



UFC Prediction

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Project Overview

The purpose of this project is to create a model to predict the outcome of UFC (Ultimate Fighting Championship) events.

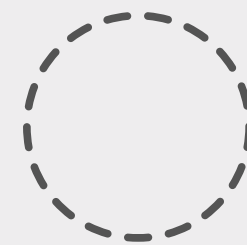
The UFC was created in 1993 with the expressed purpose of identifying the most effective martial art(s). This project is an extension of my curiosity into the original purpose of the UFC; what makes an effective martial artist, relative to an opponent?



Product Overview

The final product is a web or phone application that can predict the winner of a UFC match. Further, the product can show the viewer **WHY** one martial artist may win over another martial artist, by reviewing the respective fighters' most important features, according to the final model.

This product could be used by coaches, trainers, athletes and analysts to deduce how a match is likely to play out. For athletes or coach, they may be able to utilize the product to increase their chances of victory.



The Data

- Data Description

The data includes over 8,000 fights and over 450 features, and was web-scraped from the following sources:

- Ufc.com
- UfcStats.com
- BestFightOdds.com

- Target Variable

If a fighter won their respective fight.

- Scoring Metric

Overall accuracy is the scoring metric.





UFC Explained



01

02

03



UFC matches are set up in a manner similar to boxing, but with only three to five rounds scheduled.

Typical skill sets can include: Wrestling, Boxing, Kickboxing, Jiu-jitsu, Sambo, Judo, Muay Thai, Karate, as well as others.

Like boxing, a fight can end by TKO (technical knock out) or by judges' scorecards after the scheduled rounds. Unlike boxing, there are also submissions (when one fighter "taps out" or gives up).



Modeling Overview

Vanilla Models Utilized

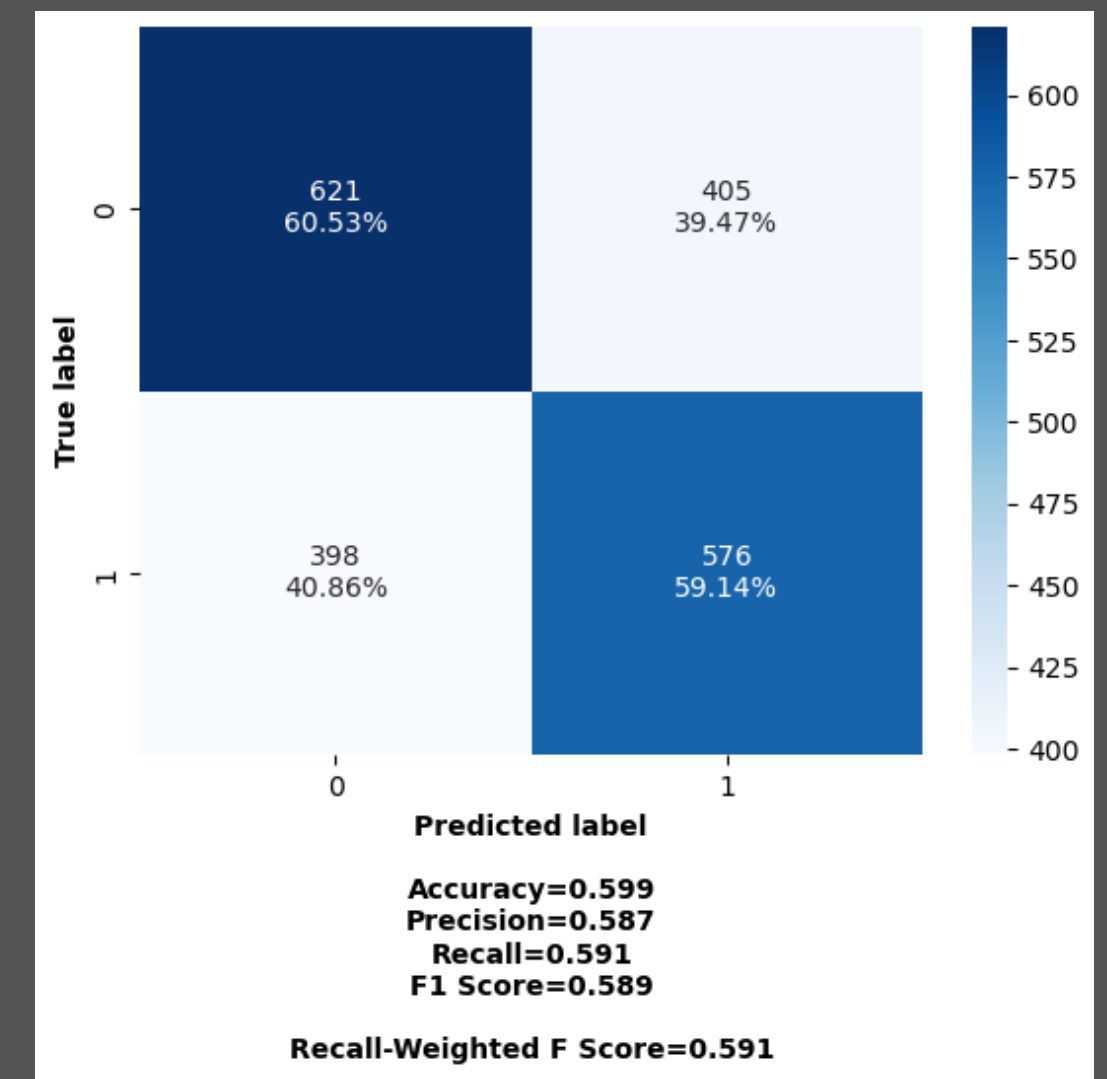
- Logistic Regression
- Random Forest
- Decision Tree
- Bagged Trees
- Extra Trees
- K Neighbors
- SVC
- XGBoost



Vanilla Model: Decision Tree



Vanilla Decision Tree
Accuracy: 60%





Initial Model Testing Results



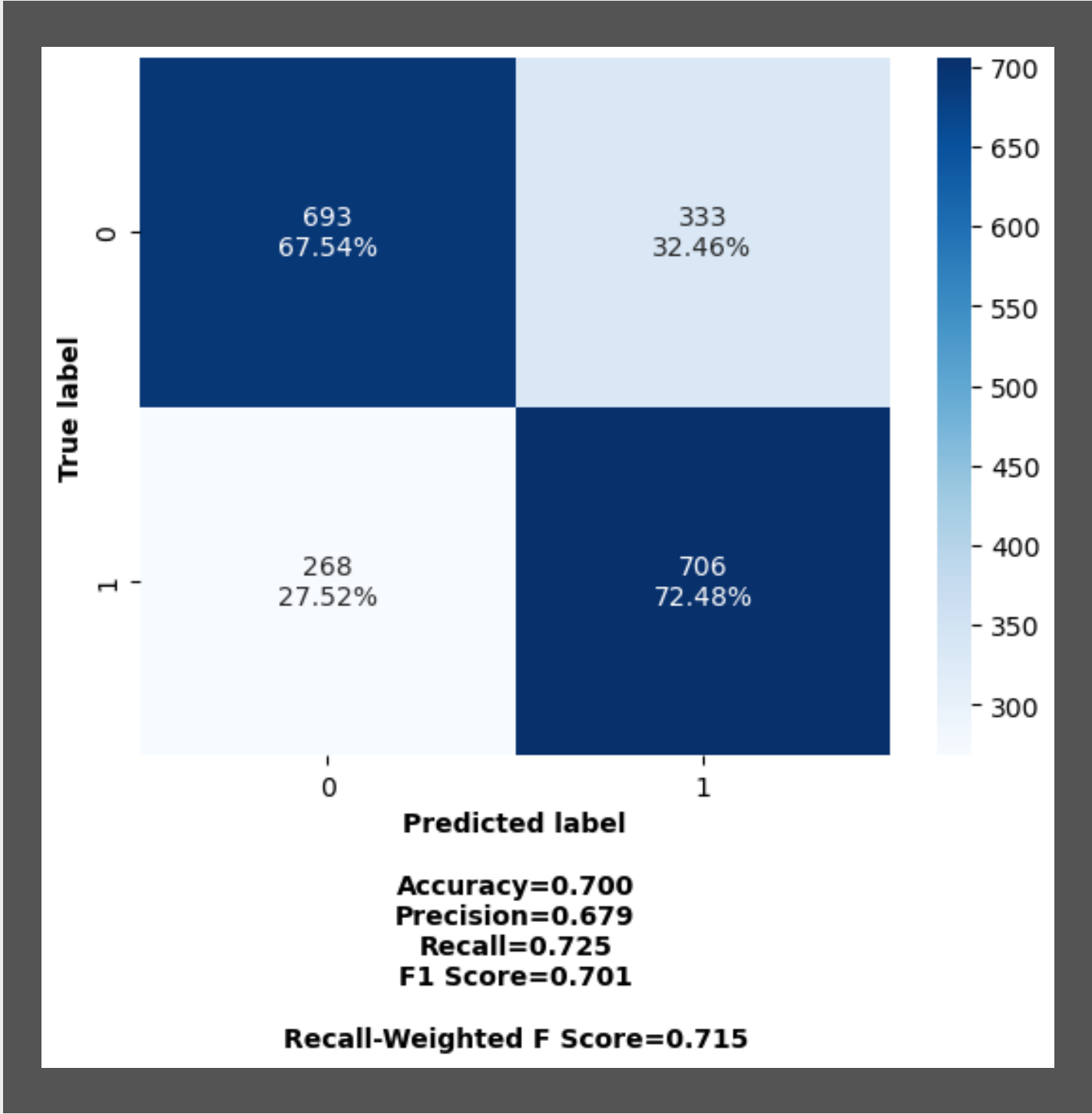
Model	Mean Accuracy	Standard Deviation
SVC	69.6%	0.8%
XGBoost	67.9%	0.8%
Random Forest	67.7%	0.1%
Extra Trees	67.3%	1.1%
Logistic Regression	66.8%	1.5%
Bagged Trees	65.3%	1.4%
Decision Tree	61.7%	0.6%

Final Model

Extra Trees Model

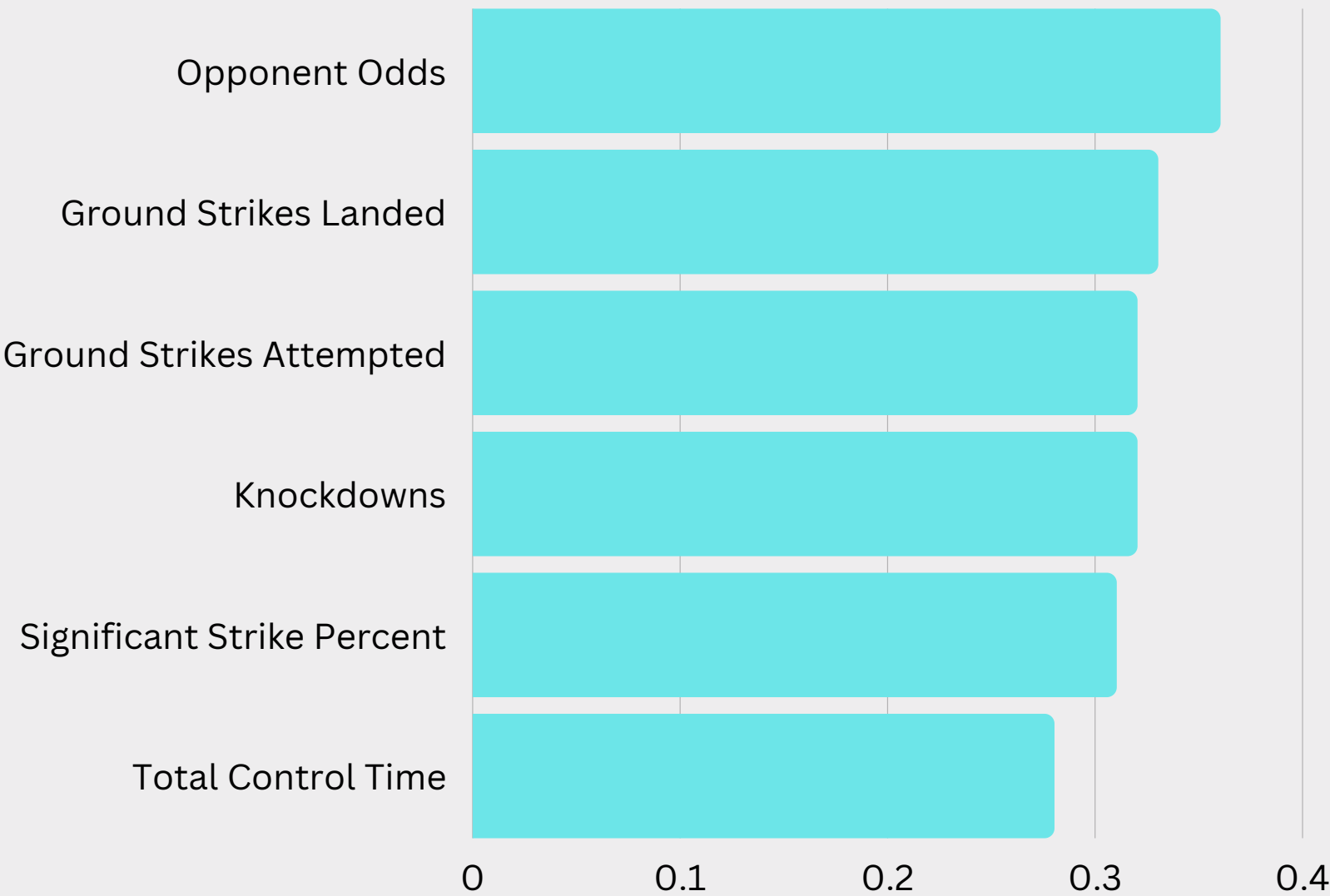


The final model achieved a 70.0% accuracy with a standard deviation of 0.03%, a 10% approximate improvement from the initial model.

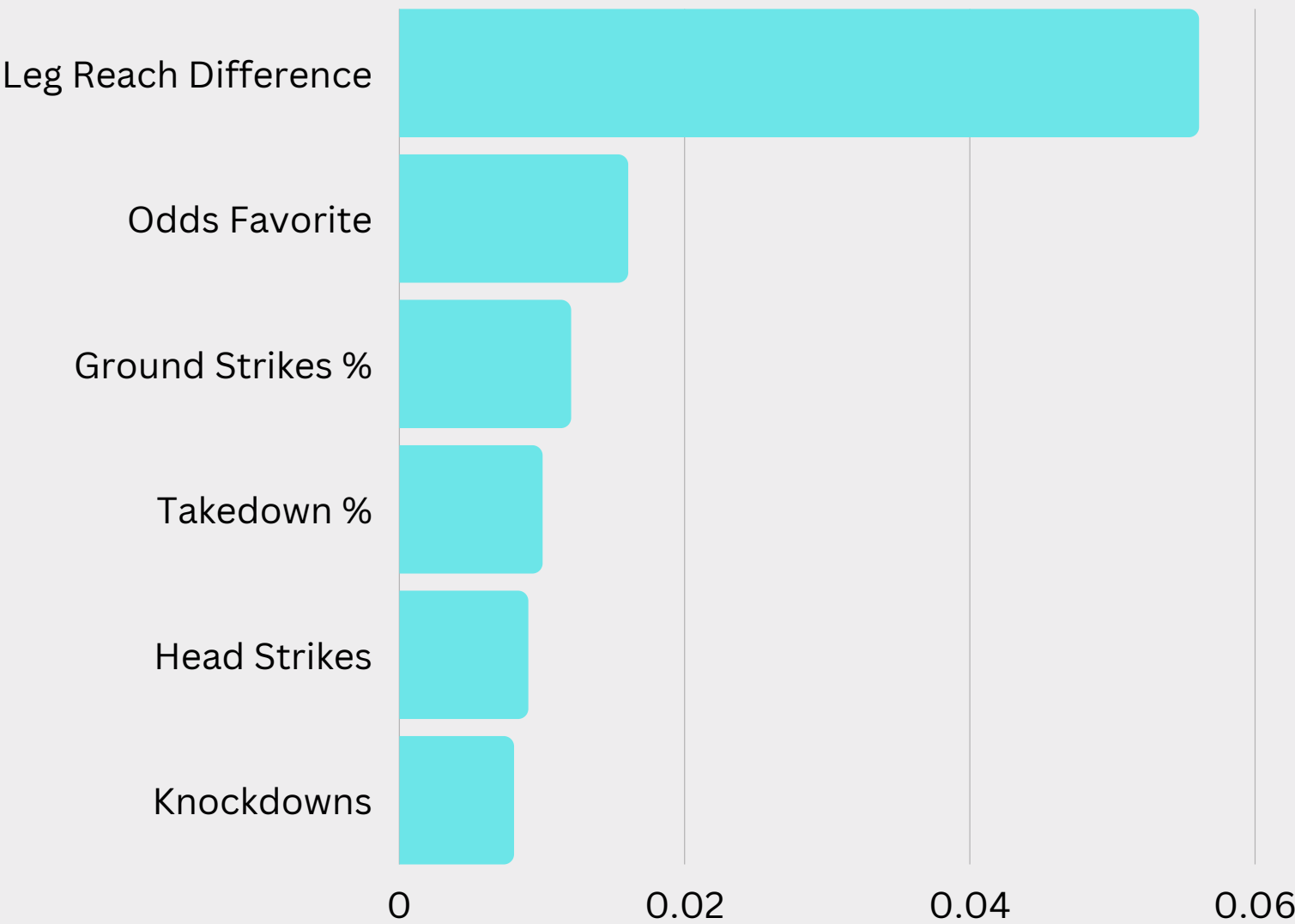


Important Features

Feature Correlations with Wins



Feature Importance








Conclusion



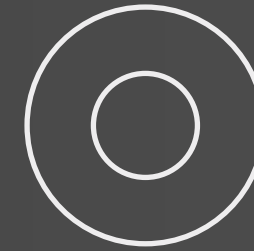
The final product, a web application that predicts UFC victories, utilizes a model which tested at 70% accuracy, an increase of approximately 10% versus the initial decision tree model.

This final product can:

- 1) **Predict the winning** martial artist,
 - 2) **Display odds** based on the final machine learning model, and
 - 3) **Depict the primary features** necessary for the model's calculation.
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THANK YOU



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