Data preparation

Dataset construction: Fusion of raw ECGs from *MIMIC-IV-ECG* with diagnosis codes from *MIMIC-IV* to form the *MIMIC-IV-ECG-ICD* dataset suitable for training comprehensive ECG classifiers.

Harmonization: Harmonization of different ICD-9 and ICD-10 codes and inclusion of all parent codes.

Stratification: Patient-based split for reliable performance evaluation.

Model training

Training two different state-of-the-art model architectures for ECG classification.

XResNet1d50: 1D residual convolutional neural network, adapted from popular image recognition models.

S4: A structured state space model, which excels in capturing long-range dependencies in sequential data.

Model evaluation

Assessment of model performance by appropriate metrics at different levels of granularity: Global model performance across all statements, performance across ICD-10 chapter and performance on individual statements or statement groups (3-digit ICD-codes).

Performance comparison

Identification of most accurately detectable individual statements and statement groups from the ECG.

Comprehensive comparison of the predictive performance of significant diagnoses and conditions against literature results.

Discussion on the predictive performance for challenging statements as well as confounding scenarios in comparison to the literature.