

Q-wave Myocardial Infarction & Stroke in patients managed interventionally for Left Main Coronary Artery Disease: Prediction by Incorporation of Ensemble approach into Automated Machine Learning

Our novel approach to developing predictive risk models for post-interventional MQMISStroke composite risk and TVR among LMCA disease patients by exploring automated machine learning provides predictive capabilities which, when incorporated into the respective prognosticative protocols, shall translate into a decrease in the morbidity and mortality associated with this ailment by assisting in risk stratification and complication triaging.

INTRODUCTION: Percutaneous coronary intervention (PCI) and coronary arterial bypass graft (CABG) are recognised as a couple of time-tested interventions to manage left main coronary artery (LMCA) disease.

METHODOLOGY: The study population comprised 2,240 patients suffering from LMCA disease managed via either PCI or CABG as collated in the MAIN-COMPARE registry.¹ The current state of the art (SOTA) for automated Machine Learning (aML)² was adopted with superimposition of ensemble approach and macro-weighted average area under the receiver operating curve (mWA-AUROC) was adopted to gauge the discriminative ability of the developed models.

RESULTS: An ensemble of Decision Tree and CatBoost algorithmic models predicted the post-interventional MQMISStroke composite risk in LMCA disease patients with an mWA-AUROC of 0.85 and a log loss of 0.53 recognizing age as the most influential predictor. An ensemble of Light Gradient Boosting Machine, Random Forest and CatBoost algorithmic models predicted post-interventional TVR in such patients with an mWA-AUROC of 0.82 and a log loss of 0.51 recognising the respective intervention as the most influential predictor. (Figure 1)

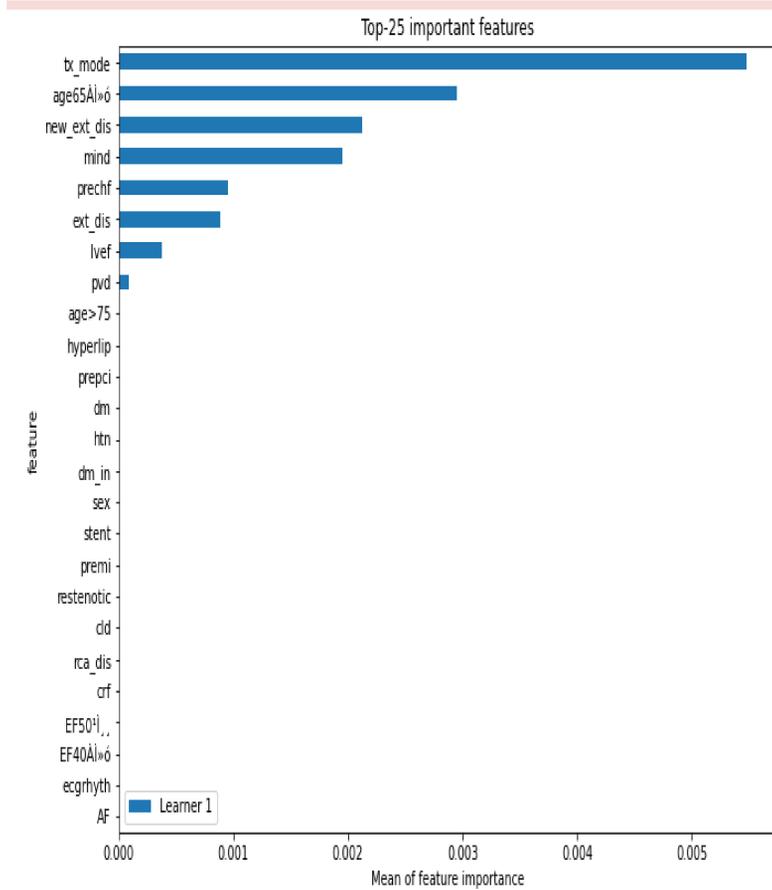


Figure 1: The most influential predictors for TVR among LMCA patients

References

1. Kim TO, Ahn JM, Kang DY, et al. Rates and Independent Correlates of 10-Year Major Adverse Events and Mortality in Patients Undergoing Left Main Coronary Arterial Revascularization. *Am J Cardiol.* 2020;125(8):1148-1153. doi:10.1016/j.amjcard.2020.01.023
2. AutoML Compare. MLJAR Automated Machine Learning. <https://mljar.com/automl-compare/>. Published 2021. Accessed June 18, 2022.