The paper “***Machine Learning Models in Heart Failure with Mildly Reduced Ejection Fraction Patients***” by Hengli Zhao et al applied machine learning models and survival analysis to predict outcomes in patients with heart failure and moderately reduced ejection fraction (HFmrEF). It leverages various ML techniques to analyze patients' data and assess their utility in clinical decision-making. The models used are logistic regression (baseline model), random forest, gradient boosting machine, support vector machine, Ridge-Cox regression, LASSO Cox regression, Enet Cox regression, and forward step regression. The data include 72 predictors collected from patients' clinical history, vital signs, social history, laboratory, and electrocardiographic parameters. Data preprocessing steps include missing value handling, feature scaling, and feature selection. The models were evaluated using concordance index (CI), accuracy score, precision, recall/sensitivity, F1-score, and AUC-ROC. The best-performing models are the LASSO Cos regression model for predicting 1 – and 6–year mortality with CI indices of 0.77 and 0.83 respectively, while random forest gave the best discrimination for HF re-hospitalization with CI indices of 0.80 and 0.85 for 6 years and 1 year follow up respectively. Strengths of the paper include comprehensive model comparison, focus on specific clinical subgroups, robust model evaluation, and clinical applicability of their model. Weaknesses include not reporting the dataset size, less emphasis on model interpretability and not validating the model with independent datasets to measure their robustness.

Citation:

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