



STRATEGIC CHECKMATE

Predicting the Winner of Online Chess Games

Final Project: Data Bootcamp - Dominik Davidhi Chavez

THE CHALLENGE

Can we predict the outcome of a game before the first move is made?

PROJECT SCOPE & DATA

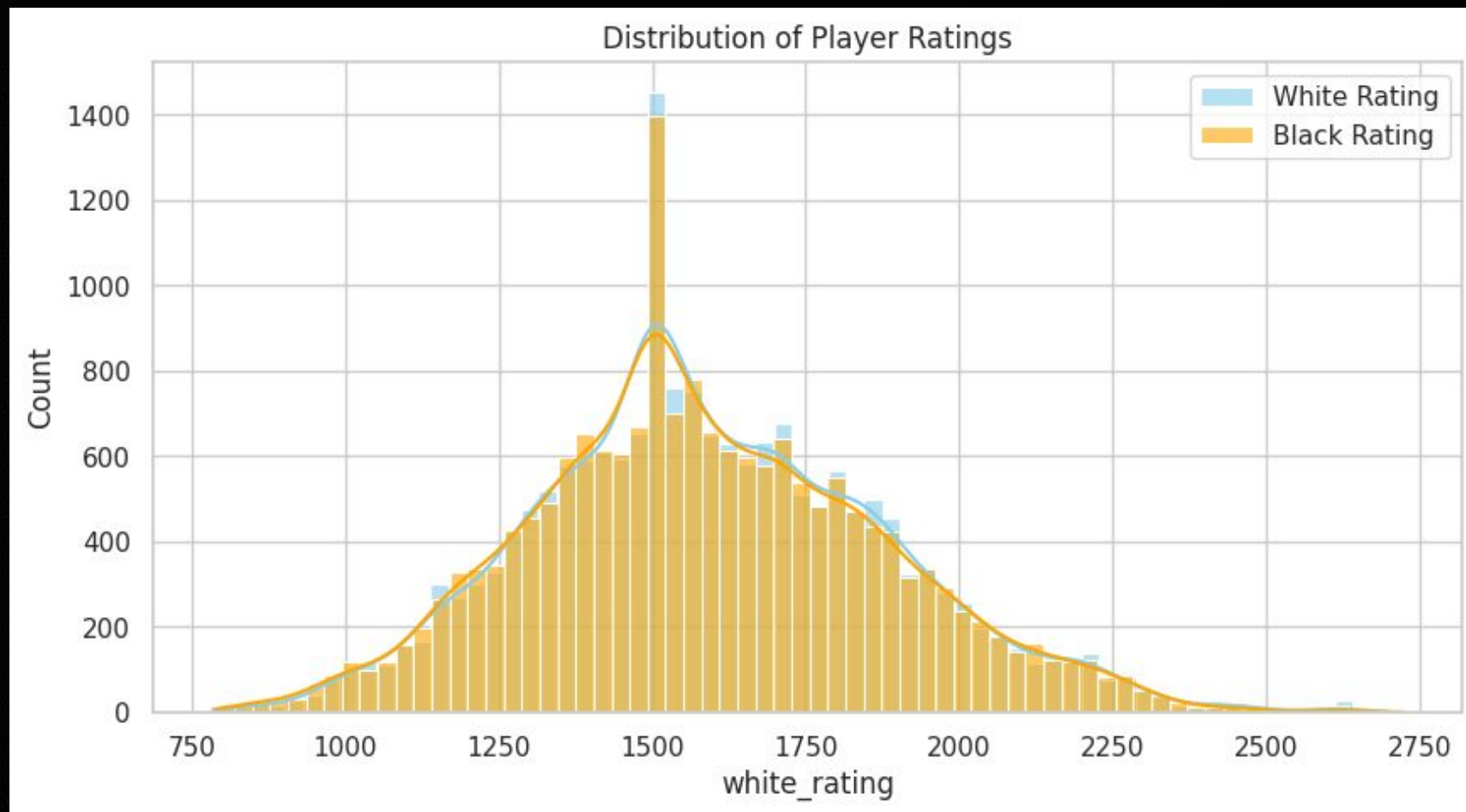
THE OBJECTIVE

Chess is a game of perfect information, but human performance is variable. The goal is to build a binary classification model (White vs. Black) to predict the winner based solely on pre-game attributes.

THE DATASET

Sourced from Lichess.org, the dataset contains over 20,000 matches. Key features include player ELO ratings, time controls, and game status. Draws were removed to focus on decisive outcomes.

WHO PLAYS?



Distribution of White vs Black ratings showing a normal distribution centered around 1500 ELO.

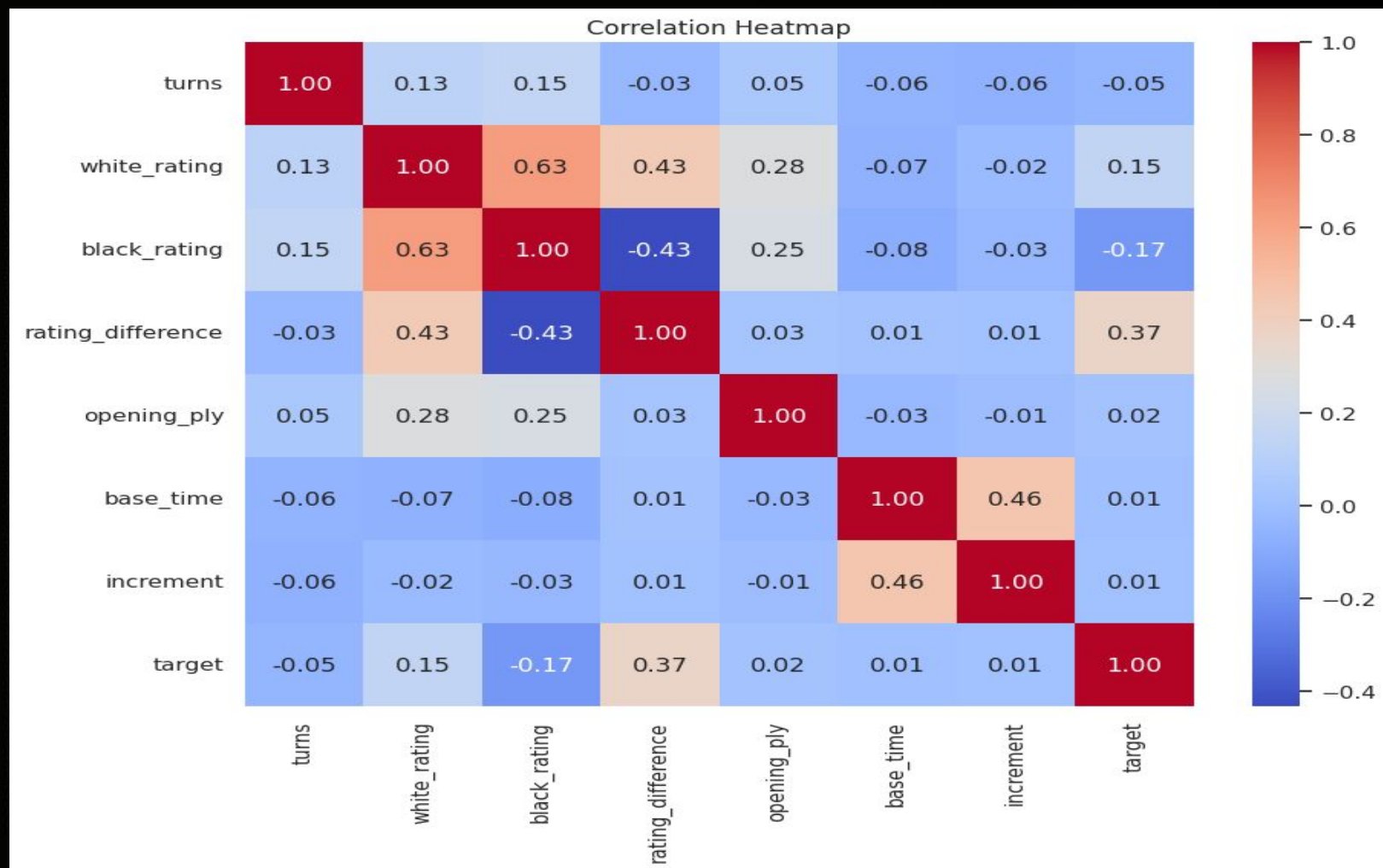
FEATURE ENGINEERING

Rating Difference: Calculated as (White Rating - Black Rating). This captures the relative skill gap rather than just absolute strength.

Time Controls: Parsed complex codes (e.g., "15+2") into base minutes and increment seconds to analyze the impact of speed.

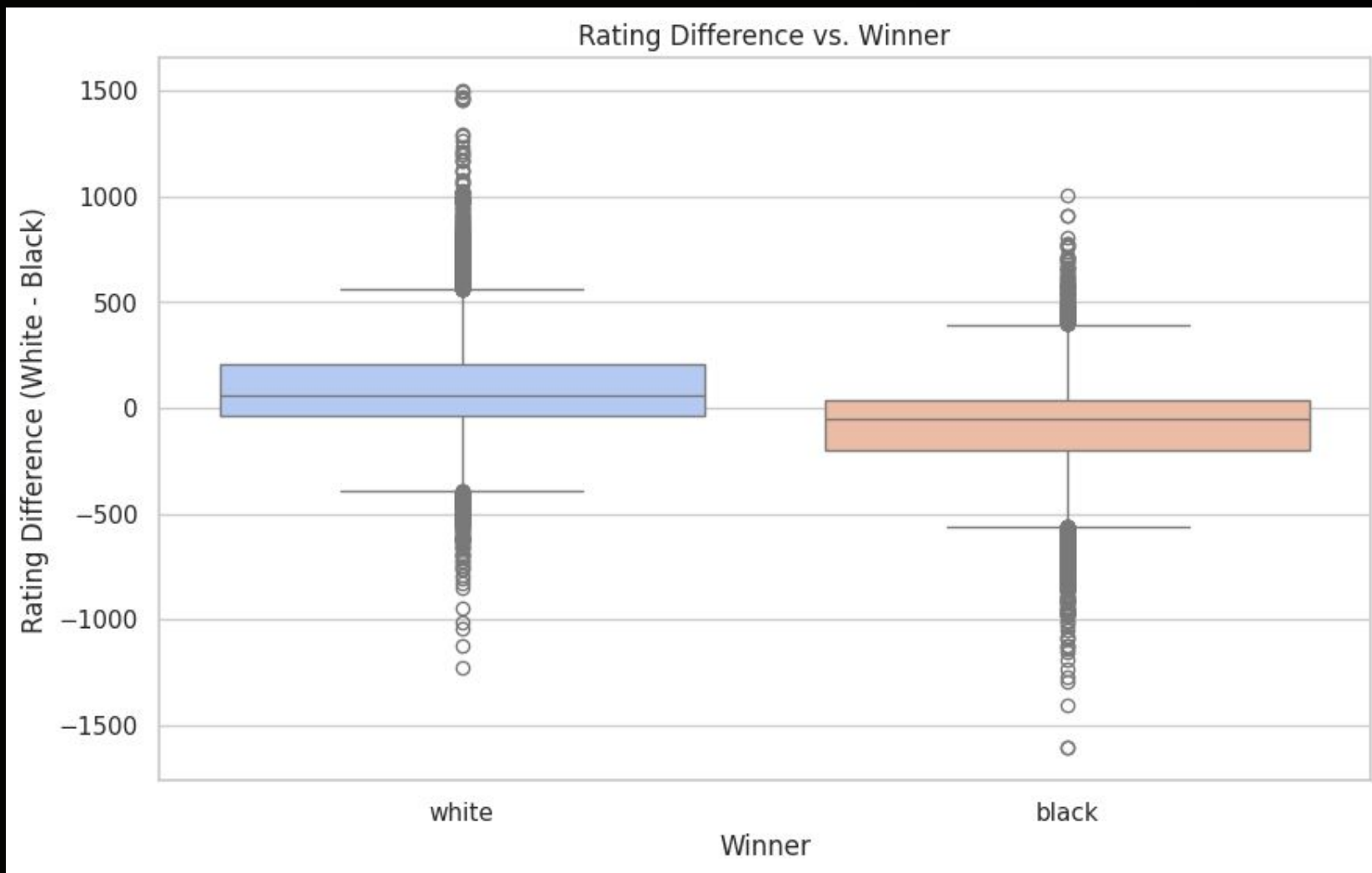


DATA CORRELATIONS



Heatmap revealing that 'Rating Difference' has the strongest positive correlation with the Target (Winner).

THE WINNING FACTOR



Clear separation showing that when the Rating Difference is positive (White is stronger), White wins significantly more often.

MODELING PIPELINE



PREPROCESSING

Draws were removed. Features scaled.



BASELINE

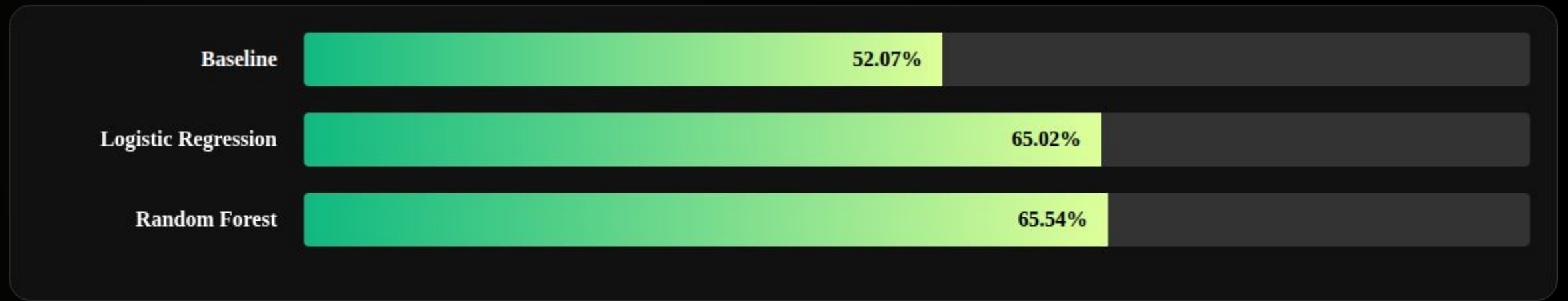
Dummy Classifier (Most Frequent):
52% Accuracy.



ALGORITHMS

Logistic Regression vs. Random
Forest.

MODEL PERFORMANCE



Random Forest marginally outperformed Logistic Regression.

| KEY METRICS

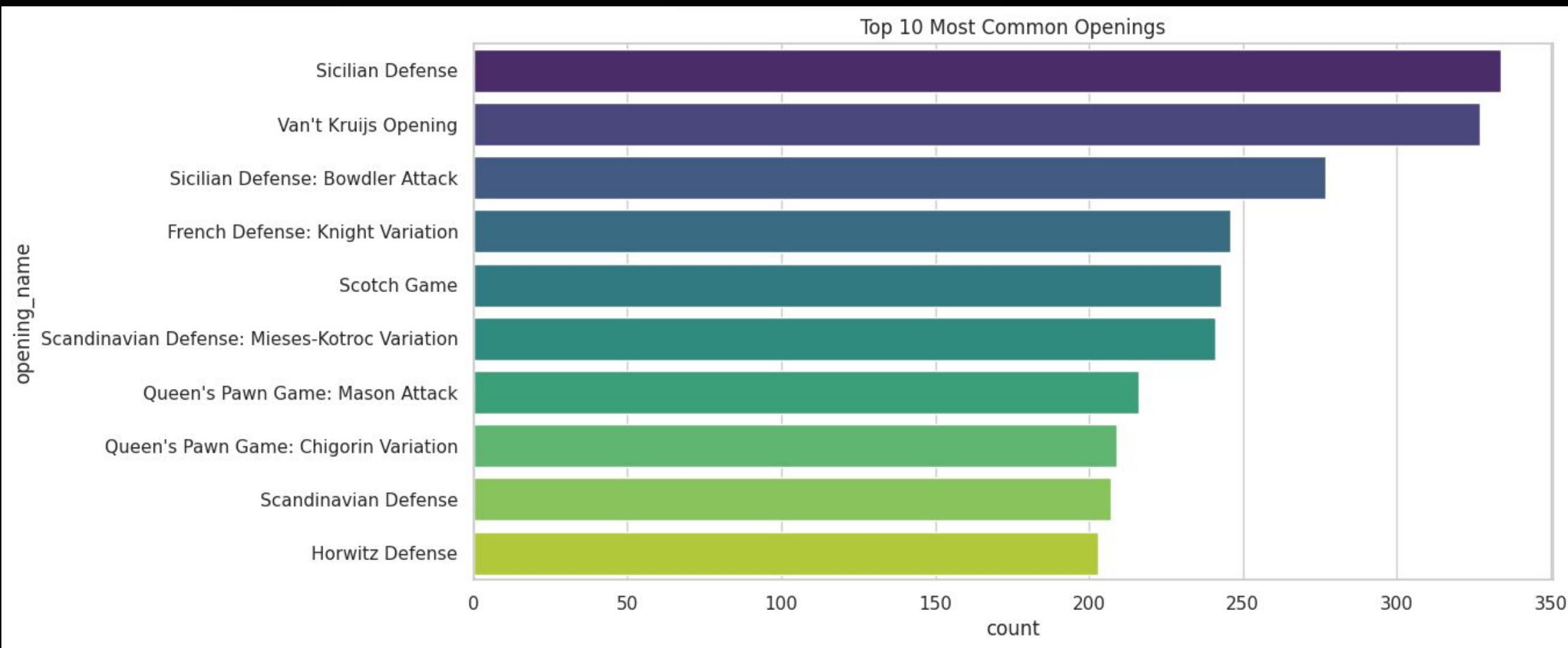
65.5%

Accuracy

+13%

Lift vs Baseline

OPENING THEORY



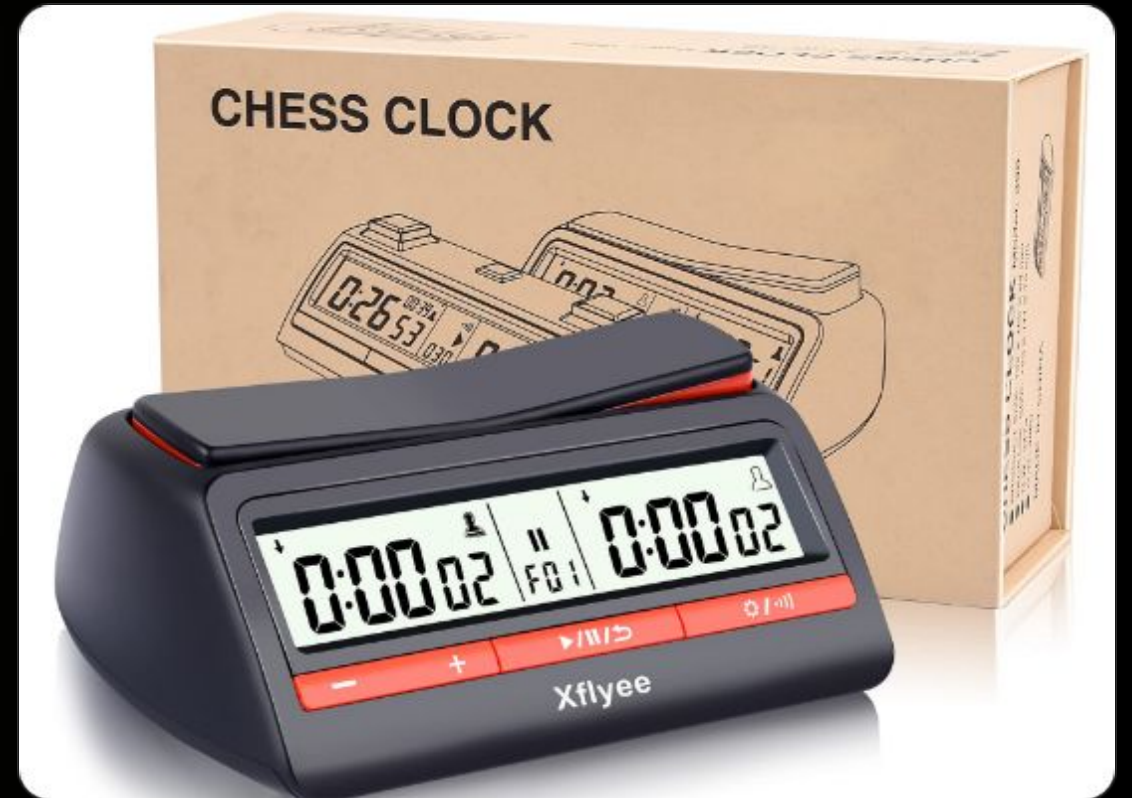
The Sicilian Defense and Van't Kruijs Opening are the most frequent starts.

FUTURE MOVES

DEEPENING THE ANALYSIS

To improve accuracy beyond 65%, future iterations will focus on:

- **Opening Theory:** One-hot encoding specific opening names.
- **Move Analysis:** Incorporating the first 10 moves.
- **Time Pressure:** Analyzing blunder rates in low-time situations.



THANK YOU

Questions?