Refining the Impact of TW-DRGs on Medical Utilization through Machine Learning

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INTRODUCTION

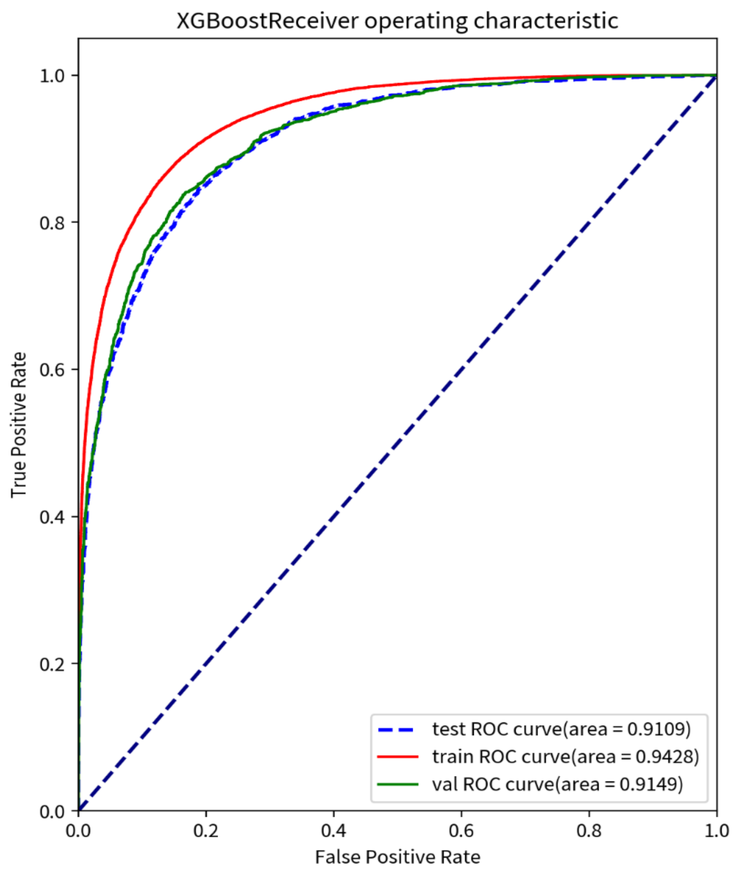
In order to control the extensive medical expenses, in 2010 the National Health Insurance Administration (NHIA) implemented the Taiwan version of Diagnosis Related Groups(Tw-DRG) system for western medicine in the circle of primary health care institutions,and started plans to launch the phases 3-5 of the DRG in all health care institutions in the years to come.

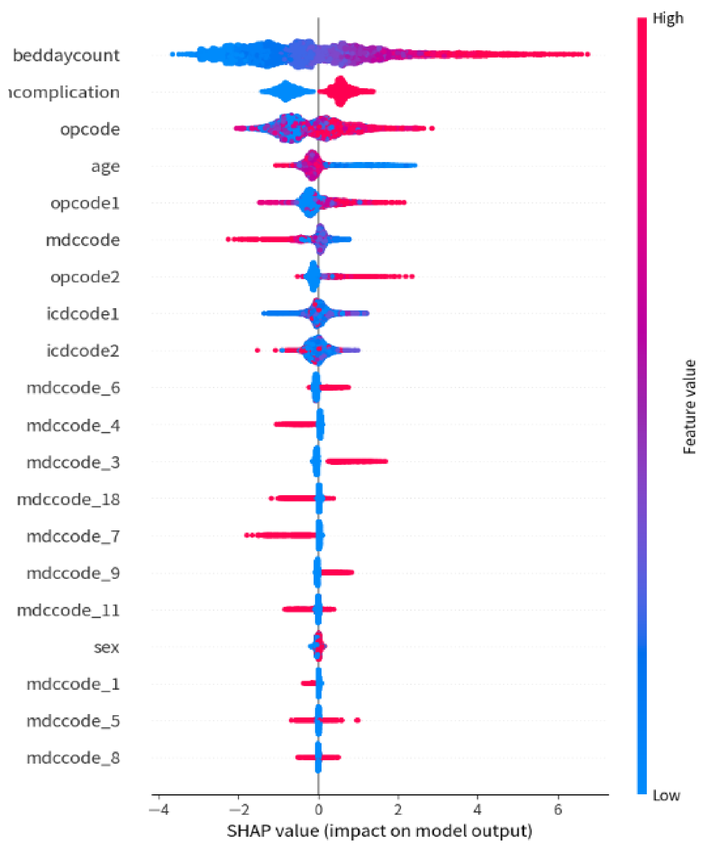
AIM

This study aims to employ machine learning techniques in creating an effective predictive model for healthcare resource variations among TW-DRG cases. The primary objective is to provide decision-making support for future stages (Phase 3-5) of TW-DRG implementation, contributing to the control of healthcare costs.

RESULTS

The study identified age, gender, primary diagnosis, primary procedure, length of hospital stay, surgery, ICU, and department transfers as crucial predictive feature variables. Higher age, longer hospital stays, postoperative complications, and admission to MDC4 (respiratory system) compared to MDC5 (circulatory system)and MDC11 (urinary and reproductive system) were associated with a higher probability of deficit. The predictive system was trialed in clinical departments, receiving positive affirmation for its valuable assistance in forecasting healthcare resource utilization.





METHOD

Relevant data (January 2019 to July 2023; 65,446 patients) were collected from a regional hospital in Kaohsiung City. The data were randomly allocated to a training set (80%), a validation set (10%), and a testing set (10%). A machine learning algorithm and 33 features were used to construct the Tw-DRGs Medical Resource Utilization Predictive Model.

CONCLUSIONS

The predictive model established through machine learning demonstrates outstanding quality, providing real-time predictions for the profit and loss of healthcare resource utilization in TW-DRG cases. This model serves as an effective reference for clinical disease care interventions, contributing to the enhancement of healthcare quality and facilitating shared decision-making between healthcare providers and patients.

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