

MyHeart Air FAQ

MyHeart Air features an **AI calculator** that predicts the rate of hospital admission and number of cardiac deaths, incorporating cardiac and air quality features based on Malaysian population data. It also provides a cardiac mortality calculator that predicts the mortality probability based on these factors.

1. What is MyHeart Air?

MyHeart Air is an AI-powered tool designed to predict cardiovascular outcomes by integrating both cardiac and air quality data. By considering environmental factors, this tool provides a more comprehensive and contextualized prediction tailored to the Malaysian population. MyHeart Air aims to enable more accurate risk assessment, leading to more timely and efficient treatments and preventive measures.

2. What are the features of MyHeart Air?

MyHeart Air provides several features:

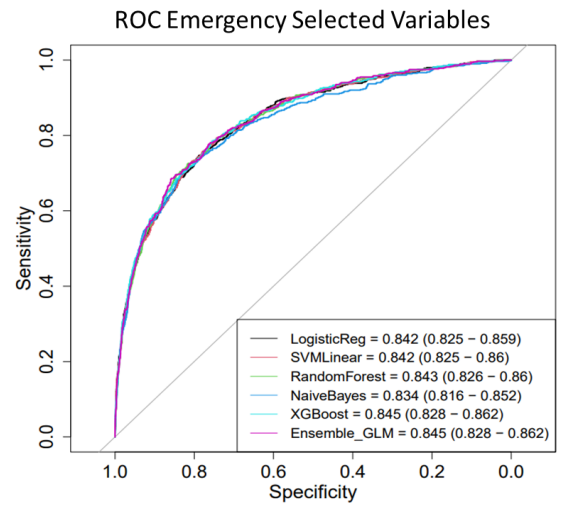
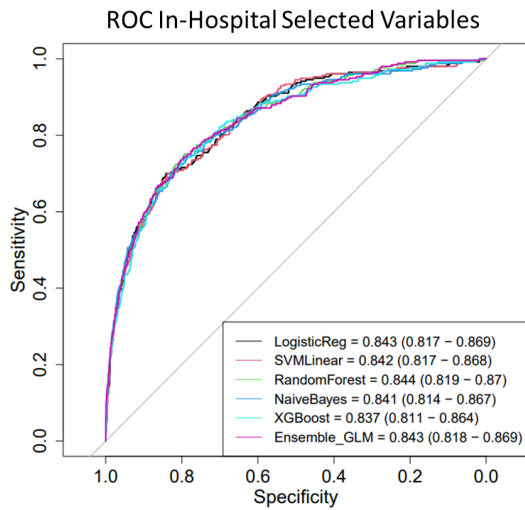
- **Hospital (Single) Geo-Location Prediction:** This feature shows the expected hospital admission and cardiac death rates for a chosen location. It combines patient health data and local air quality information to provide precise estimates.
- **Hospital (Batch) Geo-Location Prediction:** Similar to the single geo-location prediction, this feature also predicts hospital admission and cardiac death rates. However, it does so for multiple hospital locations simultaneously and displays the results on a map.
- **Hospital Admission and Mortality Event Calculator:** This calculator predicts hospital admission and cardiac death rates based on air quality readings. By incorporating real-time air quality data, it provides an additional layer of precision to the risk assessment.
- **Cardiac Death Prediction (Warded):** This feature estimates the probability of cardiac death for warded patients based on their cardiac features and the air pollution level in their location.
- **Cardiac Death Prediction (Emergency):** This feature functions similarly to the warded patient's feature but focuses on emergency patients. It provides a quick risk assessment which could be critical in emergency settings.

3. How reliable is MyHeart Air?

MyHeart Air uses advanced machine learning algorithms trained on large and comprehensive datasets, ensuring high accuracy in its predictions. The tool's predictions have been validated against several benchmarks, showing reliable performance. The RMSE results for hospital admission and cardiac mortality for ACS patients, as well as the AUC result of the classification model, attest to the model's reliability. However, as with any predictive model, the results should be used as part of a broader assessment rather than standalone definitive predictions.

Predict	Best Regression ML Model	RMSE
Hospital Admission	Random Forest	1.859
Cardiac Death Rate	Support Vector Machine	0.236

Predict	Best Classification ML Model	AUC
In-Hospital Patient	Random Forest	0.843 (0.813 - 0.873)
Emergency Patient	XGBoost	0.845 (0.828 - 0.862)



4. How do the Single and Batch Geo-Location Predictions work?

Both Single and Batch Geo-Location predictions use health and environmental data to estimate the rate of hospital admissions and cardiac deaths in specified locations. For Single Geo-Location, users select one hospital location, and the tool provides the estimates. For Batch Geo-Location, users can choose multiple hospital locations, and the tool will display the estimates for all chosen locations on a map. This feature is particularly useful for healthcare administrators and policymakers in assessing regional health risks and planning resource allocation.

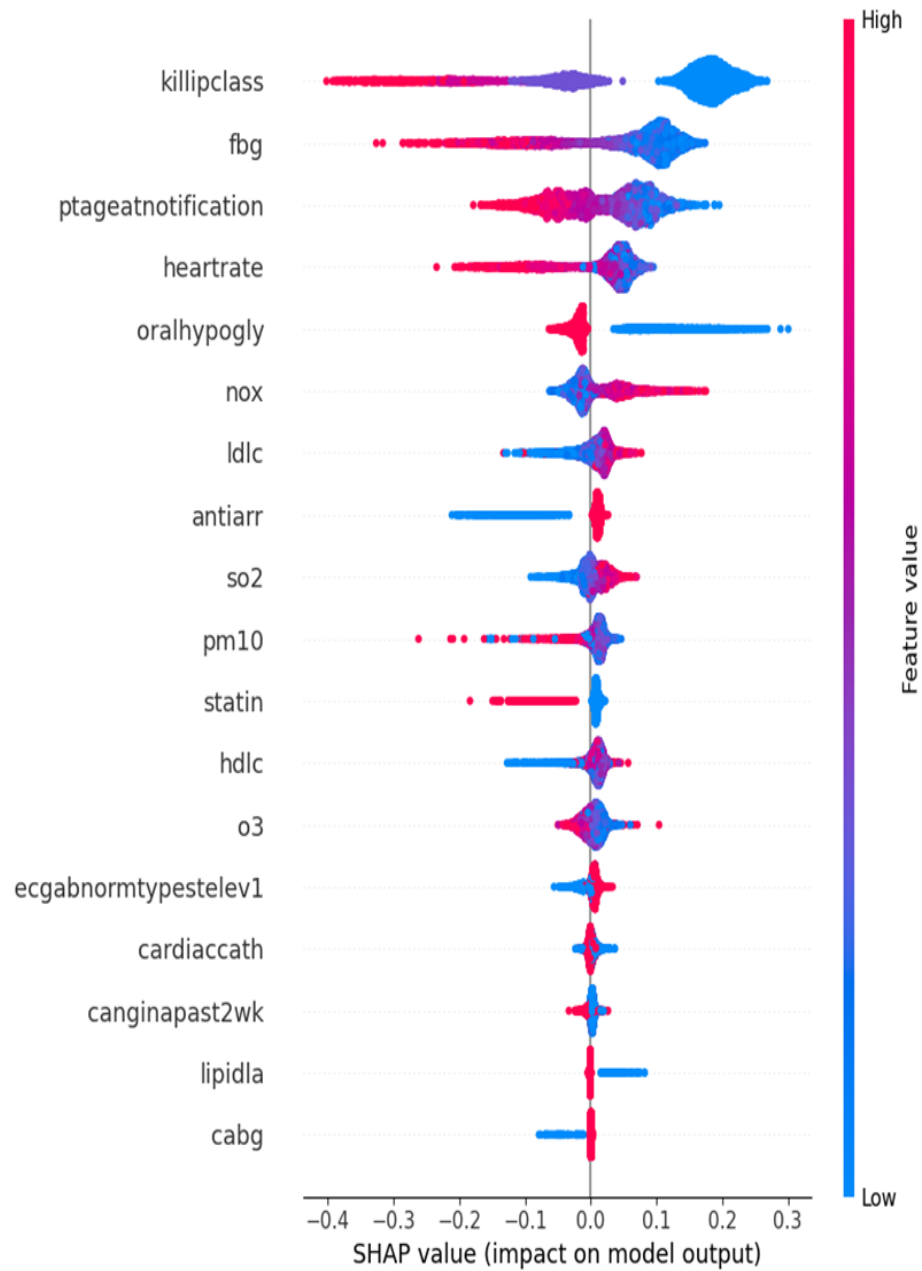
5. How do the Cardiac Death Prediction Calculators for Warded and Emergency Patients work?

Both the Cardiac Death Prediction Calculator for Warded Patients and for Emergency Patients use individual cardiac features and the local air quality data to estimate the risk of cardiac death.

A tool called SHAP (SHapley Additive exPlanations) is used to understand these models. SHAP plots show the impact of each feature on the model's prediction, allowing users to understand which factors are most influential in predicting the risk of cardiac death.

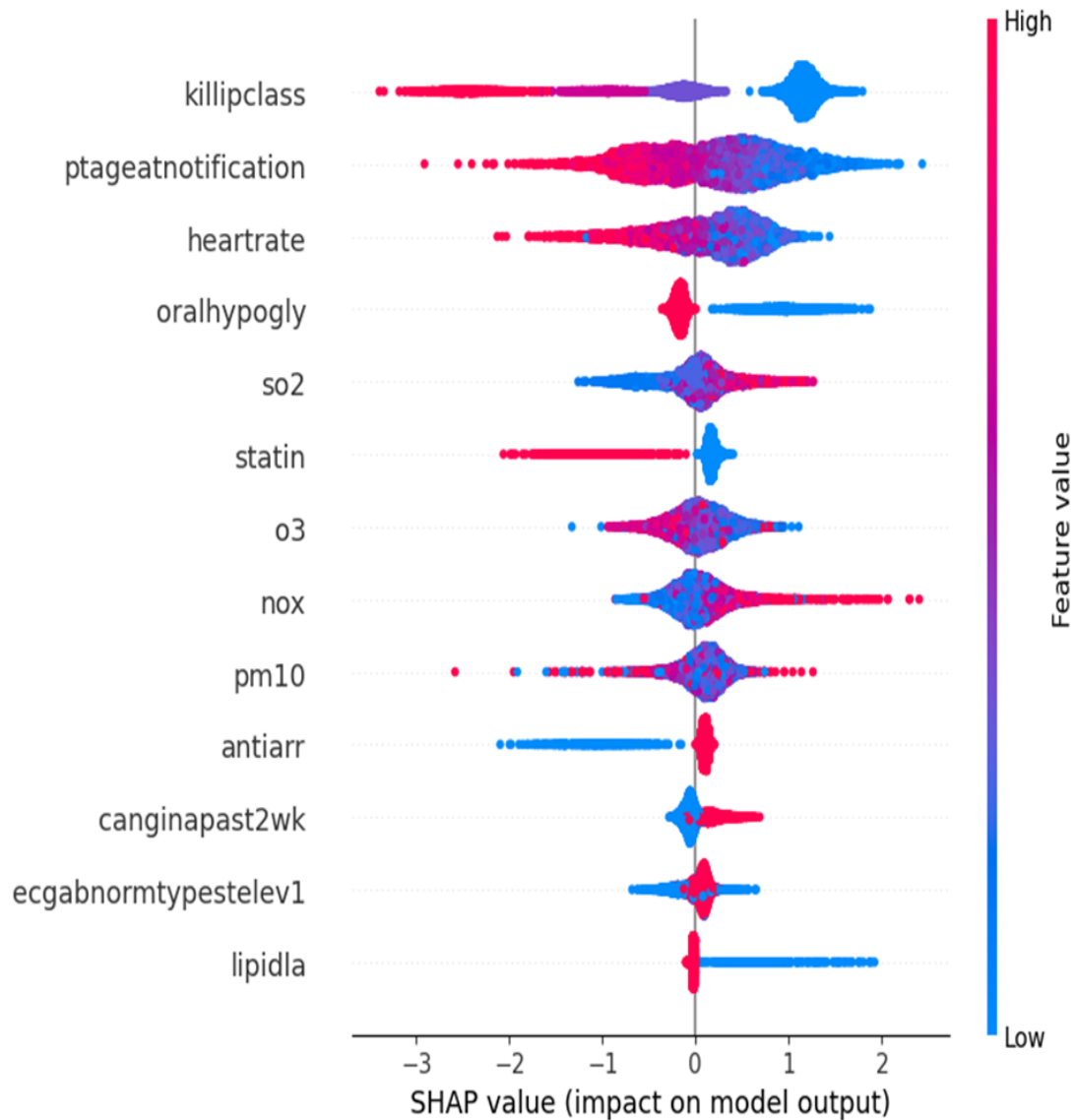
For Warded Patients, the SHAP plot may look like this:

SHAP Summary Plot for In Hospital Selected Variables



While for Emergency Patients, the SHAP plot may differ:

SHAP Summary Plot for Emergency Selected Variables



By examining these plots, users can gain insight into the model's decision-making process, seeing which factors are deemed most critical in each context.

6. Publication Works

Song, C., Kasim, S.S., Malek, S., Ibrahim, K.S., Sulaiman, N.M.N., Negishi, K., Hamidi, M.H.M., Aziz, M.F. and Ibrahim, N., 2022. Effects of air pollution towards hospital admission prediction of Asian patients with acute coronary syndrome (ACS) using LSTM method. *International Journal of Cardiology*, 369, p.16.