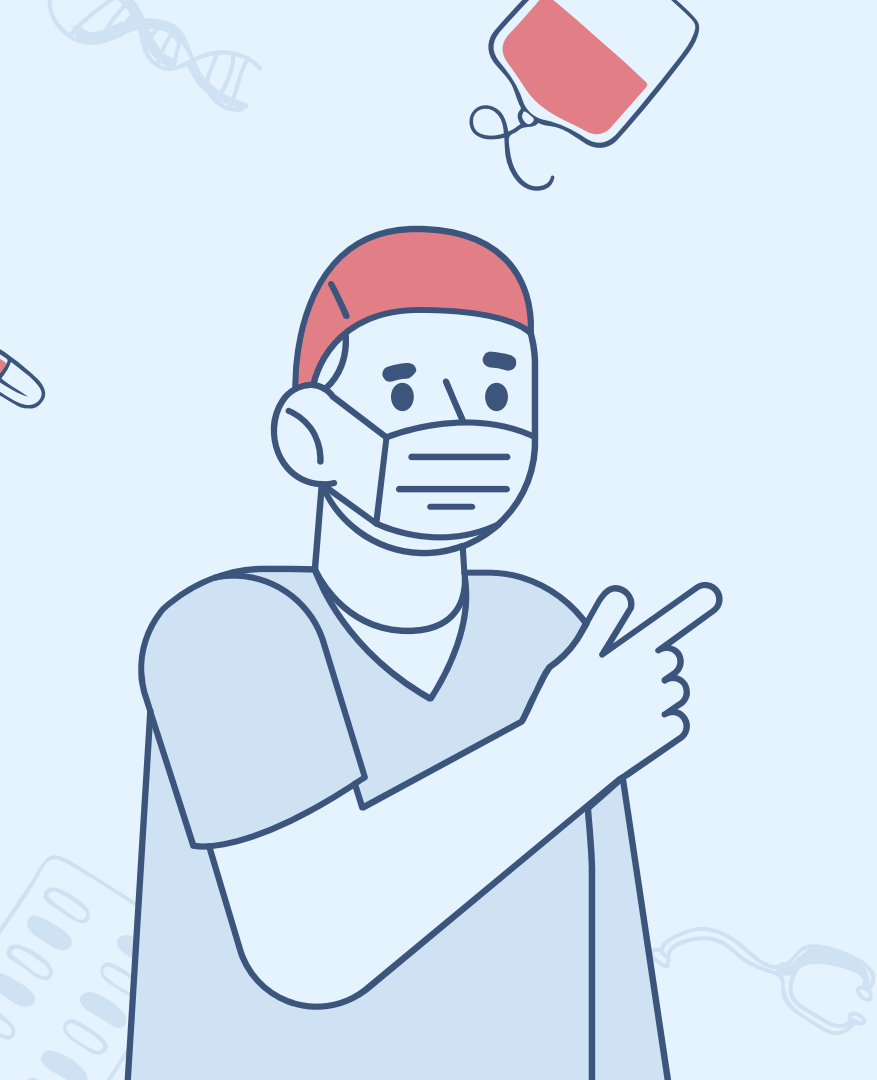


# Hospital Mortality Prediction

Classification Machine Learning

Oscar Facey

# Problem

The predictors of in-hospital mortality for ICU admitted Heart Failure patients remain poorly characterized.

What are the most important metrics to look at when a patient is admitted to the ICU?

# Dataset

- 1077 patients
- 51 different measurements
- Vital signs and laboratory test

# Planning model

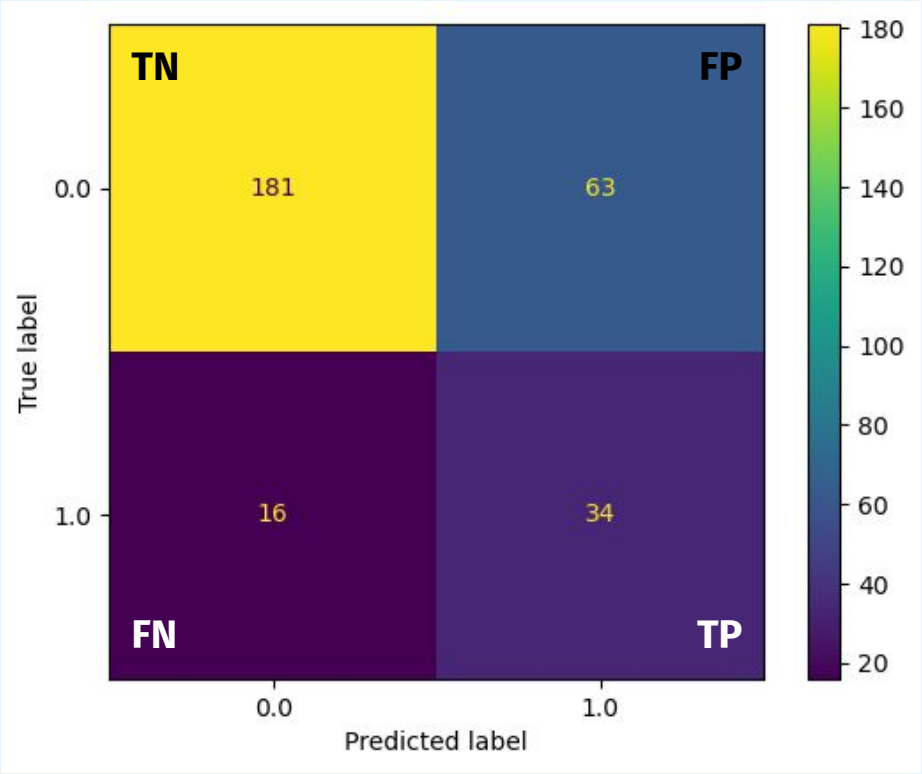
When working with high stakes issues like predicting the mortality risk of patients I concluded that minimizing false negative predictions is crucial

Recall = TP / (TP + FN)

I decided to assume random guessing of survival/mortality

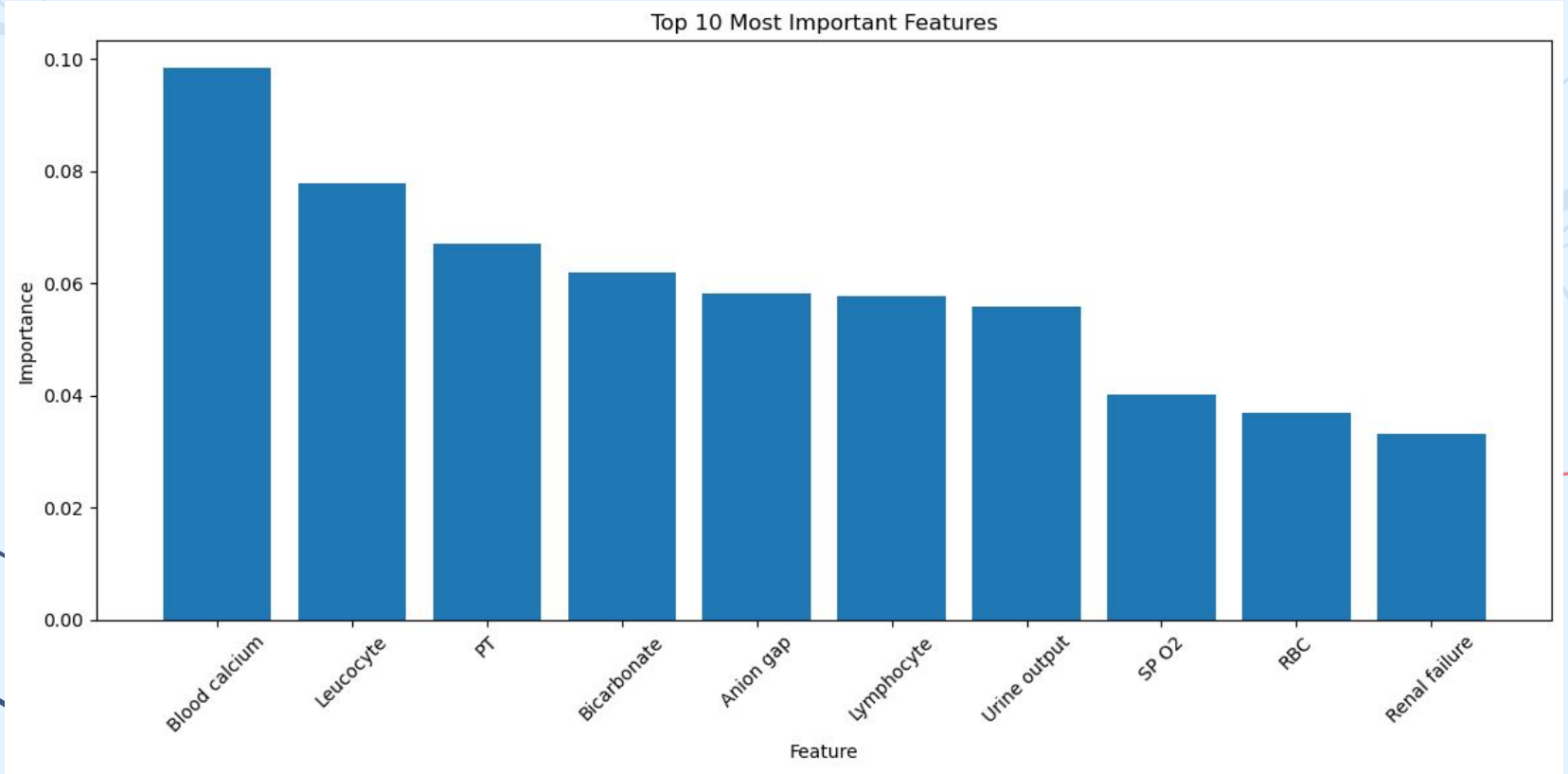
Recall baseline 0.13

# Model Outcome




Test Recall ( 0.64 ) > Baseline recall ( 0.13 )

# Most Important Features



# Understanding Features

## Blood Homeostasis (Bicarbonate, Blood calcium, RBC count, SPO2)

- Monitor acid-base balance, assess bone health, and evaluate oxygen-carrying capacity. Calcium is crucial for nerve function, blood clotting and muscle contraction.

## Antibodies (Lymphocyte count, Leucocyte count)

- Critical indicators of a patient's immune system health. Increased values indicate infections and inflammatory conditions.

## Renal Function (Renal failure,  Urine output)

- Kidney function is critical for maintaining electrolyte balance, removing waste products, and regulating blood pressure.

# Discussion

- Patients admitted to ICU - Already pretty ill
- Heart Failure - Result of wide range of problems
- Model Predicted a lot of FP (63)  - Wasted resources?
- Better than baseline - Better survival rate
- Understand what tests should be admitted first

# Challenges & Learnings

- Finding the right model and tuning the parameters
- Overfitted?
  - Random Forest (min_leaf=10, min_split=5, trees=50)
  - Train model score Recall  = 0.75
- Downsampling and understanding how it works
- Enjoyed working through the process