Patient Survival Prediction

A PRESENTATION BY JOCEL ARCELONA

BUSINESS PROBLEM

Maimonides Medical Center in Brooklyn is in need of a preliminary screening test to predict a patient's mortality after being admitted to the ICU.

Stakeholders

Maimonides Medical Center in Brooklyn, New York

OBJECTIVES

- Clean and Analyze a Patient Survival Prediction dataset

- Figure out features that most accurately predicts a patient's mortality after being admitted to the ICU

- Create, use and tune multiple classification models to figure out which model produces the best recall score
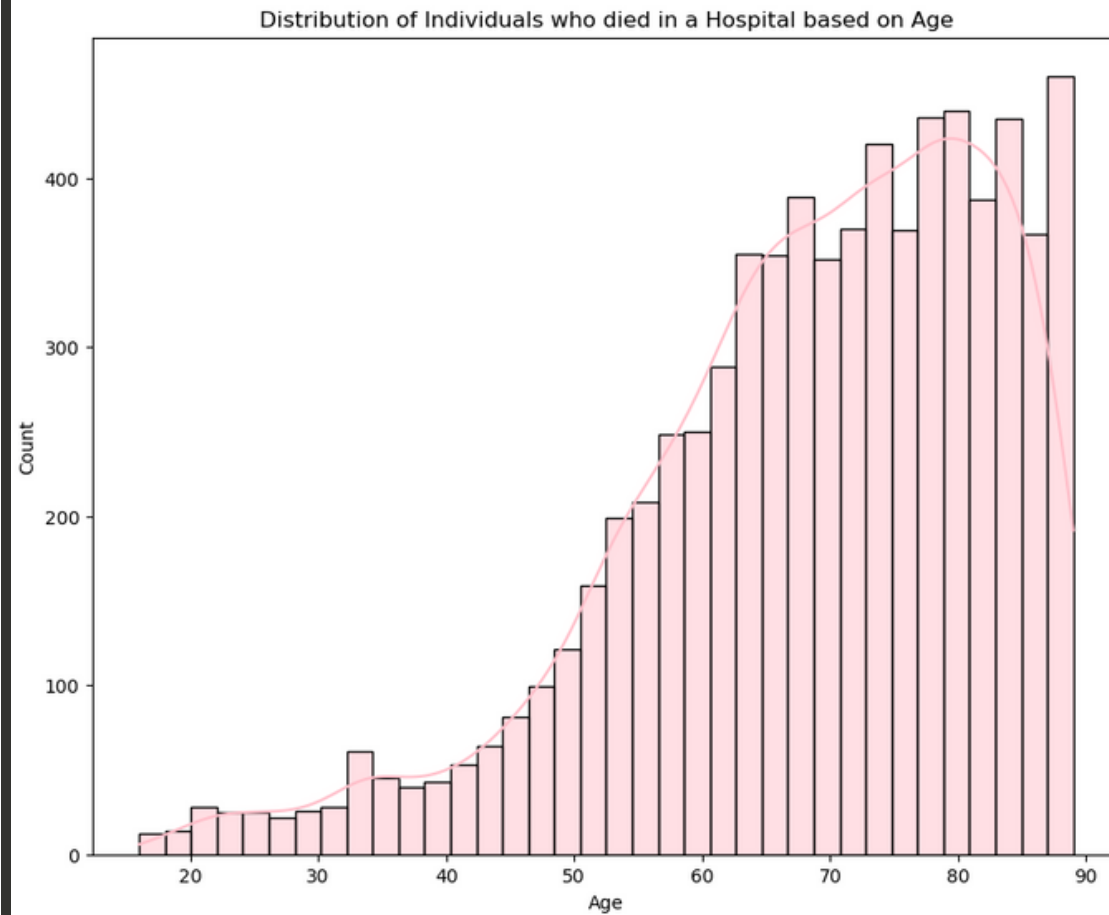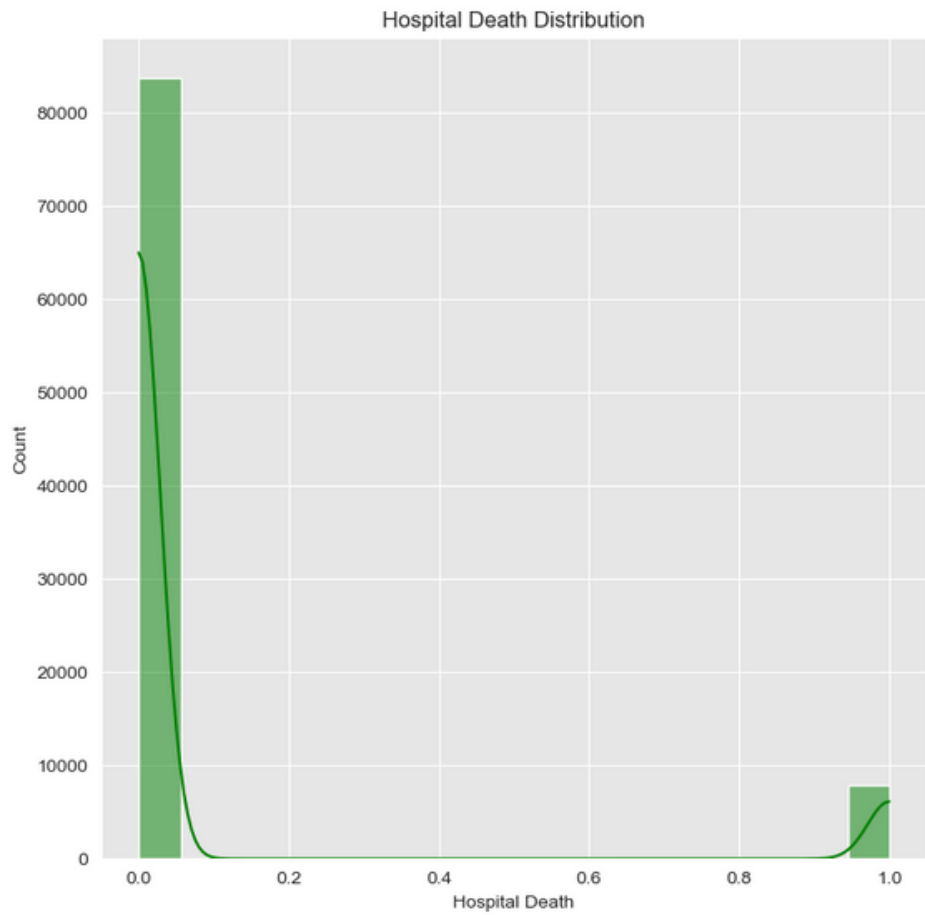
Data Source:

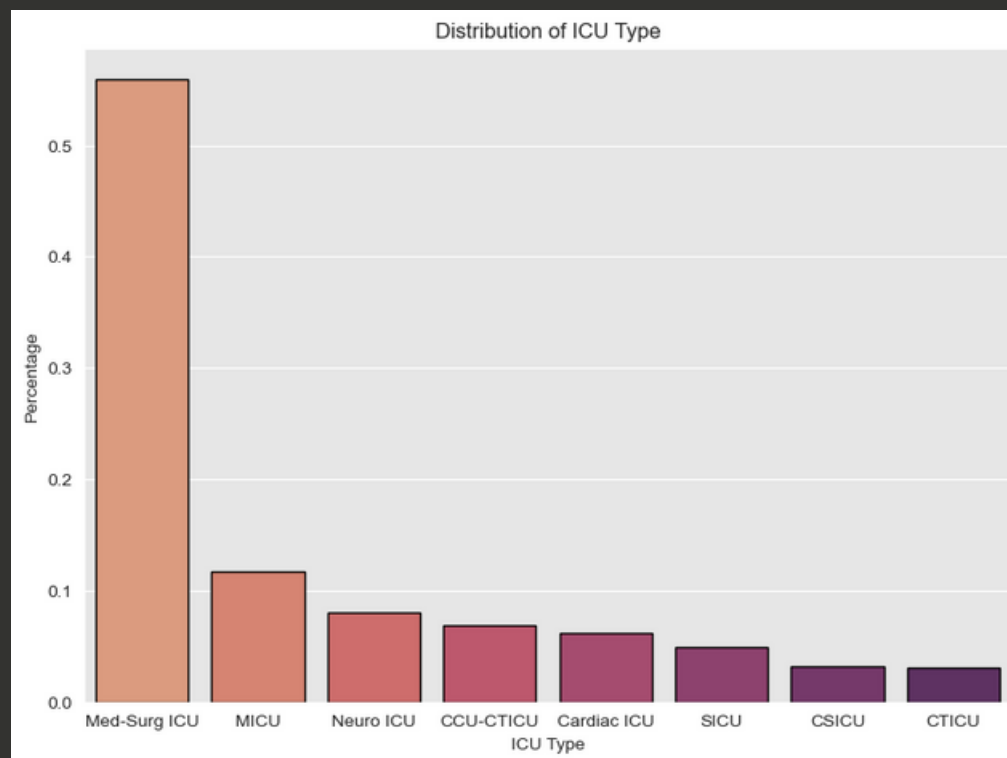**Patient Survival Prediction**

Classification Problem

k kaggle.com

Rows: 90,000

Columns: 85

Hospital Death Distribution

Distribution of Individuals who died in a Hospital based on Age
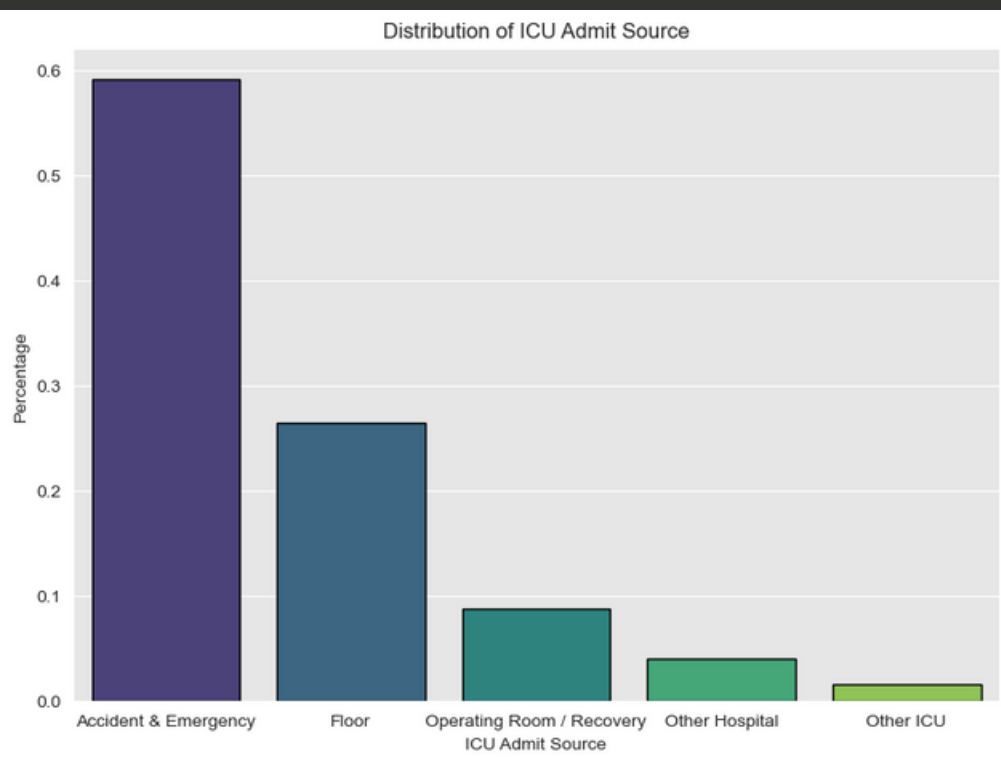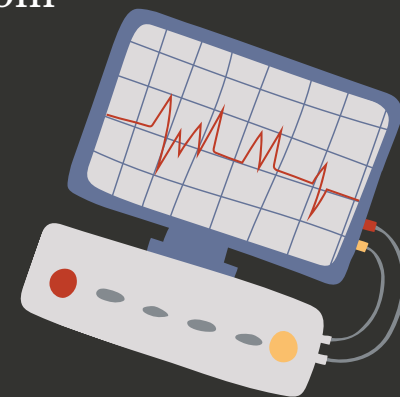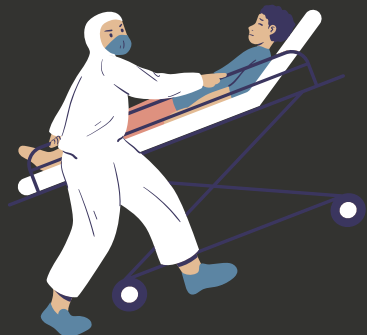
Findings:

1.   Only about 10% of the patients in this dataset died in the hospital
2. Age of most patients who died rises around the Age of 50, so the older you are the higher your chances of dying when hospitalized
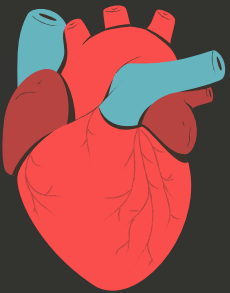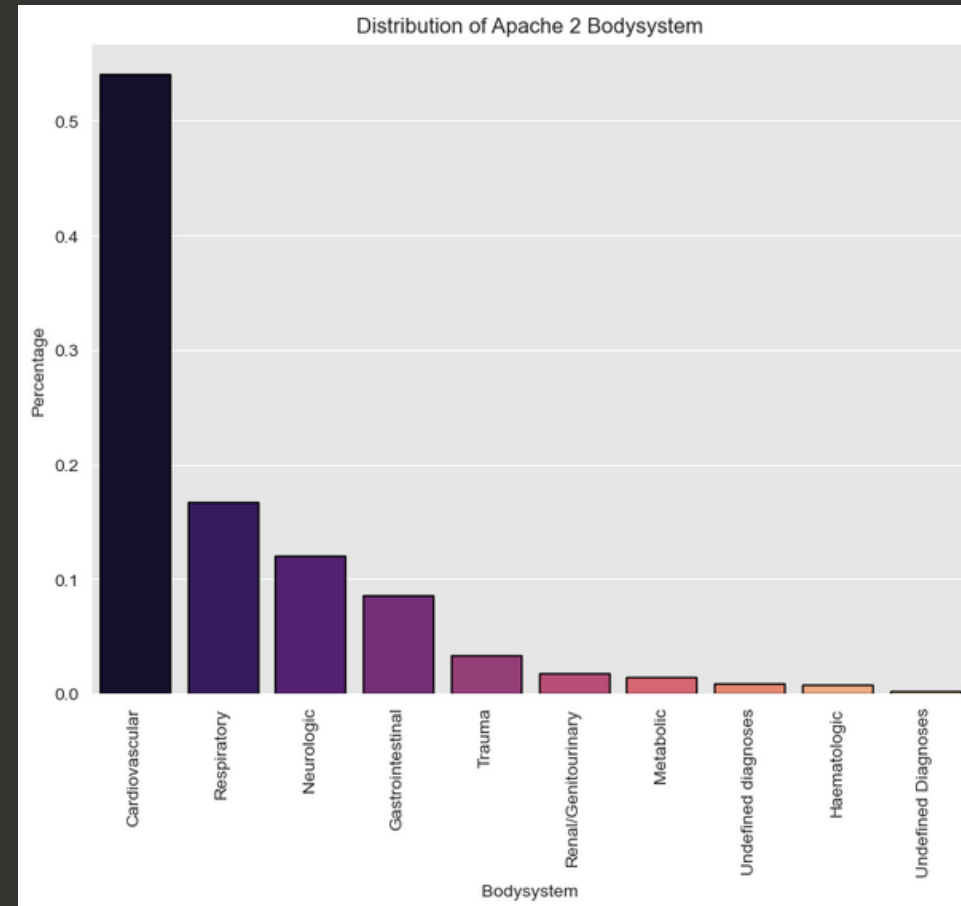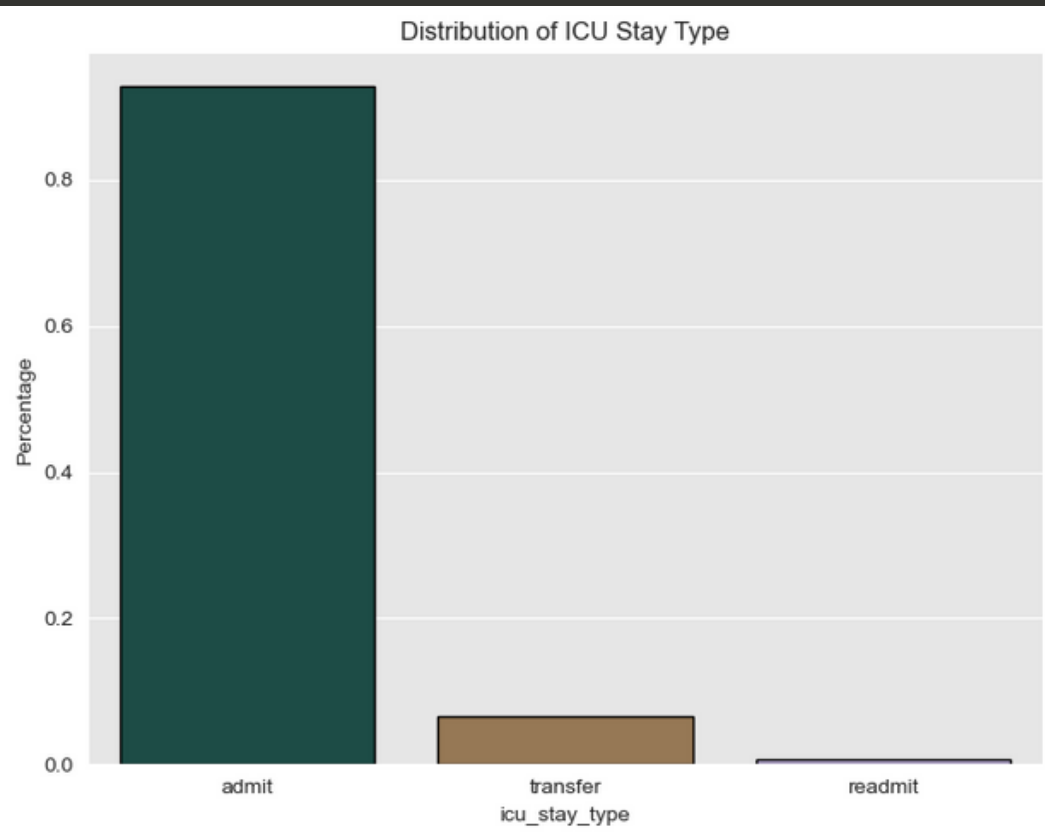
Findings:

60% of patient who died were admitted in the emergency room

56% were in medical surgery ICU

Distribution of ICU Stay Type

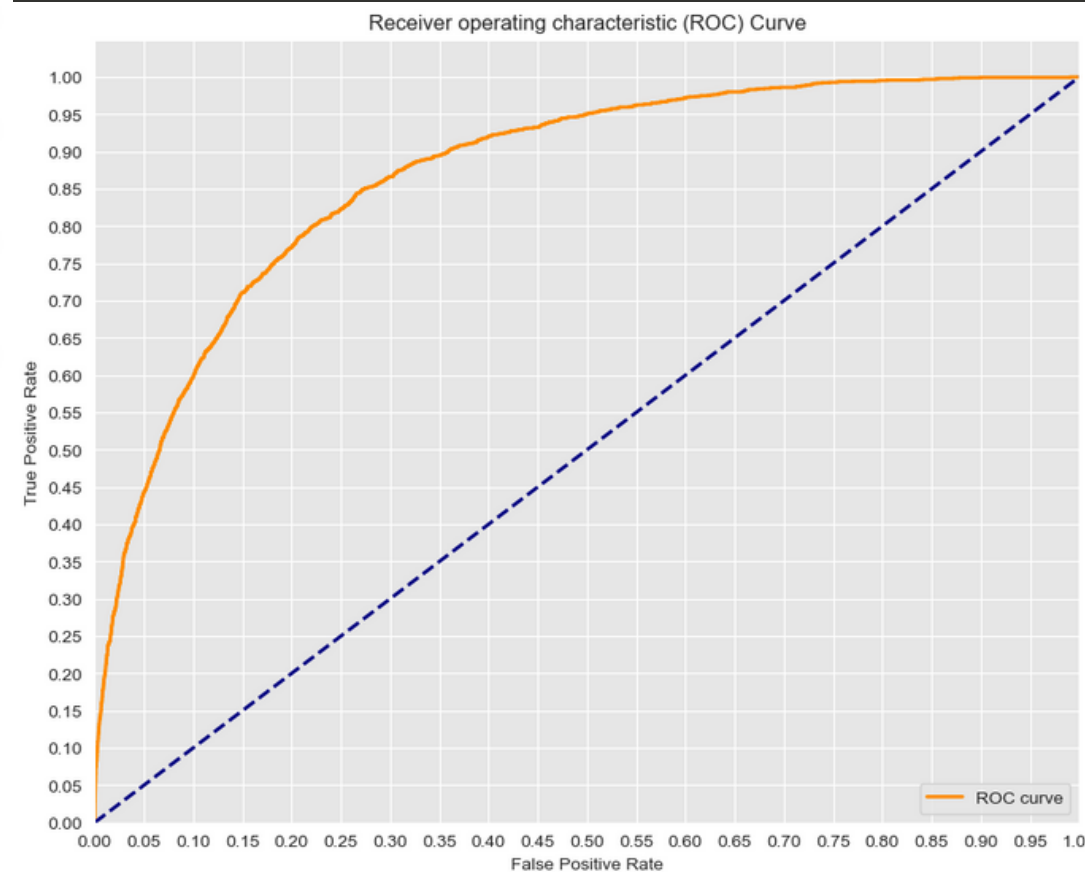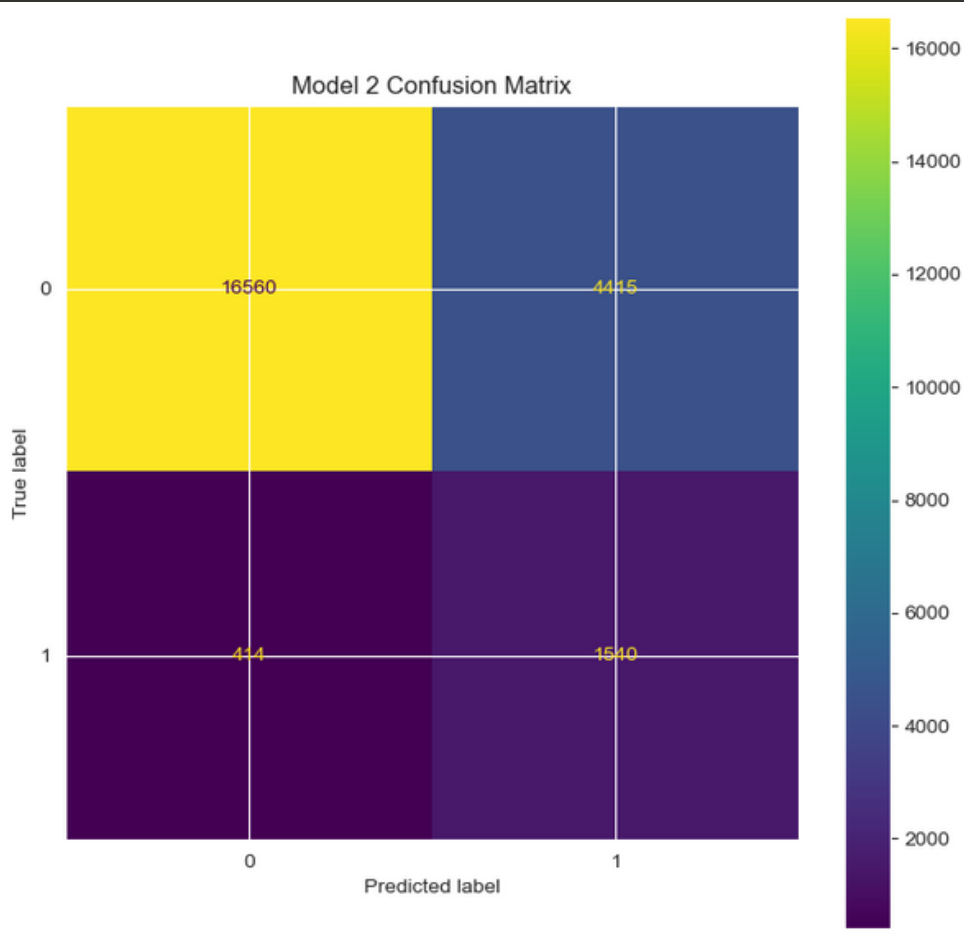Distribution of Apache 2 Bodysystem

Findings:

93% of patients who died were first time admittance patients

54% of deaths were caused by cardiovascular complications

	ACCURACY	RECALL	PRECISION
LOGISTIC REGRESSION	79%	78%	26%
GAUSSIAN NAIVE BAYES	68%	75%	19%
K NEAREST NEIGHBORS	71%	76%	20%

Best model: Logistic regression

Model 2 Confusion Matrix
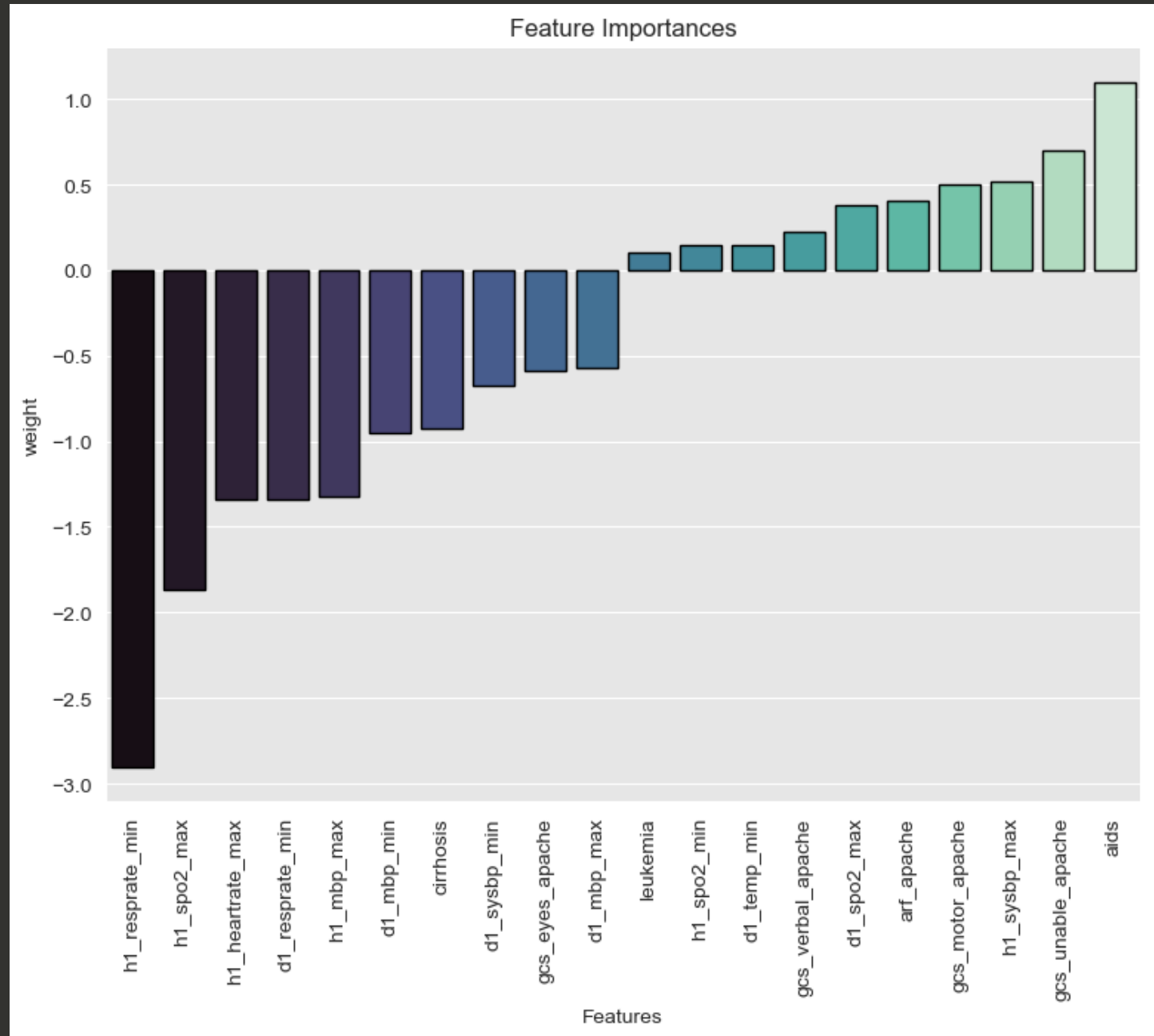
Receiver operating characteristic (ROC) Curve

Recall Score: 0.788
AUC: 0.8696

TOP PREDICTOR OF
DEATH:

AIDS
UNABLE APACHE
MOTOR APACHE
SYSBP MAX
ACUTE RENAL FAILURE
SPO2 MIN
SPO2 MAX
VERBAL APACHE
LEUKEMIA

RECOMMENDATIONS

Gather more data about a patient's:

- Lifestyle
- Type of Job
- Medications
- Reason of admittance
- Non-elective surgery

With more data about a patient, we can focus more on lowering false negatives and false positives at the same time considering that they are both misdiagnosis and could pose different risks for both the patient and the hospital involved.

Thank You

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