

INCORPORATING ENSEMBLED STACKED APPROACH INTO AUTOMATED MACHINE LEARNING IN AN ATTEMPT TO PREDICT ACUTE ISCHEMIC HEART DISEASE IN PATIENTS WITH ATYPICAL CHEST PAIN: SECONDARY ANALYSIS OF A SINGLE-CENTER RETROSPECTIVE COHORT STUDY

Our novel approach to developing algorithmic predictive models for acute ischemic heart disease among patients presenting with atypical chest pain by adoption of the current SOTA for aML provides optimal predictions which, when incorporated into the respective protocols, shall translate into a decrease in the morbidity associated with ischemic heart disease by assisting in risk stratification and complication triaging.

INTRODUCTION: Considerable research has been carried out to explore the adoption of novel methodologies in a bid to optimize the management protocols for acute ischemic heart disease (AIHD) that is prevalent worldwide and has significant morbidity and mortality associated with it.

METHODOLOGY: The study population comprised 3,833 patients presenting with chest pain who visited the ED of a tertiary-care hospital from January 2014 to December 2018.¹ 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 stacked Extra Trees, Neural Network, CatBoost, Light Gradient Boosted Machine and Random Forest algorithmic models achieved an mWA-AUROC of 0.78 and an accuracy of 87.9%. **(Figure 1)** Our model outperformed that developed by Kim KH et al.¹

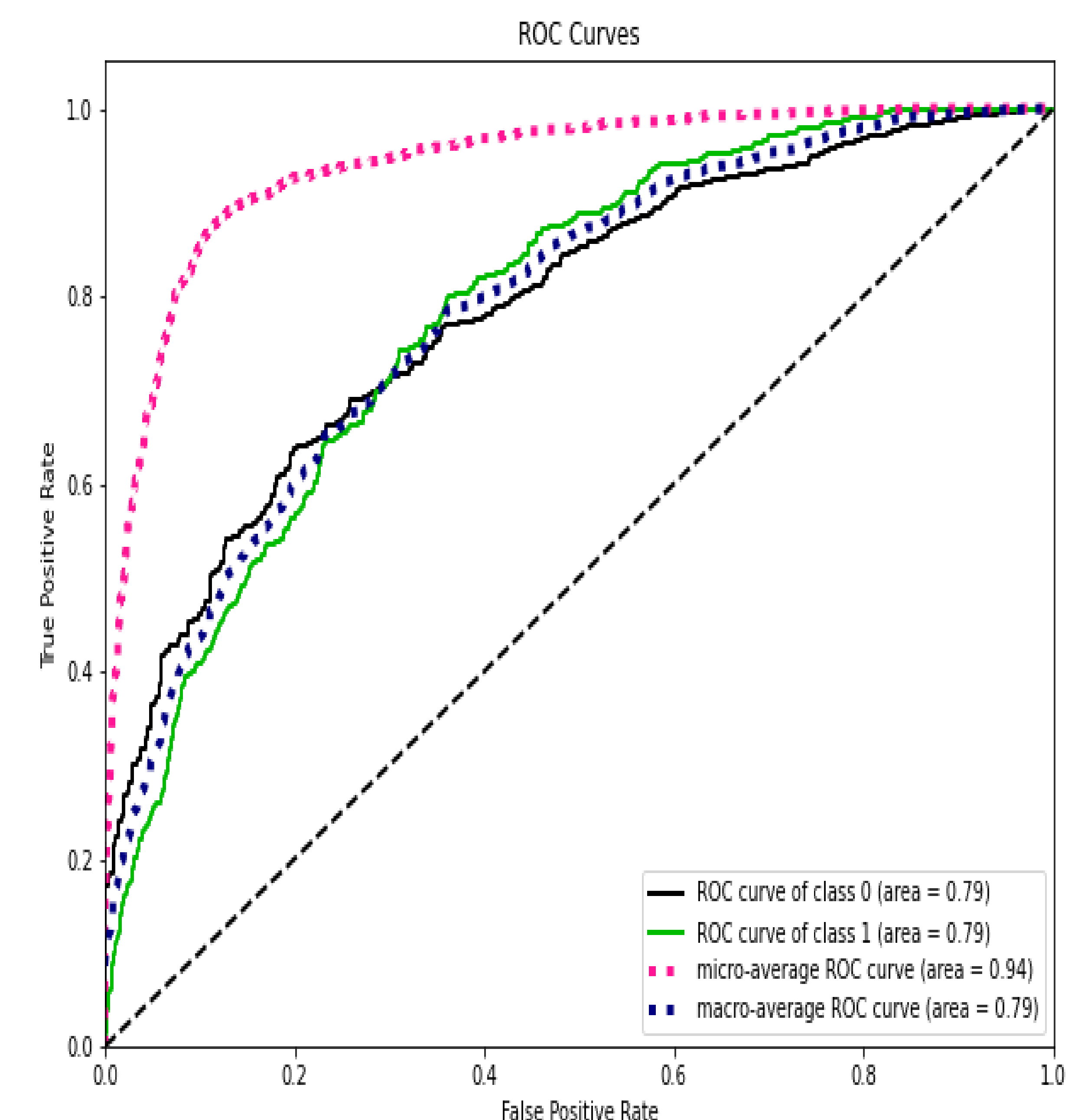


Figure 1: The AUROC curve of Stacked ensemble indicative of discriminative classification ability

References

1. Kim KH, Park JH, Ro YS, Hong KJ, Song KJ, Shin SD. Emergency department routine data and the diagnosis of acute ischemic heart disease in patients with atypical chest pain. PLoS One. 2020;15(11):e0241920. Published 2020 Nov 5. doi:10.1371/journal.pone.0241920
2. AutoML Compare. MLJAR Automated Machine Learning. <https://mljar.com/automl-compare/>. Published 2021. Accessed September 21, 2022.