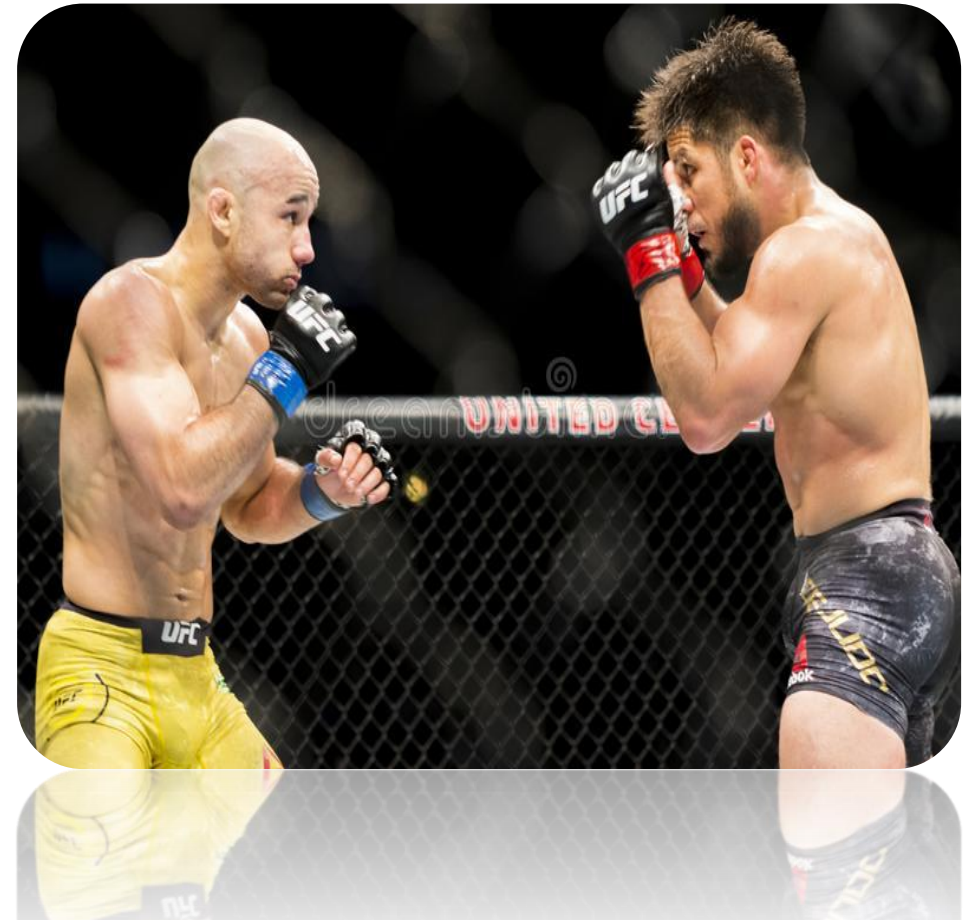# THE TALE OF THE TAPE:

CAN YOU MEASURE VICTORY?

BY DARIUS FULLER

PART-TIME COHORT 100719

TARGET & GOAL

- Investigating whether I can create a machine learning model to predict the outcome of a UFC fight.

- The ideal output will be a value representing the likelihood that either fighter will win.

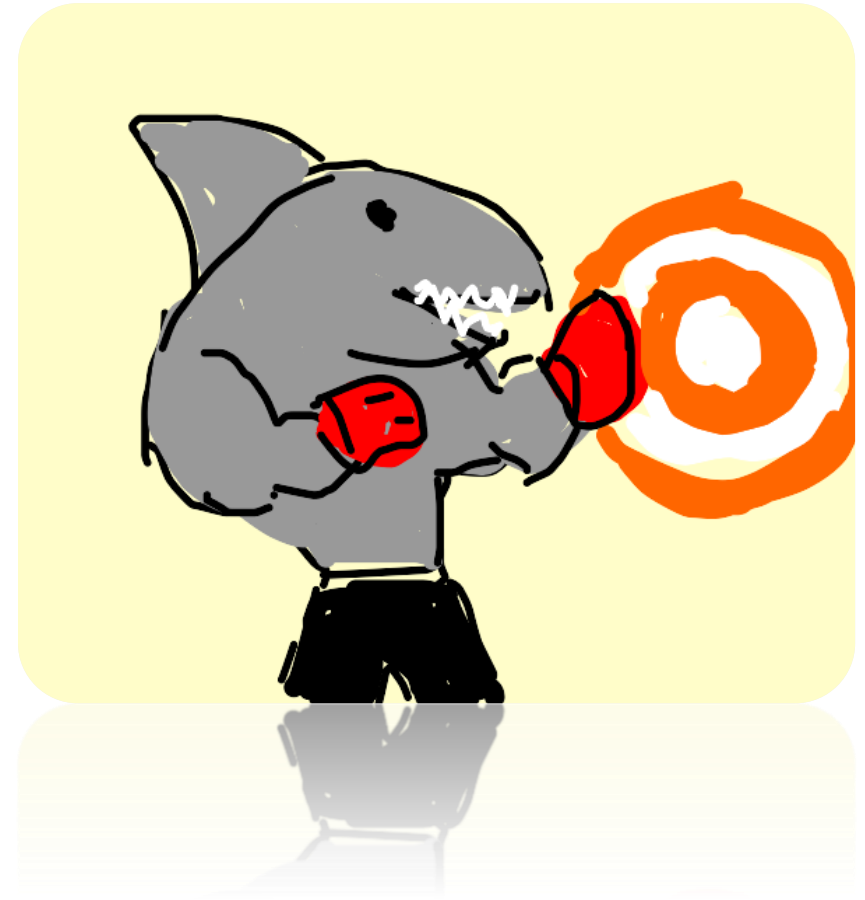- The goal is that the model perform better than random chance (50% accuracy)

THE DATASET

- The dataset I used in this project is found at: https://www.kaggle.com/rajeevw/ufcdata

- There are:
  - 145 features and over 5000 rows
  - Details from every UFC fight up until June of 2019

- There is information about:
  - Fighter's Win/Loss/Draw record prior to fight
  - Fighter's method of winning fights
  - Fighting stance and physical attributes
  - Pre-calculated averages covering:
    - Significant strikes
    - Submissions
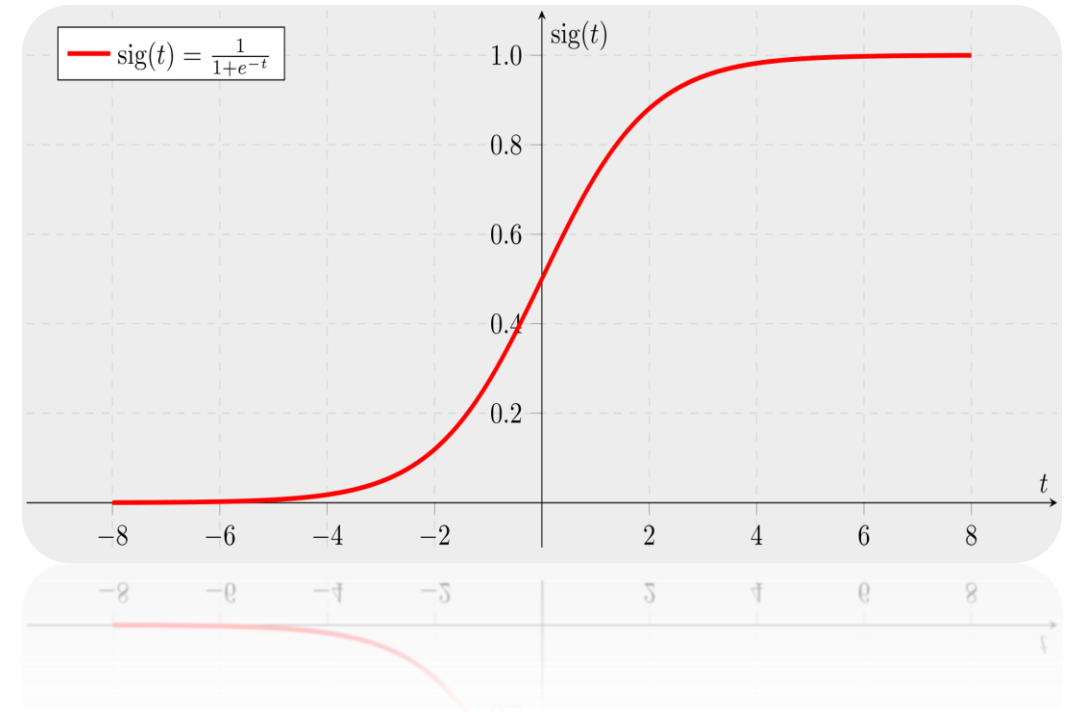   - 'Passing' on the ground
    - etc.

THE PROCESS - THE TARGET

- Creating the target
  - 3 possible results:
    - Draw
    - Win (Blue corner)
    - Win (Red corner)
- Can provide knowledge to:
  - Trainers / Fighters
  - Advertisers / TV Networks / Promoters
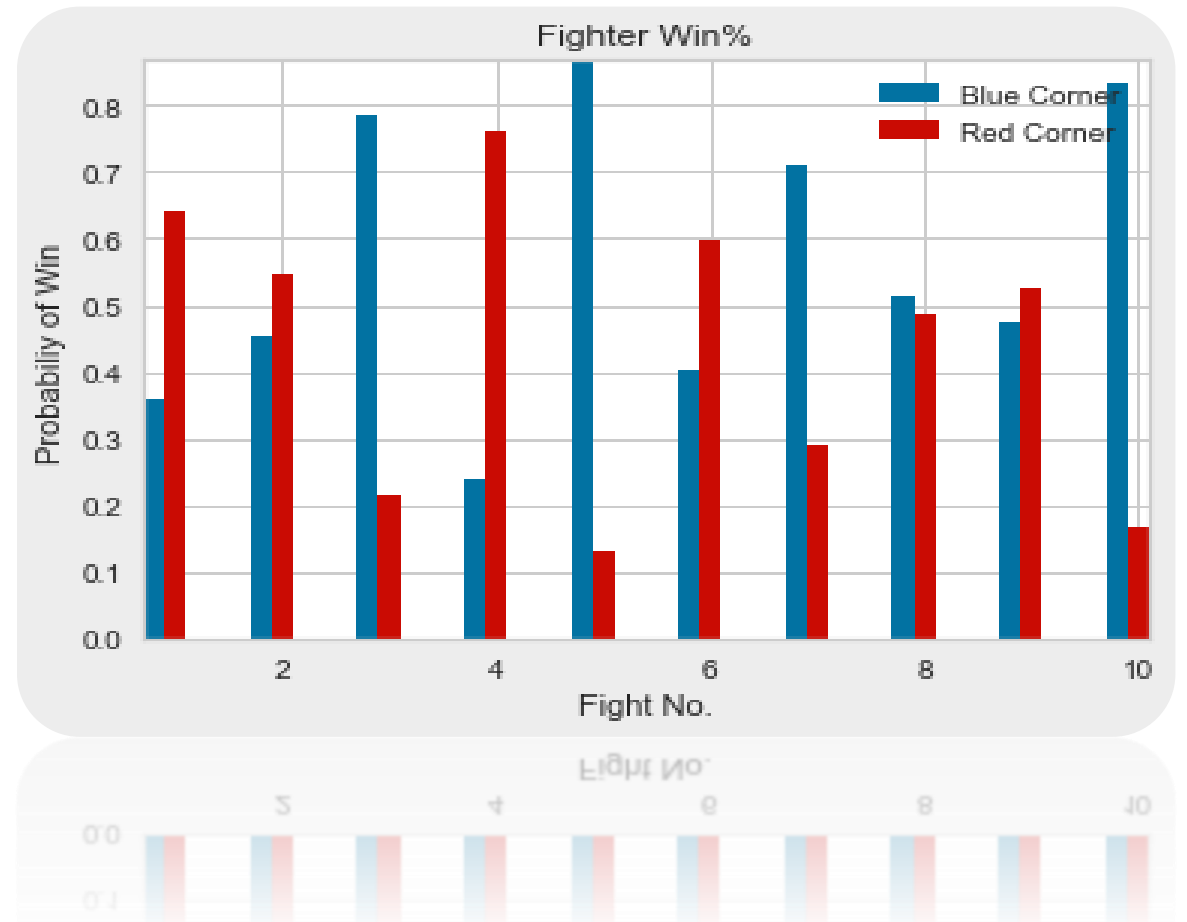 - Combat sports organizers (e.g. UFC)

THE PROCESS - MODELING

- What is a model?
  - An algorithm that "learns" and makes predictions
  - Tried seven different kinds during this process

- Logistic Regression model
  - Single value output
  - Each feature carries a "weight"

$$\text{sig}(t) = \frac{1}{1+e^{-t}}$$
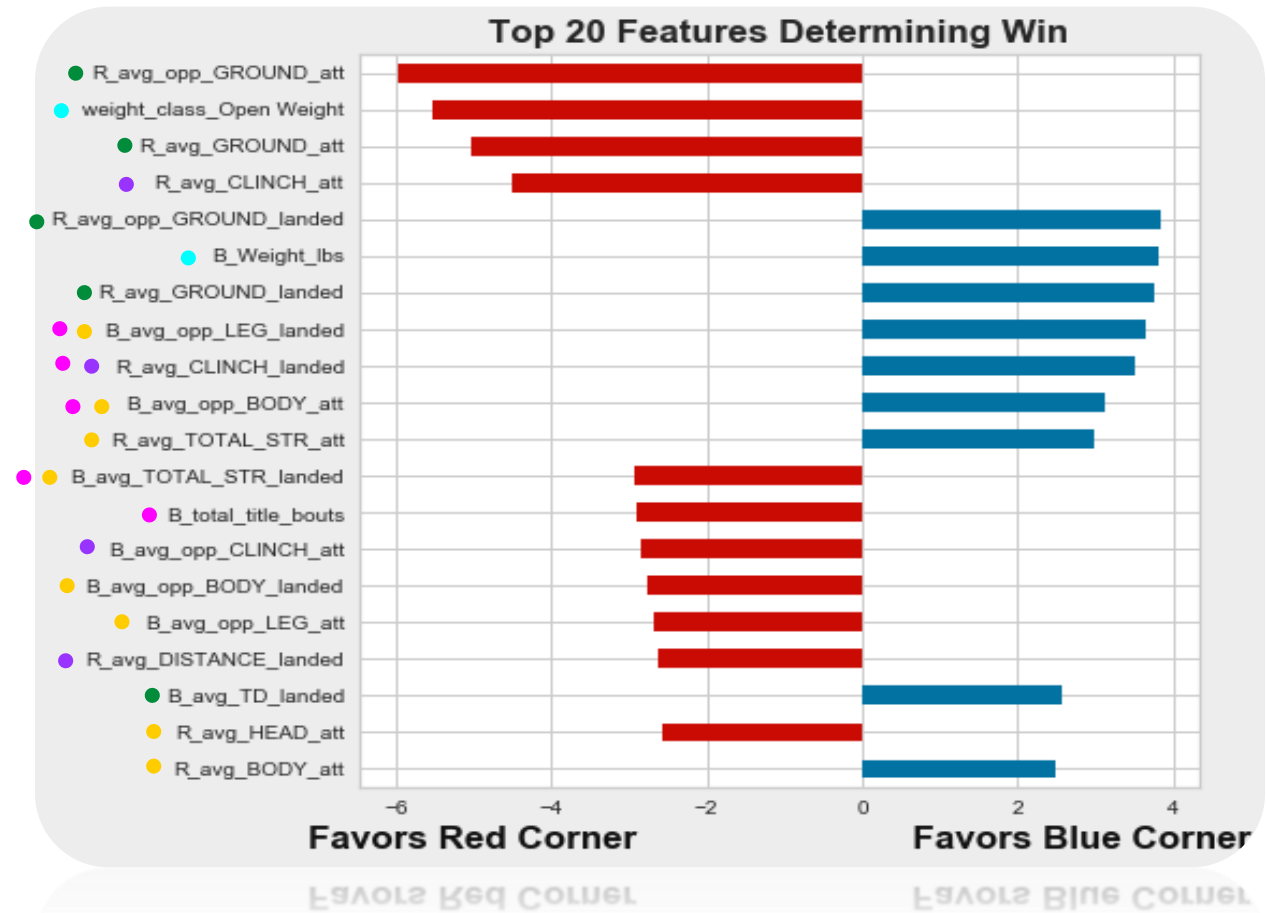
THE RESULTS

- The best model performed at 66% accuracy!

- Successful at producing probabilities for each fighter

THE RESULTS – WHAT MATTERS?

<u>Top 20 values taken from final model</u>

- Ground game is important! (green dots)

- Working the clinch/space control (purple dots)

- Diversify your striking plan (orange dots)

- Experience can help <u>or</u> hurt (pink dots)
    - Staying elusive and executing plan is key

- Physical dominance always helps (cyan dots)
    - Open weight fights allow for cross-weight bouts

Top 20 Features Determining Win

- R_avg_opp_GROUND_att
- weight_class_Open Weight
- R_avg_GROUND_att
- R_avg_CLINCH_att
- R_avg_opp_GROUND_landed
- B_Weight_lbs
- R_avg_GROUND_landed
- B_avg_opp_LEG_landed
- R_avg_CLINCH_landed
- B_avg_opp_BODY_att
- R_avg_TOTAL_STR_att
- B_avg_TOTAL_STR_landed
- B_total_title_bouts
- B_avg_opp_CLINCH_att
- B_avg_opp_BODY_landed
- B_avg_opp_LEG_att
- R_avg_DISTANCE_landed
- B_avg_TD_landed
- R_avg_HEAD_att
- R_avg_BODY_att

Favors Red Corner   **Favors Blue Corner**

RECOMMENDATIONS

- Given my results, I recommend using the model to show probabilities primarily

- Show before a fight along with basic info for fighters

- Never ignore the ground game or the clinch, maintaining control of spacing is crucial
  - No evidence of a "one trick pony"

- Regulating weight classes is important to keeping fights competitive

FUTURE WORK(S)

- More time working preprocessing
  - Find out how helpful AVGs are in prediction
  - Create a feature for 1st time UFC fighters
  - Find other metrics to add-in

- Model tuning
  - Take time to combine more than one model (ensemble)
  - Play with model parameters longer

THANK YOU!