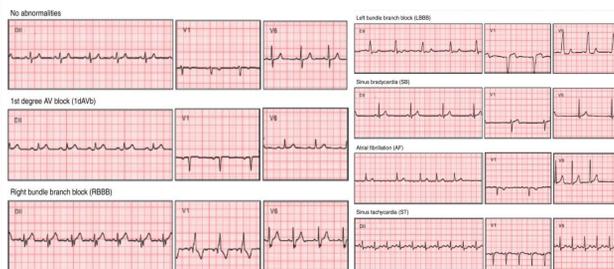


Issue

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

Goal

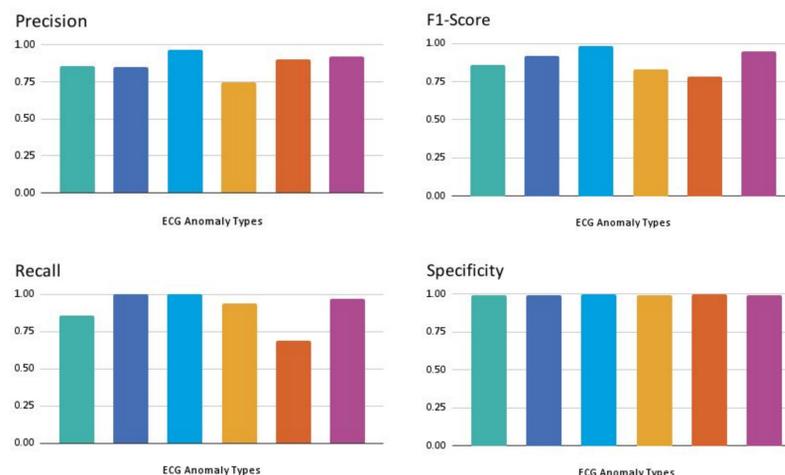
- Determine if **ECG anomalies** (1dAVb, RBBB, LBBB, SB, AF, ST) are present in patients' heart exam data



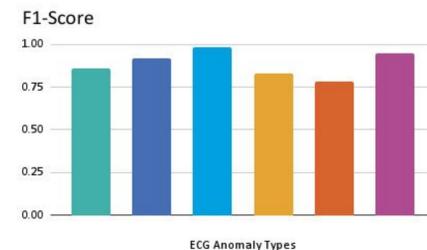
Results

DNN Classification Results Per Anomaly

Legend: RBBB (teal), LBBB (blue), SB (light blue), AF (yellow), ST (orange), 1dAVb (purple)



Random Forest Results



Discussion/Conclusions

- **Tree-based** classifiers, like the Random Forest model, can be quicker and require **fewer resources** than **deep learning** models

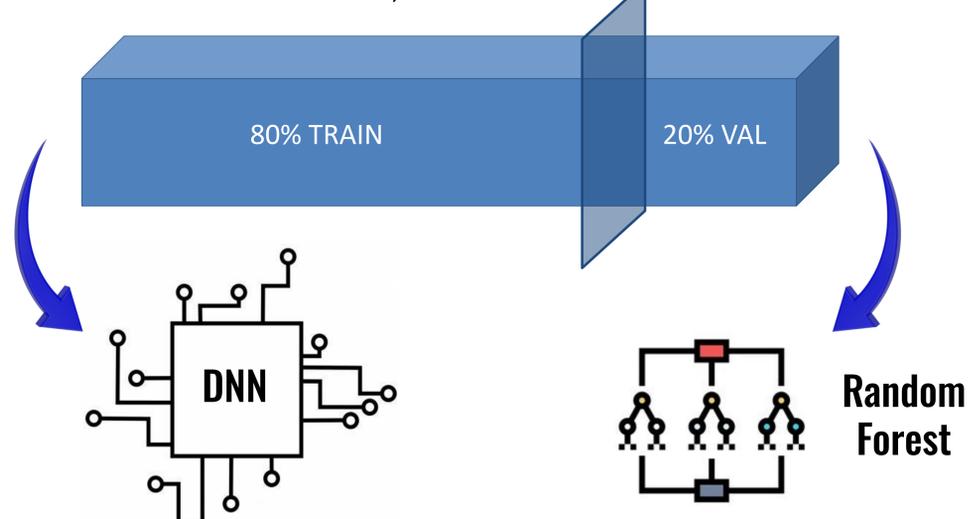
Future Work

- Train on larger dataset
 - Entire CODE dataset: **over 2 million** ECG exam tracings
- Experiment with hyperparameter tuning

Methods

Model Training

CODE-15% Dataset: 345,779 ECG Exams



Model Testing & Evaluation

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

References

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- Ribeiro, Antônio H.; Paixao, Gabriela M.M.; Lima, Emilly M.; Horta Ribeiro, Manoel; Pinto Filho, Marcelo M.; Gomes, Paulo R.; Oliveira, Derick M.; Meira Jr, Wagner; Schon, Thõmas B; Ribeiro, Antonio Luiz P. CODE-15%: A Large Scale Annotated Dataset of 12-lead ECGs, 2021. <https://doi.org/10.5281/zenodo.4916206>.
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