

Predicting UFC Fight Results

2023-12-11

Introduction

The UFC began as a professional mixed martial arts organization in 1993 serving as an alternative hand-to-hand combat sport that combined traditional boxing with wrestling, karate, kickboxing, and jiu-jitsu fighting techniques. The entity was acquired by a group led by Dana White in 2001, who has served as the President for over two decades. Since establishing control, Dana White has exponentially grown the reach of UFC's product while also creating more structure and sanction to the sport of MMA. UFC currently has over 60 global broadcasting partners and is able to be accessed in over 165 different countries. With a traveling, tour-like model, the UFC has been able to sell-out many arenas across the world as equally become a highly-touted event to attend similar to boxing matches with well-known participants involved.

In many other North-american based sports, organizations have invested and founded their own analytics departments. These departments are responsible for using data to acquire and develop the right talent that will lead to on-field success and improve the team's product. Since the UFC's participants are individual fighters that often follow their own training regiment, there is a smaller focus on analytics within the sport.

The purpose of our project is two-fold. We want to evaluate fighters' historical data to determine fight styles that may possess a stronger correlation to success within the octagon. Identifying important factors will allow UFC fighters and their hired trainers to optimize their training regime, and will also benefit commentators in pointing out facets of the match the audience should keep in mind while spectating.

Additionally, we want to create a model that maximizes predictive accuracy for the purposes of assisting sports bettors in finding potential opportunities for value not seen by the public. Dana White and the UFC have fully embraced the recent popularity of sports betting, forming sponsorships with companies such as bet365 in the UK, DraftKings in the US, as well as many others located worldwide. There is an established market for sports betting in the UFC, and we hope to create a model that provides an estimation of a winner between two fighters along with some form of uncertainty that allows a sports-better to determine if the predicted odds over or under-estimate a fighter's chance of winning compared to the sportsbook odds given to the public.

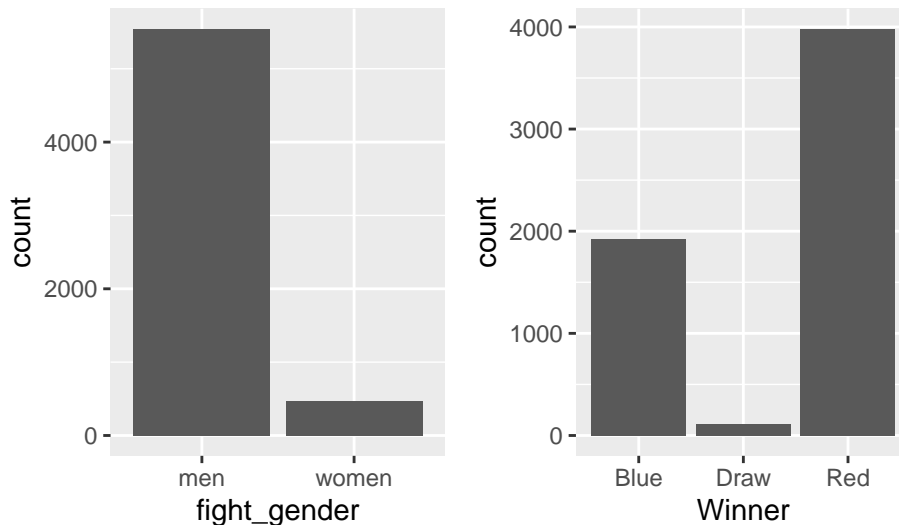
Our data is each UFC fight from 1994-2021, containing each fighter's names, physical information (age, height, weight), the amount of wins and losses in their UFC history, and various fighting data. The fighting data includes the average amount of attempted and landed attacks over their UFC career, as well as the amount of different types of attacks they have faced from their previous opponents. We plan to initially fit an elastic net model that incorporates the standardization of a ridge regression model, and the variable selection of a lasso regression model, to determine which predictors in our dataset are most influential. Our response variable will be the winner in each fight, with that value randomized dependent on the color of the corner assigned during the fight (red or blue). The elastic net model will be best served for UFC commentators and trainers interested in how prior fighting strategies can lead to success in the future. From there, we plan to evaluate the inclusion of nonlinear effects within the most influential predictors in hopes to maximize predictive accuracy.

Data Description and EDA

The dataset used for modeling was initially sourced from ufcstats.com, where the data was processed and published on kaggle.com. The dataset contains roughly 6,012 unique fights over a 27 year span, with each

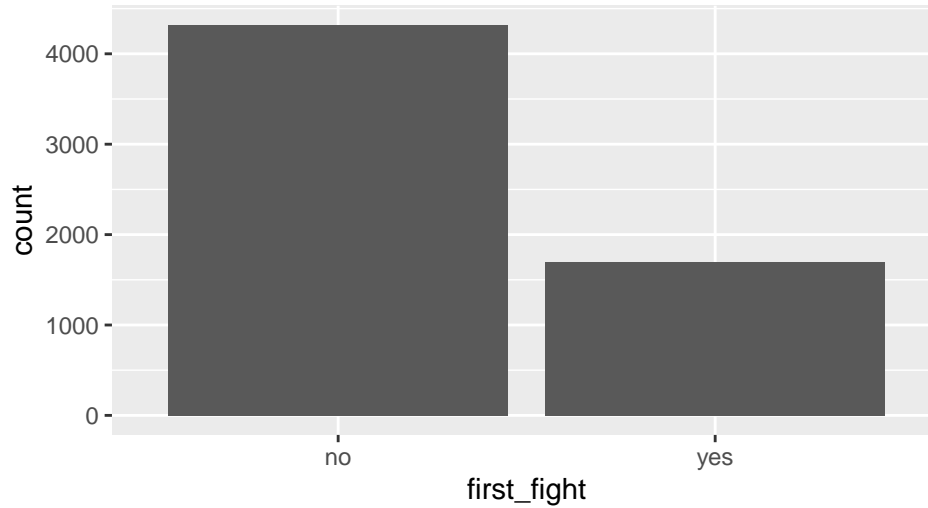
row containing data on fighters in the red and blue corner, a universal classification system used throughout all rows. The corner classification is the differentiating factor in providing each fighter's historical statistics. Since a given fighter could be in the red corner for one fight and in the blue corner for another, we don't place any value in the classification.

```
##
## Blue Draw Red
## 1923 110 3979
```



The plots above provide a better idea on the breakdown of the amount of male and female fights in UFC's history, as well as the results based on which corner was victorious. Similar to men's and women's lacrosse or men's and women's soccer, we believe that men's and women's UFC fights should be considered different sports given the difference in fighting style. Men's MMA is centered around wrestling, while women's MMA is centered around jiu-jitsu and judo with a strong preference for striking than grappling seen more commonly on the men's side. Since roughly 92% of the data are men's UFC fights, we will remove the observations in which the two fighters are female. The right plot above reveals that about 2/3 of fights with a winner are assigned to the red corner. Since the corners are simply a classifier and we are concerned that our models will be biased towards the red corner, we will randomize the fighters within each fight and reassign their corresponding statistics if necessary.

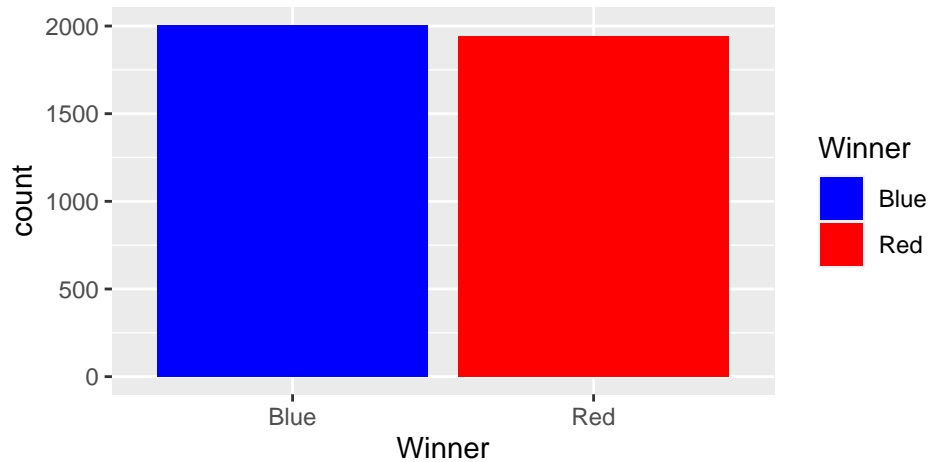
Calculating Instances of a Fighter's 1st Fight



Another limitation within our data is that for a fighter's first career UFC fight, they have no historical data and thus their respective columns are N/A in our dataset. Since our modeling techniques require clean data without missing data, we will need to remove instances of a fighter's first fight.

New Distribution of Blue & Red Winners

After Randomization of Classification

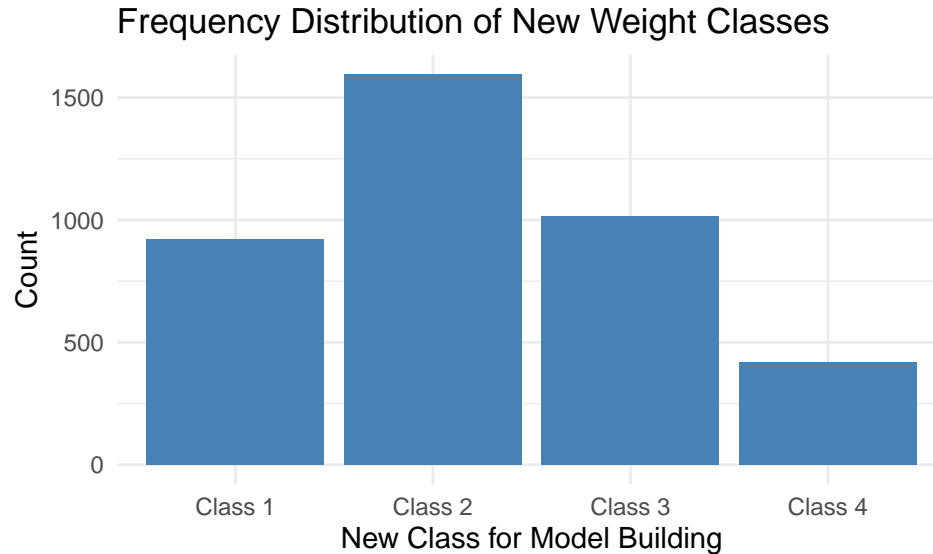


After shuffling the data, we see a much more even distribution of fight winners between the red and blue corner. Similar to comparing the difference between men's and women's MMA, we believe the fighting styles begin to differ as fighters increase in weight class. Therefore, rather than creating nine different models for each class, we will group weight classes together as seen below:

Table 1: Frequency of Weight Class Fights

new_class	weight_class	max_weight	count
Class 1	Flyweight	125	175
Class 1	Bantamweight	135	339
Class 1	Featherweight	145	408
Class 2	Lightweight	155	797

new_class	weight_class	max_weight	count
Class 2	Welterweight	170	797
Class 3	Middleweight	185	590
Class 3	LightHeavyweight	205	424
Class 4	Heavyweight	265	389
Class 4	OpenWeight	300	29



The plot above displays the new distribution of observations by the new weight classes. While we were unable to create a completely even split of observations, we believe we have enough fights within each weight class to proceed in fitting four models for each new subset. The table below shows the average attempts of different types of strikes for one classification of the fighters. We see that numbers tend to decrease for standing strikes such as the head, body, and leg as the weight class increases. This could be because heavier fighters prefer to spend more of the fight wrestling on the floor, or heavier fights typically lasting less time, with such cases not mutually exclusive.

Table 2: Avg Attempt of Different Style Attacks

new_class	Rmean_head	Rmean_body	Rmean_leg	Rmean_clinch	Rmean_ground	Rmean_ctrltime
Class 1	73.3	12.3	8.0	7.4	8.1	139.6
Class 2	62.2	10.0	7.0	7.7	8.6	153.6
Class 3	52.3	8.2	6.0	8.2	9.2	141.7
Class 4	45.0	6.5	5.1	7.4	8.5	102.5

Inference EDA/make model

Removing Columns that will provide no meaning to our models

```
## # A tibble: 1 x 2
##   R_draw count
##   <dbl> <int>
## 1      0 3948
```

```
## # A tibble: 1 x 2
##   B_draw count
##   <dbl> <int>
## 1      0  3948
```

No draws. Going to remove this as well.

checking for NA values

```
## [1] TRUE
```

```
## [1] 507
```

```
##           Winner           title_bout
##           0           0
##           B_avg_KD           B_avg_opp_KD
##           0           0
##           B_avg_SIG_STR_pct           B_avg_opp_SIG_STR_pct
##           0           0
##           B_avg_TD_pct           B_avg_opp_TD_pct
##           0           0
##           B_avg_SUB_ATT           B_avg_opp_SUB_ATT
##           0           0
##           B_avg_REV           B_avg_opp_REV
##           0           0
##           B_avg_SIG_STR_att           B_avg_SIG_STR_landed
##           0           0
##           B_avg_opp_SIG_STR_att           B_avg_opp_SIG_STR_landed
##           0           0
##           B_avg_TOTAL_STR_att           B_avg_TOTAL_STR_landed
##           0           0
##           B_avg_opp_TOTAL_STR_att           B_avg_opp_TOTAL_STR_landed
##           0           0
##           B_avg_TD_att           B_avg_TD_landed
##           0           0
##           B_avg_opp_TD_att           B_avg_opp_TD_landed
##           0           0
##           B_avg_HEAD_att           B_avg_HEAD_landed
##           0           0
##           B_avg_opp_HEAD_att           B_avg_opp_HEAD_landed
##           0           0
##           B_avg_BODY_att           B_avg_BODY_landed
##           0           0
##           B_avg_opp_BODY_att           B_avg_opp_BODY_landed
##           0           0
##           B_avg_LEG_att           B_avg_LEG_landed
##           0           0
##           B_avg_opp_LEG_att           B_avg_opp_LEG_landed
##           0           0
##           B_avg_DISTANCE_att           B_avg_DISTANCE_landed
##           0           0
##           B_avg_opp_DISTANCE_att           B_avg_opp_DISTANCE_landed
```

##	0	0
##	B_avg_CLINCH_att	B_avg_CLINCH_landed
##	0	0
##	B_avg_opp_CLINCH_att	B_avg_opp_CLINCH_landed
##	0	0
##	B_avg_GROUND_att	B_avg_GROUND_landed
##	0	0
##	B_avg_opp_GROUND_att	B_avg_opp_GROUND_landed
##	0	0
##	B_avg_CTRL_time.seconds.	B_avg_opp_CTRL_time.seconds.
##	0	0
##	B_total_time_fought.seconds.	B_total_rounds_fought
##	0	0
##	B_total_title_bouts	B_current_win_streak
##	0	0
##	B_current_lose_streak	B_longest_win_streak
##	0	0
##	B_wins	B_losses
##	0	0
##	B_win_by_Decision_Majority	B_win_by_Decision_Split
##	0	0
##	B_win_by_Decision_Unanimous	B_win_by_KO.TKO
##	0	0
##	B_win_by_Submission	B_win_by_TKO_Doctor_Stoppage
##	0	0
##	B_Stance	B_Height_cms
##	5	0
##	B_Reach_cms	B_Weight_lbs
##	216	0
##	R_avg_KD	R_avg_opp_KD
##	0	0
##	R_avg_SIG_STR_pct	R_avg_opp_SIG_STR_pct
##	0	0
##	R_avg_TD_pct	R_avg_opp_TD_pct
##	0	0
##	R_avg_SUB_ATT	R_avg_opp_SUB_ATT
##	0	0
##	R_avg_REV	R_avg_opp_REV
##	0	0
##	R_avg_SIG_STR_att	R_avg_SIG_STR_landed
##	0	0
##	R_avg_opp_SIG_STR_att	R_avg_opp_SIG_STR_landed
##	0	0
##	R_avg_TOTAL_STR_att	R_avg_TOTAL_STR_landed
##	0	0
##	R_avg_opp_TOTAL_STR_att	R_avg_opp_TOTAL_STR_landed
##	0	0
##	R_avg_TD_att	R_avg_TD_landed
##	0	0
##	R_avg_opp_TD_att	R_avg_opp_TD_landed
##	0	0
##	R_avg_HEAD_att	R_avg_HEAD_landed
##	0	0
##	R_avg_opp_HEAD_att	R_avg_opp_HEAD_landed

```

##          0          0
##      R_avg_BODY_att      R_avg_BODY_landed
##          0          0
##      R_avg_opp_BODY_att      R_avg_opp_BODY_landed
##          0          0
##      R_avg_LEG_att      R_avg_LEG_landed
##          0          0
##      R_avg_opp_LEG_att      R_avg_opp_LEG_landed
##          0          0
##      R_avg_DISTANCE_att      R_avg_DISTANCE_landed
##          0          0
##      R_avg_opp_DISTANCE_att      R_avg_opp_DISTANCE_landed
##          0          0
##      R_avg_CLINCH_att      R_avg_CLINCH_landed
##          0          0
##      R_avg_opp_CLINCH_att      R_avg_opp_CLINCH_landed
##          0          0
##      R_avg_GROUND_att      R_avg_GROUND_landed
##          0          0
##      R_avg_opp_GROUND_att      R_avg_opp_GROUND_landed
##          0          0
##      R_avg_CTRL_time.seconds. R_avg_opp_CTRL_time.seconds.
##          0          0
## R_total_time_fought.seconds.      R_total_rounds_fought
##          0          0
##      R_total_title_bouts      R_current_win_streak
##          0          0
##      R_current_lose_streak      R_longest_win_streak
##          0          0
##          R_wins      R_losses
##          0          0
##      R_win_by_Decision_Majority      R_win_by_Decision_Split
##          0          0
##      R_win_by_Decision_Unanimous      R_win_by_KO.TKO
##          0          0
##      R_win_by_Submission R_win_by_TKO_Doctor_Stoppage
##          0          0
##          R_Stance      R_Height_cms
##          8          1
##      R_Reach_cms      R_Weight_lbs
##          220          0
##          B_age      R_age
##          34          23
##      new_class
##          0

```

removing all rows with NA values

```
## [1] 3948
```

```
## [1] 3577
```

```
## [1] 371
```

creating 4 different dataframes, dividing up by our weight class division

```
## [1] 875
```

```
## [1] 1458
```

```
## [1] 927
```

```
## [1] 317
```

```
#check multicollinearity
```

##	Var1	Var2	Correlation
## 1	B_avg_SIG_STR_att	B_avg_SIG_STR_landed	0.9118933
## 2	B_avg_SIG_STR_att	B_avg_opp_SIG_STR_att	0.8115190
## 3	B_avg_SIG_STR_att	B_avg_opp_SIG_STR_landed	0.7130943
## 4	B_avg_SIG_STR_att	B_avg_TOTAL_STR_att	0.9313087
## 5	B_avg_SIG_STR_att	B_avg_opp_TOTAL_STR_att	0.7381866
## 6	B_avg_SIG_STR_att	B_avg_HEAD_att	0.9793568
## 7	B_avg_SIG_STR_att	B_avg_HEAD_landed	0.8664199
## 8	B_avg_SIG_STR_att	B_avg_opp_HEAD_att	0.7954509
## 9	B_avg_SIG_STR_att	B_avg_BODY_att	0.7120165
## 10	B_avg_SIG_STR_att	B_avg_DISTANCE_att	0.9728178
## 11	B_avg_SIG_STR_att	B_avg_DISTANCE_landed	0.9151053
## 12	B_avg_SIG_STR_att	B_avg_opp_DISTANCE_att	0.8343294
## 13	B_avg_SIG_STR_att	B_avg_opp_DISTANCE_landed	0.7843885
## 14	B_avg_SIG_STR_landed	B_avg_opp_SIG_STR_att	0.7073931
## 15	B_avg_SIG_STR_landed	B_avg_TOTAL_STR_att	0.8813982
## 16	B_avg_SIG_STR_landed	B_avg_TOTAL_STR_landed	0.7970326
## 17	B_avg_SIG_STR_landed	B_avg_HEAD_att	0.8599064
## 18	B_avg_SIG_STR_landed	B_avg_HEAD_landed	0.9310995
## 19	B_avg_SIG_STR_landed	B_avg_BODY_att	0.7659969
## 20	B_avg_SIG_STR_landed	B_avg_BODY_landed	0.7700784
## 21	B_avg_SIG_STR_landed	B_avg_DISTANCE_att	0.8394360
## 22	B_avg_SIG_STR_landed	B_avg_DISTANCE_landed	0.9194060
## 23	B_avg_SIG_STR_landed	B_avg_opp_DISTANCE_att	0.7290727
## 24	B_avg_opp_SIG_STR_att	B_avg_opp_SIG_STR_landed	0.9216315
## 25	B_avg_opp_SIG_STR_att	B_avg_TOTAL_STR_att	0.7052540
## 26	B_avg_opp_SIG_STR_att	B_avg_opp_TOTAL_STR_att	0.9565683
## 27	B_avg_opp_SIG_STR_att	B_avg_opp_TOTAL_STR_landed	0.7567592
## 28	B_avg_opp_SIG_STR_att	B_avg_HEAD_att	0.7948824
## 29	B_avg_opp_SIG_STR_att	B_avg_opp_HEAD_att	0.9832666
## 30	B_avg_opp_SIG_STR_att	B_avg_opp_HEAD_landed	0.8599409
## 31	B_avg_opp_SIG_STR_att	B_avg_opp_BODY_att	0.7361457
## 32	B_avg_opp_SIG_STR_att	B_avg_DISTANCE_att	0.8343482
## 33	B_avg_opp_SIG_STR_att	B_avg_DISTANCE_landed	0.7871846
## 34	B_avg_opp_SIG_STR_att	B_avg_opp_DISTANCE_att	0.9751871
## 35	B_avg_opp_SIG_STR_att	B_avg_opp_DISTANCE_landed	0.9238726
## 36	B_avg_opp_SIG_STR_landed	B_avg_opp_TOTAL_STR_att	0.9104087
## 37	B_avg_opp_SIG_STR_landed	B_avg_opp_TOTAL_STR_landed	0.8680688
## 38	B_avg_opp_SIG_STR_landed	B_avg_opp_HEAD_att	0.8934760

## 39	B_avg_opp_SIG_STR_landed	B_avg_opp_HEAD_landed	0.9422485
## 40	B_avg_opp_SIG_STR_landed	B_avg_opp_BODY_att	0.7337431
## 41	B_avg_opp_SIG_STR_landed	B_avg_opp_BODY_landed	0.7281348
## 42	B_avg_opp_SIG_STR_landed	B_avg_DISTANCE_att	0.7315242
## 43	B_avg_opp_SIG_STR_landed	B_avg_opp_DISTANCE_att	0.8558824
## 44	B_avg_opp_SIG_STR_landed	B_avg_opp_DISTANCE_landed	0.9317875
## 45	B_avg_TOTAL_STR_att	B_avg_TOTAL_STR_landed	0.8731412
## 46	B_avg_TOTAL_STR_att	B_avg_HEAD_att	0.9117430
## 47	B_avg_TOTAL_STR_att	B_avg_HEAD_landed	0.8452974
## 48	B_avg_TOTAL_STR_att	B_avg_DISTANCE_att	0.8613426
## 49	B_avg_TOTAL_STR_att	B_avg_DISTANCE_landed	0.8044246
## 50	B_avg_TOTAL_STR_att	B_avg_opp_DISTANCE_att	0.7167148
## 51	B_avg_TOTAL_STR_att	B_total_time_fought.seconds.	0.7171841
## 52	B_avg_TOTAL_STR_landed	B_avg_HEAD_landed	0.7552359
## 53	B_avg_opp_TOTAL_STR_att	B_avg_opp_TOTAL_STR_landed	0.8917908
## 54	B_avg_opp_TOTAL_STR_att	B_avg_HEAD_att	0.7233154
## 55	B_avg_opp_TOTAL_STR_att	B_avg_opp_HEAD_att	0.9414227
## 56	B_avg_opp_TOTAL_STR_att	B_avg_opp_HEAD_landed	0.8558962
## 57	B_avg_opp_TOTAL_STR_att	B_avg_opp_BODY_att	0.7214170
## 58	B_avg_opp_TOTAL_STR_att	B_avg_DISTANCE_att	0.7508327
## 59	B_avg_opp_TOTAL_STR_att	B_avg_DISTANCE_landed	0.7047678
## 60	B_avg_opp_TOTAL_STR_att	B_avg_opp_DISTANCE_att	0.8972513
## 61	B_avg_opp_TOTAL_STR_att	B_avg_opp_DISTANCE_landed	0.8525769
## 62	B_avg_opp_TOTAL_STR_landed	B_avg_opp_HEAD_att	0.7346221
## 63	B_avg_opp_TOTAL_STR_landed	B_avg_opp_HEAD_landed	0.8272608
## 64	B_avg_opp_TOTAL_STR_landed	B_avg_opp_DISTANCE_landed	0.7105463
## 65	B_avg_TD_att	B_avg_TD_landed	0.7978084
## 66	B_avg_TD_landed	B_avg_CTRL_time.seconds.	0.7320934
## 67	B_avg_opp_TD_att	B_avg_opp_TD_landed	0.7229297
## 68	B_avg_opp_TD_landed	B_avg_opp_CTRL_time.seconds.	0.7050343
## 69	B_avg_HEAD_att	B_avg_HEAD_landed	0.8838905
## 70	B_avg_HEAD_att	B_avg_opp_HEAD_att	0.7904713
## 71	B_avg_HEAD_att	B_avg_DISTANCE_att	0.9575236
## 72	B_avg_HEAD_att	B_avg_DISTANCE_landed	0.8720602
## 73	B_avg_HEAD_att	B_avg_opp_DISTANCE_att	0.8208437
## 74	B_avg_HEAD_att	B_avg_opp_DISTANCE_landed	0.7658824
## 75	B_avg_HEAD_landed	B_avg_DISTANCE_att	0.7937233
## 76	B_avg_HEAD_landed	B_avg_DISTANCE_landed	0.8505878
## 77	B_avg_opp_HEAD_att	B_avg_opp_HEAD_landed	0.8893017
## 78	B_avg_opp_HEAD_att	B_avg_DISTANCE_att	0.8180234
## 79	B_avg_opp_HEAD_att	B_avg_DISTANCE_landed	0.7628686
## 80	B_avg_opp_HEAD_att	B_avg_opp_DISTANCE_att	0.9605196
## 81	B_avg_opp_HEAD_att	B_avg_opp_DISTANCE_landed	0.8993475
## 82	B_avg_opp_HEAD_landed	B_avg_opp_DISTANCE_att	0.7935049
## 83	B_avg_opp_HEAD_landed	B_avg_opp_DISTANCE_landed	0.8732893
## 84	B_avg_BODY_att	B_avg_BODY_landed	0.9566568
## 85	B_avg_BODY_att	B_avg_DISTANCE_landed	0.7198859
## 86	B_avg_opp_BODY_att	B_avg_opp_BODY_landed	0.9464609
## 87	B_avg_LEG_att	B_avg_LEG_landed	0.9723921
## 88	B_avg_opp_LEG_att	B_avg_opp_LEG_landed	0.9757600
## 89	B_avg_DISTANCE_att	B_avg_DISTANCE_landed	0.9328355
## 90	B_avg_DISTANCE_att	B_avg_opp_DISTANCE_att	0.8650185
## 91	B_avg_DISTANCE_att	B_avg_opp_DISTANCE_landed	0.8161272
## 92	B_avg_DISTANCE_landed	B_avg_opp_DISTANCE_att	0.8230752

## 93	B_avg_DISTANCE_landed	B_avg_opp_DISTANCE_landed	0.7891947
## 94	B_avg_opp_DISTANCE_att	B_avg_opp_DISTANCE_landed	0.9372223
## 95	B_avg_CLINCH_att	B_avg_CLINCH_landed	0.9662009
## 96	B_avg_opp_CLINCH_att	B_avg_opp_CLINCH_landed	0.9601543
## 97	B_avg_GROUND_att	B_avg_GROUND_landed	0.9744145
## 98	B_avg_opp_GROUND_att	B_avg_opp_GROUND_landed	0.9729177
## 99	B_total_rounds_fought	B_wins	0.9317012
## 100	B_total_rounds_fought	B_losses	0.8046383
## 101	B_total_rounds_fought	B_win_by_Decision_Unanimous	0.7945870
## 102	B_longest_win_streak	B_wins	0.8107518
## 103	B_wins	B_win_by_Decision_Unanimous	0.8205120
## 104	B_wins	B_win_by_KO.TKO	0.7110863
## 105	B_Height_cms	B_Reach_cms	0.7384280
## 106	B_Weight_lbs	R_Weight_lbs	0.7356741
## 107	R_avg_SIG_STR_att	R_avg_SIG_STR_landed	0.9065296
## 108	R_avg_SIG_STR_att	R_avg_opp_SIG_STR_att	0.7960845
## 109	R_avg_SIG_STR_att	R_avg_TOTAL_STR_att	0.9289222
## 110	R_avg_SIG_STR_att	R_avg_opp_TOTAL_STR_att	0.7145980
## 111	R_avg_SIG_STR_att	R_avg_HEAD_att	0.9746333
## 112	R_avg_SIG_STR_att	R_avg_HEAD_landed	0.8340423
## 113	R_avg_SIG_STR_att	R_avg_opp_HEAD_att	0.7733059
## 114	R_avg_SIG_STR_att	R_avg_DISTANCE_att	0.9695521
## 115	R_avg_SIG_STR_att	R_avg_DISTANCE_landed	0.9002668
## 116	R_avg_SIG_STR_att	R_avg_opp_DISTANCE_att	0.8161846
## 117	R_avg_SIG_STR_att	R_avg_opp_DISTANCE_landed	0.7643908
## 118	R_avg_SIG_STR_landed	R_avg_TOTAL_STR_att	0.8769152
## 119	R_avg_SIG_STR_landed	R_avg_TOTAL_STR_landed	0.8006095
## 120	R_avg_SIG_STR_landed	R_avg_HEAD_att	0.8538527
## 121	R_avg_SIG_STR_landed	R_avg_HEAD_landed	0.9176469
## 122	R_avg_SIG_STR_landed	R_avg_BODY_att	0.7233255
## 123	R_avg_SIG_STR_landed	R_avg_BODY_landed	0.7332265
## 124	R_avg_SIG_STR_landed	R_avg_DISTANCE_att	0.8307602
## 125	R_avg_SIG_STR_landed	R_avg_DISTANCE_landed	0.9088296
## 126	R_avg_SIG_STR_landed	R_avg_opp_DISTANCE_att	0.7135630
## 127	R_avg_opp_SIG_STR_att	R_avg_opp_SIG_STR_landed	0.8929700
## 128	R_avg_opp_SIG_STR_att	R_avg_TOTAL_STR_att	0.7024896
## 129	R_avg_opp_SIG_STR_att	R_avg_opp_TOTAL_STR_att	0.9401960
## 130	R_avg_opp_SIG_STR_att	R_avg_HEAD_att	0.7928904
## 131	R_avg_opp_SIG_STR_att	R_avg_opp_HEAD_att	0.9813848
## 132	R_avg_opp_SIG_STR_att	R_avg_opp_HEAD_landed	0.8410439
## 133	R_avg_opp_SIG_STR_att	R_avg_opp_BODY_att	0.7056330
## 134	R_avg_opp_SIG_STR_att	R_avg_DISTANCE_att	0.8242035
## 135	R_avg_opp_SIG_STR_att	R_avg_DISTANCE_landed	0.7796129
## 136	R_avg_opp_SIG_STR_att	R_avg_opp_DISTANCE_att	0.9751144
## 137	R_avg_opp_SIG_STR_att	R_avg_opp_DISTANCE_landed	0.9032635
## 138	R_avg_opp_SIG_STR_landed	R_avg_opp_TOTAL_STR_att	0.8805555
## 139	R_avg_opp_SIG_STR_landed	R_avg_opp_TOTAL_STR_landed	0.8215414
## 140	R_avg_opp_SIG_STR_landed	R_avg_opp_HEAD_att	0.8440685
## 141	R_avg_opp_SIG_STR_landed	R_avg_opp_HEAD_landed	0.9286524
## 142	R_avg_opp_SIG_STR_landed	R_avg_opp_BODY_att	0.7452744
## 143	R_avg_opp_SIG_STR_landed	R_avg_opp_BODY_landed	0.7344599
## 144	R_avg_opp_SIG_STR_landed	R_avg_DISTANCE_att	0.7073913
## 145	R_avg_opp_SIG_STR_landed	R_avg_opp_DISTANCE_att	0.8184340
## 146	R_avg_opp_SIG_STR_landed	R_avg_opp_DISTANCE_landed	0.9176595

## 147	R_avg_TOTAL_STR_att	R_avg_TOTAL_STR_landed	0.8764648
## 148	R_avg_TOTAL_STR_att	R_avg_HEAD_att	0.9043830
## 149	R_avg_TOTAL_STR_att	R_avg_HEAD_landed	0.8133848
## 150	R_avg_TOTAL_STR_att	R_avg_DISTANCE_att	0.8532539
## 151	R_avg_TOTAL_STR_att	R_avg_DISTANCE_landed	0.7872728
## 152	R_avg_TOTAL_STR_att	R_avg_opp_DISTANCE_att	0.7122460
## 153	R_avg_TOTAL_STR_att	R_total_time_fought.seconds.	0.7208178
## 154	R_avg_TOTAL_STR_landed	R_avg_HEAD_landed	0.7435774
## 155	R_avg_opp_TOTAL_STR_att	R_avg_opp_TOTAL_STR_landed	0.8583205
## 156	R_avg_opp_TOTAL_STR_att	R_avg_HEAD_att	0.7135064
## 157	R_avg_opp_TOTAL_STR_att	R_avg_opp_HEAD_att	0.9191838
## 158	R_avg_opp_TOTAL_STR_att	R_avg_opp_HEAD_landed	0.8358045
## 159	R_avg_opp_TOTAL_STR_att	R_avg_DISTANCE_att	0.7306083
## 160	R_avg_opp_TOTAL_STR_att	R_avg_opp_DISTANCE_att	0.8766955
## 161	R_avg_opp_TOTAL_STR_att	R_avg_opp_DISTANCE_landed	0.8142752
## 162	R_avg_opp_TOTAL_STR_att	R_total_time_fought.seconds.	0.7142560
## 163	R_avg_opp_TOTAL_STR_landed	R_avg_opp_HEAD_landed	0.7733102
## 164	R_avg_TD_att	R_avg_TD_landed	0.8366978
## 165	R_avg_TD_landed	R_avg_CTRL_time.seconds.	0.7357088
## 166	R_avg_opp_TD_att	R_avg_opp_TD_landed	0.7507697
## 167	R_avg_HEAD_att	R_avg_HEAD_landed	0.8659221
## 168	R_avg_HEAD_att	R_avg_opp_HEAD_att	0.7789526
## 169	R_avg_HEAD_att	R_avg_DISTANCE_att	0.9495502
## 170	R_avg_HEAD_att	R_avg_DISTANCE_landed	0.8571914
## 171	R_avg_HEAD_att	R_avg_opp_DISTANCE_att	0.8149176
## 172	R_avg_HEAD_att	R_avg_opp_DISTANCE_landed	0.7598650
## 173	R_avg_HEAD_landed	R_avg_DISTANCE_att	0.7580568
## 174	R_avg_HEAD_landed	R_avg_DISTANCE_landed	0.8258056
## 175	R_avg_opp_HEAD_att	R_avg_opp_HEAD_landed	0.8589620
## 176	R_avg_opp_HEAD_att	R_avg_DISTANCE_att	0.8033379
## 177	R_avg_opp_HEAD_att	R_avg_DISTANCE_landed	0.7567909
## 178	R_avg_opp_HEAD_att	R_avg_opp_DISTANCE_att	0.9605685
## 179	R_avg_opp_HEAD_att	R_avg_opp_DISTANCE_landed	0.8604360
## 180	R_avg_opp_HEAD_landed	R_avg_opp_DISTANCE_att	0.7617864
## 181	R_avg_opp_HEAD_landed	R_avg_opp_DISTANCE_landed	0.8351600
## 182	R_avg_BODY_att	R_avg_BODY_landed	0.9525897
## 183	R_avg_opp_BODY_att	R_avg_opp_BODY_landed	0.9464785
## 184	R_avg_LEG_att	R_avg_LEG_landed	0.9773711
## 185	R_avg_opp_LEG_att	R_avg_opp_LEG_landed	0.9689729
## 186	R_avg_DISTANCE_att	R_avg_DISTANCE_landed	0.9262045
## 187	R_avg_DISTANCE_att	R_avg_opp_DISTANCE_att	0.8511891
## 188	R_avg_DISTANCE_att	R_avg_opp_DISTANCE_landed	0.8018293
## 189	R_avg_DISTANCE_landed	R_avg_opp_DISTANCE_att	0.8099174
## 190	R_avg_DISTANCE_landed	R_avg_opp_DISTANCE_landed	0.7504100
## 191	R_avg_opp_DISTANCE_att	R_avg_opp_DISTANCE_landed	0.9155800
## 192	R_avg_CLINCH_att	R_avg_CLINCH_landed	0.9676118
## 193	R_avg_opp_CLINCH_att	R_avg_opp_CLINCH_landed	0.9648693
## 194	R_avg_GROUND_att	R_avg_GROUND_landed	0.9712627
## 195	R_avg_opp_GROUND_att	R_avg_opp_GROUND_landed	0.9729853
## 196	R_total_rounds_fought	R_wins	0.9318836
## 197	R_total_rounds_fought	R_losses	0.8217007
## 198	R_total_rounds_fought	R_win_by_Decision_Unanimous	0.8338867
## 199	R_longest_win_streak	R_wins	0.8042711
## 200	R_wins	R_win_by_Decision_Unanimous	0.8384310

## 201	R_wins	R_win_by_KO.TKO	0.7146235
## 202	R_Height_cms	R_Reach_cms	0.7458658

##	Var1	Var2	Correlation
## 1	B_avg_SIG_STR_att	B_avg_SIG_STR_landed	0.9193433
## 2	B_avg_SIG_STR_att	B_avg_opp_SIG_STR_att	0.8059872
## 3	B_avg_SIG_STR_att	B_avg_opp_SIG_STR_landed	0.7195505
## 4	B_avg_SIG_STR_att	B_avg_TOTAL_STR_att	0.9267764
## 5	B_avg_SIG_STR_att	B_avg_opp_TOTAL_STR_att	0.7098132
## 6	B_avg_SIG_STR_att	B_avg_HEAD_att	0.9783942
## 7	B_avg_SIG_STR_att	B_avg_HEAD_landed	0.8477664
## 8	B_avg_SIG_STR_att	B_avg_opp_HEAD_att	0.7843443
## 9	B_avg_SIG_STR_att	B_avg_BODY_att	0.7111751
## 10	B_avg_SIG_STR_att	B_avg_DISTANCE_att	0.9674280
## 11	B_avg_SIG_STR_att	B_avg_DISTANCE_landed	0.9058476
## 12	B_avg_SIG_STR_att	B_avg_opp_DISTANCE_att	0.8251897
## 13	B_avg_SIG_STR_att	B_avg_opp_DISTANCE_landed	0.7908728
## 14	B_avg_SIG_STR_landed	B_avg_opp_SIG_STR_att	0.7249787
## 15	B_avg_SIG_STR_landed	B_avg_TOTAL_STR_att	0.8880252
## 16	B_avg_SIG_STR_landed	B_avg_TOTAL_STR_landed	0.8026118
## 17	B_avg_SIG_STR_landed	B_avg_HEAD_att	0.8769034
## 18	B_avg_SIG_STR_landed	B_avg_HEAD_landed	0.9258174
## 19	B_avg_SIG_STR_landed	B_avg_BODY_att	0.7269131
## 20	B_avg_SIG_STR_landed	B_avg_BODY_landed	0.7325467
## 21	B_avg_SIG_STR_landed	B_avg_DISTANCE_att	0.8455073
## 22	B_avg_SIG_STR_landed	B_avg_DISTANCE_landed	0.9141095
## 23	B_avg_SIG_STR_landed	B_avg_opp_DISTANCE_att	0.7411679
## 24	B_avg_SIG_STR_landed	B_avg_opp_DISTANCE_landed	0.7199084
## 25	B_avg_opp_SIG_STR_att	B_avg_opp_SIG_STR_landed	0.9086963
## 26	B_avg_opp_SIG_STR_att	B_avg_TOTAL_STR_att	0.7060238
## 27	B_avg_opp_SIG_STR_att	B_avg_opp_TOTAL_STR_att	0.9308937
## 28	B_avg_opp_SIG_STR_att	B_avg_HEAD_att	0.7918453
## 29	B_avg_opp_SIG_STR_att	B_avg_opp_HEAD_att	0.9814543
## 30	B_avg_opp_SIG_STR_att	B_avg_opp_HEAD_landed	0.8376090
## 31	B_avg_opp_SIG_STR_att	B_avg_opp_BODY_att	0.7630711
## 32	B_avg_opp_SIG_STR_att	B_avg_opp_BODY_landed	0.7050408
## 33	B_avg_opp_SIG_STR_att	B_avg_DISTANCE_att	0.8306732
## 34	B_avg_opp_SIG_STR_att	B_avg_DISTANCE_landed	0.7970977
## 35	B_avg_opp_SIG_STR_att	B_avg_opp_DISTANCE_att	0.9698127
## 36	B_avg_opp_SIG_STR_att	B_avg_opp_DISTANCE_landed	0.9074398
## 37	B_avg_opp_SIG_STR_landed	B_avg_opp_TOTAL_STR_att	0.8745905
## 38	B_avg_opp_SIG_STR_landed	B_avg_opp_TOTAL_STR_landed	0.7893828
## 39	B_avg_opp_SIG_STR_landed	B_avg_HEAD_att	0.7015429
## 40	B_avg_opp_SIG_STR_landed	B_avg_opp_HEAD_att	0.8682283
## 41	B_avg_opp_SIG_STR_landed	B_avg_opp_HEAD_landed	0.9312538
## 42	B_avg_opp_SIG_STR_landed	B_avg_opp_BODY_att	0.7673631
## 43	B_avg_opp_SIG_STR_landed	B_avg_opp_BODY_landed	0.7806331
## 44	B_avg_opp_SIG_STR_landed	B_avg_DISTANCE_att	0.7446666
## 45	B_avg_opp_SIG_STR_landed	B_avg_DISTANCE_landed	0.7268242
## 46	B_avg_opp_SIG_STR_landed	B_avg_opp_DISTANCE_att	0.8341316
## 47	B_avg_opp_SIG_STR_landed	B_avg_opp_DISTANCE_landed	0.9193554
## 48	B_avg_TOTAL_STR_att	B_avg_TOTAL_STR_landed	0.8925467
## 49	B_avg_TOTAL_STR_att	B_avg_HEAD_att	0.9061015
## 50	B_avg_TOTAL_STR_att	B_avg_HEAD_landed	0.8248146

## 51	B_avg_TOTAL_STR_att	B_avg_DISTANCE_att	0.8406953
## 52	B_avg_TOTAL_STR_att	B_avg_DISTANCE_landed	0.7850017
## 53	B_avg_TOTAL_STR_att	B_avg_opp_DISTANCE_att	0.7031875
## 54	B_avg_TOTAL_STR_att	B_total_time_fought.seconds.	0.7595718
## 55	B_avg_TOTAL_STR_landed	B_avg_HEAD_landed	0.7501229
## 56	B_avg_TOTAL_STR_landed	B_total_time_fought.seconds.	0.7071009
## 57	B_avg_opp_TOTAL_STR_att	B_avg_opp_TOTAL_STR_landed	0.8722427
## 58	B_avg_opp_TOTAL_STR_att	B_avg_opp_HEAD_att	0.9160192
## 59	B_avg_opp_TOTAL_STR_att	B_avg_opp_HEAD_landed	0.8179828
## 60	B_avg_opp_TOTAL_STR_att	B_avg_opp_BODY_att	0.7092478
## 61	B_avg_opp_TOTAL_STR_att	B_avg_DISTANCE_att	0.7116536
## 62	B_avg_opp_TOTAL_STR_att	B_avg_opp_DISTANCE_att	0.8517129
## 63	B_avg_opp_TOTAL_STR_att	B_avg_opp_DISTANCE_landed	0.7918889
## 64	B_avg_opp_TOTAL_STR_att	B_total_time_fought.seconds.	0.7228887
## 65	B_avg_opp_TOTAL_STR_landed	B_avg_opp_HEAD_landed	0.7531488
## 66	B_avg_TD_att	B_avg_TD_landed	0.8083777
## 67	B_avg_TD_att	B_avg_CTRL_time.seconds.	0.7041642
## 68	B_avg_TD_landed	B_avg_CTRL_time.seconds.	0.8037670
## 69	B_avg_opp_TD_att	B_avg_opp_TD_landed	0.7165759
## 70	B_avg_opp_TD_landed	B_avg_opp_CTRL_time.seconds.	0.7432183
## 71	B_avg_HEAD_att	B_avg_HEAD_landed	0.8793645
## 72	B_avg_HEAD_att	B_avg_opp_HEAD_att	0.7741556
## 73	B_avg_HEAD_att	B_avg_DISTANCE_att	0.9463082
## 74	B_avg_HEAD_att	B_avg_DISTANCE_landed	0.8649801
## 75	B_avg_HEAD_att	B_avg_opp_DISTANCE_att	0.8120092
## 76	B_avg_HEAD_att	B_avg_opp_DISTANCE_landed	0.7747679
## 77	B_avg_HEAD_landed	B_avg_DISTANCE_att	0.7692947
## 78	B_avg_HEAD_landed	B_avg_DISTANCE_landed	0.8328807
## 79	B_avg_opp_HEAD_att	B_avg_opp_HEAD_landed	0.8615894
## 80	B_avg_opp_HEAD_att	B_avg_DISTANCE_att	0.8067909
## 81	B_avg_opp_HEAD_att	B_avg_DISTANCE_landed	0.7681769
## 82	B_avg_opp_HEAD_att	B_avg_opp_DISTANCE_att	0.9490548
## 83	B_avg_opp_HEAD_att	B_avg_opp_DISTANCE_landed	0.8640460
## 84	B_avg_opp_HEAD_landed	B_avg_opp_DISTANCE_att	0.7485330
## 85	B_avg_opp_HEAD_landed	B_avg_opp_DISTANCE_landed	0.8260811
## 86	B_avg_BODY_att	B_avg_BODY_landed	0.9536149
## 87	B_avg_opp_BODY_att	B_avg_opp_BODY_landed	0.9484730
## 88	B_avg_opp_BODY_att	B_avg_opp_DISTANCE_att	0.7327694
## 89	B_avg_opp_BODY_att	B_avg_opp_DISTANCE_landed	0.7463024
## 90	B_avg_opp_BODY_landed	B_avg_opp_DISTANCE_landed	0.7132943
## 91	B_avg_LEG_att	B_avg_LEG_landed	0.9794843
## 92	B_avg_opp_LEG_att	B_avg_opp_LEG_landed	0.9792885
## 93	B_avg_DISTANCE_att	B_avg_DISTANCE_landed	0.9336526
## 94	B_avg_DISTANCE_att	B_avg_opp_DISTANCE_att	0.8608612
## 95	B_avg_DISTANCE_att	B_avg_opp_DISTANCE_landed	0.8347944
## 96	B_avg_DISTANCE_landed	B_avg_opp_DISTANCE_att	0.8300895
## 97	B_avg_DISTANCE_landed	B_avg_opp_DISTANCE_landed	0.8182249
## 98	B_avg_opp_DISTANCE_att	B_avg_opp_DISTANCE_landed	0.9274182
## 99	B_avg_CLINCH_att	B_avg_CLINCH_landed	0.9668000
## 100	B_avg_opp_CLINCH_att	B_avg_opp_CLINCH_landed	0.9647416
## 101	B_avg_GROUND_att	B_avg_GROUND_landed	0.9670500
## 102	B_avg_opp_GROUND_att	B_avg_opp_GROUND_landed	0.9682892
## 103	B_total_rounds_fought	B_longest_win_streak	0.7087499
## 104	B_total_rounds_fought	B_wins	0.9413365

## 105	B_total_rounds_fought	B_losses	0.8512083
## 106	B_total_rounds_fought	B_win_by_Decision_Unanimous	0.7981109
## 107	B_longest_win_streak	B_wins	0.8115355
## 108	B_wins	B_losses	0.7143437
## 109	B_wins	B_win_by_Decision_Unanimous	0.7901481
## 110	B_wins	B_win_by_KO.TKO	0.7052589
## 111	B_Height_cms	B_Reach_cms	0.7200520
## 112	R_avg_SIG_STR_att	R_avg_SIG_STR_landed	0.9213574
## 113	R_avg_SIG_STR_att	R_avg_opp_SIG_STR_att	0.7875994
## 114	R_avg_SIG_STR_att	R_avg_TOTAL_STR_att	0.9196765
## 115	R_avg_SIG_STR_att	R_avg_HEAD_att	0.9777532
## 116	R_avg_SIG_STR_att	R_avg_HEAD_landed	0.8521532
## 117	R_avg_SIG_STR_att	R_avg_opp_HEAD_att	0.7784482
## 118	R_avg_SIG_STR_att	R_avg_BODY_att	0.7185108
## 119	R_avg_SIG_STR_att	R_avg_DISTANCE_att	0.9671590
## 120	R_avg_SIG_STR_att	R_avg_DISTANCE_landed	0.9105352
## 121	R_avg_SIG_STR_att	R_avg_opp_DISTANCE_att	0.8085661
## 122	R_avg_SIG_STR_att	R_avg_opp_DISTANCE_landed	0.7579240
## 123	R_avg_SIG_STR_landed	R_avg_opp_SIG_STR_att	0.7183914
## 124	R_avg_SIG_STR_landed	R_avg_TOTAL_STR_att	0.8815164
## 125	R_avg_SIG_STR_landed	R_avg_TOTAL_STR_landed	0.7868405
## 126	R_avg_SIG_STR_landed	R_avg_HEAD_att	0.8771654
## 127	R_avg_SIG_STR_landed	R_avg_HEAD_landed	0.9241985
## 128	R_avg_SIG_STR_landed	R_avg_opp_HEAD_att	0.7052849
## 129	R_avg_SIG_STR_landed	R_avg_BODY_att	0.7320459
## 130	R_avg_SIG_STR_landed	R_avg_BODY_landed	0.7300532
## 131	R_avg_SIG_STR_landed	R_avg_DISTANCE_att	0.8460871
## 132	R_avg_SIG_STR_landed	R_avg_DISTANCE_landed	0.9121032
## 133	R_avg_SIG_STR_landed	R_avg_opp_DISTANCE_att	0.7335245
## 134	R_avg_SIG_STR_landed	R_avg_opp_DISTANCE_landed	0.7042722
## 135	R_avg_opp_SIG_STR_att	R_avg_opp_SIG_STR_landed	0.9177822
## 136	R_avg_opp_SIG_STR_att	R_avg_opp_TOTAL_STR_att	0.9346090
## 137	R_avg_opp_SIG_STR_att	R_avg_HEAD_att	0.7625819
## 138	R_avg_opp_SIG_STR_att	R_avg_opp_HEAD_att	0.9823337
## 139	R_avg_opp_SIG_STR_att	R_avg_opp_HEAD_landed	0.8541033
## 140	R_avg_opp_SIG_STR_att	R_avg_opp_BODY_att	0.7424601
## 141	R_avg_opp_SIG_STR_att	R_avg_DISTANCE_att	0.8158970
## 142	R_avg_opp_SIG_STR_att	R_avg_DISTANCE_landed	0.7958215
## 143	R_avg_opp_SIG_STR_att	R_avg_opp_DISTANCE_att	0.9743397
## 144	R_avg_opp_SIG_STR_att	R_avg_opp_DISTANCE_landed	0.9122232
## 145	R_avg_opp_SIG_STR_landed	R_avg_opp_TOTAL_STR_att	0.8835550
## 146	R_avg_opp_SIG_STR_landed	R_avg_opp_TOTAL_STR_landed	0.8003885
## 147	R_avg_opp_SIG_STR_landed	R_avg_opp_HEAD_att	0.8817765
## 148	R_avg_opp_SIG_STR_landed	R_avg_opp_HEAD_landed	0.9393079
## 149	R_avg_opp_SIG_STR_landed	R_avg_opp_BODY_att	0.7628761
## 150	R_avg_opp_SIG_STR_landed	R_avg_opp_BODY_landed	0.7644385
## 151	R_avg_opp_SIG_STR_landed	R_avg_DISTANCE_att	0.7246735
## 152	R_avg_opp_SIG_STR_landed	R_avg_DISTANCE_landed	0.7247350
## 153	R_avg_opp_SIG_STR_landed	R_avg_opp_DISTANCE_att	0.8576143
## 154	R_avg_opp_SIG_STR_landed	R_avg_opp_DISTANCE_landed	0.9337262
## 155	R_avg_TOTAL_STR_att	R_avg_TOTAL_STR_landed	0.8905236
## 156	R_avg_TOTAL_STR_att	R_avg_HEAD_att	0.8985215
## 157	R_avg_TOTAL_STR_att	R_avg_HEAD_landed	0.8215843
## 158	R_avg_TOTAL_STR_att	R_avg_DISTANCE_att	0.8346522

## 159	R_avg_TOTAL_STR_att	R_avg_DISTANCE_landed	0.7831239
## 160	R_avg_TOTAL_STR_att	R_total_time_fought.seconds.	0.7217588
## 161	R_avg_TOTAL_STR_landed	R_avg_HEAD_landed	0.7360141
## 162	R_avg_opp_TOTAL_STR_att	R_avg_opp_TOTAL_STR_landed	0.8792150
## 163	R_avg_opp_TOTAL_STR_att	R_avg_opp_HEAD_att	0.9166090
## 164	R_avg_opp_TOTAL_STR_att	R_avg_opp_HEAD_landed	0.8235847
## 165	R_avg_opp_TOTAL_STR_att	R_avg_opp_BODY_att	0.7141523
## 166	R_avg_opp_TOTAL_STR_att	R_avg_DISTANCE_att	0.7044686
## 167	R_avg_opp_TOTAL_STR_att	R_avg_opp_DISTANCE_att	0.8655339
## 168	R_avg_opp_TOTAL_STR_att	R_avg_opp_DISTANCE_landed	0.8061638
## 169	R_avg_opp_TOTAL_STR_att	R_total_time_fought.seconds.	0.7131218
## 170	R_avg_opp_TOTAL_STR_landed	R_avg_opp_HEAD_landed	0.7521897
## 171	R_avg_TD_att	R_avg_TD_landed	0.7658266
## 172	R_avg_TD_landed	R_avg_CTRL_time.seconds.	0.7676872
## 173	R_avg_opp_TD_att	R_avg_opp_TD_landed	0.7128430
## 174	R_avg_opp_TD_landed	R_avg_opp_CTRL_time.seconds.	0.7606633
## 175	R_avg_HEAD_att	R_avg_HEAD_landed	0.8844911
## 176	R_avg_HEAD_att	R_avg_opp_HEAD_att	0.7582950
## 177	R_avg_HEAD_att	R_avg_DISTANCE_att	0.9437901
## 178	R_avg_HEAD_att	R_avg_DISTANCE_landed	0.8655284
## 179	R_avg_HEAD_att	R_avg_opp_DISTANCE_att	0.7849610
## 180	R_avg_HEAD_att	R_avg_opp_DISTANCE_landed	0.7325644
## 181	R_avg_HEAD_landed	R_avg_DISTANCE_att	0.7675408
## 182	R_avg_HEAD_landed	R_avg_DISTANCE_landed	0.8212366
## 183	R_avg_opp_HEAD_att	R_avg_opp_HEAD_landed	0.8778030
## 184	R_avg_opp_HEAD_att	R_avg_DISTANCE_att	0.8059406
## 185	R_avg_opp_HEAD_att	R_avg_DISTANCE_landed	0.7827067
## 186	R_avg_opp_HEAD_att	R_avg_opp_DISTANCE_att	0.9583764
## 187	R_avg_opp_HEAD_att	R_avg_opp_DISTANCE_landed	0.8803836
## 188	R_avg_opp_HEAD_landed	R_avg_opp_DISTANCE_att	0.7910419
## 189	R_avg_opp_HEAD_landed	R_avg_opp_DISTANCE_landed	0.8702110
## 190	R_avg_BODY_att	R_avg_BODY_landed	0.9549870
## 191	R_avg_opp_BODY_att	R_avg_opp_BODY_landed	0.9527413
## 192	R_avg_opp_BODY_att	R_avg_opp_DISTANCE_att	0.7032307
## 193	R_avg_opp_BODY_att	R_avg_opp_DISTANCE_landed	0.7168839
## 194	R_avg_LEG_att	R_avg_LEG_landed	0.9811108
## 195	R_avg_opp_LEG_att	R_avg_opp_LEG_landed	0.9760541
## 196	R_avg_DISTANCE_att	R_avg_DISTANCE_landed	0.9388445
## 197	R_avg_DISTANCE_att	R_avg_opp_DISTANCE_att	0.8473083
## 198	R_avg_DISTANCE_att	R_avg_opp_DISTANCE_landed	0.8013407
## 199	R_avg_DISTANCE_landed	R_avg_opp_DISTANCE_att	0.8281398
## 200	R_avg_DISTANCE_landed	R_avg_opp_DISTANCE_landed	0.8029410
## 201	R_avg_opp_DISTANCE_att	R_avg_opp_DISTANCE_landed	0.9308196
## 202	R_avg_CLINCH_att	R_avg_CLINCH_landed	0.9665172
## 203	R_avg_opp_CLINCH_att	R_avg_opp_CLINCH_landed	0.9631992
## 204	R_avg_GROUND_att	R_avg_GROUND_landed	0.9699420
## 205	R_avg_opp_GROUND_att	R_avg_opp_GROUND_landed	0.9622829
## 206	R_total_rounds_fought	R_longest_win_streak	0.7028427
## 207	R_total_rounds_fought	R_wins	0.9356438
## 208	R_total_rounds_fought	R_losses	0.8562287
## 209	R_total_rounds_fought	R_win_by_Decision_Unanimous	0.7987254
## 210	R_longest_win_streak	R_wins	0.8355846
## 211	R_wins	R_win_by_Decision_Unanimous	0.7969505
## 212	R_wins	R_win_by_KO.TKO	0.7240856

## 213	R_Height_cms	R_Reach_cms	0.7052589
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##	Var1	Var2	Correlation
## 1	B_avg_SIG_STR_att	B_avg_SIG_STR_landed	0.9177893
## 2	B_avg_SIG_STR_att	B_avg_opp_SIG_STR_att	0.7611901
## 3	B_avg_SIG_STR_att	B_avg_TOTAL_STR_att	0.9148054
## 4	B_avg_SIG_STR_att	B_avg_HEAD_att	0.9752552
## 5	B_avg_SIG_STR_att	B_avg_HEAD_landed	0.8540004
## 6	B_avg_SIG_STR_att	B_avg_opp_HEAD_att	0.7434348
## 7	B_avg_SIG_STR_att	B_avg_DISTANCE_att	0.9605089
## 8	B_avg_SIG_STR_att	B_avg_DISTANCE_landed	0.9057305
## 9	B_avg_SIG_STR_att	B_avg_opp_DISTANCE_att	0.7913794
## 10	B_avg_SIG_STR_att	B_avg_opp_DISTANCE_landed	0.7401590
## 11	B_avg_SIG_STR_landed	B_avg_TOTAL_STR_att	0.8830574
## 12	B_avg_SIG_STR_landed	B_avg_TOTAL_STR_landed	0.7865872
## 13	B_avg_SIG_STR_landed	B_avg_HEAD_att	0.8601808
## 14	B_avg_SIG_STR_landed	B_avg_HEAD_landed	0.9148388
## 15	B_avg_SIG_STR_landed	B_avg_BODY_att	0.7416549
## 16	B_avg_SIG_STR_landed	B_avg_BODY_landed	0.7175135
## 17	B_avg_SIG_STR_landed	B_avg_DISTANCE_att	0.8255717
## 18	B_avg_SIG_STR_landed	B_avg_DISTANCE_landed	0.8927003
## 19	B_avg_opp_SIG_STR_att	B_avg_opp_SIG_STR_landed	0.9116727
## 20	B_avg_opp_SIG_STR_att	B_avg_opp_TOTAL_STR_att	0.9179239
## 21	B_avg_opp_SIG_STR_att	B_avg_HEAD_att	0.7375774
## 22	B_avg_opp_SIG_STR_att	B_avg_opp_HEAD_att	0.9743563
## 23	B_avg_opp_SIG_STR_att	B_avg_opp_HEAD_landed	0.8312670
## 24	B_avg_opp_SIG_STR_att	B_avg_opp_BODY_att	0.7218912
## 25	B_avg_opp_SIG_STR_att	B_avg_DISTANCE_att	0.7858256
## 26	B_avg_opp_SIG_STR_att	B_avg_DISTANCE_landed	0.7422907
## 27	B_avg_opp_SIG_STR_att	B_avg_opp_DISTANCE_att	0.9608945
## 28	B_avg_opp_SIG_STR_att	B_avg_opp_DISTANCE_landed	0.9094610
## 29	B_avg_opp_SIG_STR_att	B_total_time_fought.seconds.	0.7031500
## 30	B_avg_opp_SIG_STR_landed	B_avg_opp_TOTAL_STR_att	0.8885014
## 31	B_avg_opp_SIG_STR_landed	B_avg_opp_TOTAL_STR_landed	0.7969213
## 32	B_avg_opp_SIG_STR_landed	B_avg_opp_HEAD_att	0.8592418
## 33	B_avg_opp_SIG_STR_landed	B_avg_opp_HEAD_landed	0.9115860
## 34	B_avg_opp_SIG_STR_landed	B_avg_opp_BODY_att	0.7531177
## 35	B_avg_opp_SIG_STR_landed	B_avg_opp_BODY_landed	0.7492311
## 36	B_avg_opp_SIG_STR_landed	B_avg_opp_DISTANCE_att	0.8147586
## 37	B_avg_opp_SIG_STR_landed	B_avg_opp_DISTANCE_landed	0.8972936
## 38	B_avg_TOTAL_STR_att	B_avg_TOTAL_STR_landed	0.8928081
## 39	B_avg_TOTAL_STR_att	B_avg_HEAD_att	0.8904663
## 40	B_avg_TOTAL_STR_att	B_avg_HEAD_landed	0.8295864
## 41	B_avg_TOTAL_STR_att	B_avg_DISTANCE_att	0.8130947
## 42	B_avg_TOTAL_STR_att	B_avg_DISTANCE_landed	0.7584799
## 43	B_avg_TOTAL_STR_att	B_total_time_fought.seconds.	0.7292779
## 44	B_avg_TOTAL_STR_landed	B_avg_HEAD_landed	0.7314953
## 45	B_avg_opp_TOTAL_STR_att	B_avg_opp_TOTAL_STR_landed	0.8859393
## 46	B_avg_opp_TOTAL_STR_att	B_avg_opp_HEAD_att	0.8904872
## 47	B_avg_opp_TOTAL_STR_att	B_avg_opp_HEAD_landed	0.8179694
## 48	B_avg_opp_TOTAL_STR_att	B_avg_opp_DISTANCE_att	0.8225704
## 49	B_avg_opp_TOTAL_STR_att	B_avg_opp_DISTANCE_landed	0.7867260
## 50	B_avg_opp_TOTAL_STR_att	B_total_time_fought.seconds.	0.7487652
## 51	B_avg_opp_TOTAL_STR_landed	B_avg_opp_HEAD_landed	0.7375026

## 52	B_avg_TD_att	B_avg_TD_landed	0.8149413
## 53	B_avg_TD_landed	B_avg_CTRL_time.seconds.	0.7553194
## 54	B_avg_opp_TD_att	B_avg_opp_TD_landed	0.7370143
## 55	B_avg_HEAD_att	B_avg_HEAD_landed	0.8813142
## 56	B_avg_HEAD_att	B_avg_opp_HEAD_att	0.7257958
## 57	B_avg_HEAD_att	B_avg_DISTANCE_att	0.9420144
## 58	B_avg_HEAD_att	B_avg_DISTANCE_landed	0.8590731
## 59	B_avg_HEAD_att	B_avg_opp_DISTANCE_att	0.7743619
## 60	B_avg_HEAD_att	B_avg_opp_DISTANCE_landed	0.7287503
## 61	B_avg_HEAD_landed	B_avg_DISTANCE_att	0.7589795
## 62	B_avg_HEAD_landed	B_avg_DISTANCE_landed	0.8037040
## 63	B_avg_opp_HEAD_att	B_avg_opp_HEAD_landed	0.8665451
## 64	B_avg_opp_HEAD_att	B_avg_DISTANCE_att	0.7712695
## 65	B_avg_opp_HEAD_att	B_avg_DISTANCE_landed	0.7239341
## 66	B_avg_opp_HEAD_att	B_avg_opp_DISTANCE_att	0.9393642
## 67	B_avg_opp_HEAD_att	B_avg_opp_DISTANCE_landed	0.8654850
## 68	B_avg_opp_HEAD_landed	B_avg_opp_DISTANCE_att	0.7301621
## 69	B_avg_opp_HEAD_landed	B_avg_opp_DISTANCE_landed	0.8051050
## 70	B_avg_BODY_att	B_avg_BODY_landed	0.9543194
## 71	B_avg_opp_BODY_att	B_avg_opp_BODY_landed	0.9453975
## 72	B_avg_LEG_att	B_avg_LEG_landed	0.9816534
## 73	B_avg_opp_LEG_att	B_avg_opp_LEG_landed	0.9802942
## 74	B_avg_DISTANCE_att	B_avg_DISTANCE_landed	0.9396961
## 75	B_avg_DISTANCE_att	B_avg_opp_DISTANCE_att	0.8270212
## 76	B_avg_DISTANCE_att	B_avg_opp_DISTANCE_landed	0.7841556
## 77	B_avg_DISTANCE_landed	B_avg_opp_DISTANCE_att	0.7850280
## 78	B_avg_DISTANCE_landed	B_avg_opp_DISTANCE_landed	0.7424688
## 79	B_avg_opp_DISTANCE_att	B_avg_opp_DISTANCE_landed	0.9336581
## 80	B_avg_CLINCH_att	B_avg_CLINCH_landed	0.9685687
## 81	B_avg_opp_CLINCH_att	B_avg_opp_CLINCH_landed	0.9617576
## 82	B_avg_GROUND_att	B_avg_GROUND_landed	0.9774275
## 83	B_avg_opp_GROUND_att	B_avg_opp_GROUND_landed	0.9684840
## 84	B_total_rounds_fought	B_wins	0.9272292
## 85	B_total_rounds_fought	B_losses	0.7646853
## 86	B_total_rounds_fought	B_win_by_Decision_Unanimous	0.7361096
## 87	B_total_rounds_fought	B_win_by_KO.TKO	0.7117866
## 88	B_current_win_streak	B_longest_win_streak	0.7529271
## 89	B_longest_win_streak	B_wins	0.7834275
## 90	B_wins	B_win_by_Decision_Unanimous	0.7129322
## 91	B_wins	B_win_by_KO.TKO	0.8275163
## 92	R_avg_SIG_STR_att	R_avg_SIG_STR_landed	0.9155564
## 93	R_avg_SIG_STR_att	R_avg_opp_SIG_STR_att	0.7961164
## 94	R_avg_SIG_STR_att	R_avg_TOTAL_STR_att	0.9194363
## 95	R_avg_SIG_STR_att	R_avg_TOTAL_STR_landed	0.7044721
## 96	R_avg_SIG_STR_att	R_avg_opp_TOTAL_STR_att	0.7002721
## 97	R_avg_SIG_STR_att	R_avg_HEAD_att	0.9739762
## 98	R_avg_SIG_STR_att	R_avg_HEAD_landed	0.8583561
## 99	R_avg_SIG_STR_att	R_avg_opp_HEAD_att	0.7760198
## 100	R_avg_SIG_STR_att	R_avg_DISTANCE_att	0.9555927
## 101	R_avg_SIG_STR_att	R_avg_DISTANCE_landed	0.9031987
## 102	R_avg_SIG_STR_att	R_avg_opp_DISTANCE_att	0.8194230
## 103	R_avg_SIG_STR_att	R_avg_opp_DISTANCE_landed	0.7664679
## 104	R_avg_SIG_STR_landed	R_avg_TOTAL_STR_att	0.8777013
## 105	R_avg_SIG_STR_landed	R_avg_TOTAL_STR_landed	0.8074582

## 106	R_avg_SIG_STR_landed	R_avg_HEAD_att	0.8601449
## 107	R_avg_SIG_STR_landed	R_avg_HEAD_landed	0.9192644
## 108	R_avg_SIG_STR_landed	R_avg_BODY_att	0.7018143
## 109	R_avg_SIG_STR_landed	R_avg_BODY_landed	0.7168169
## 110	R_avg_SIG_STR_landed	R_avg_DISTANCE_att	0.8123169
## 111	R_avg_SIG_STR_landed	R_avg_DISTANCE_landed	0.8855862
## 112	R_avg_SIG_STR_landed	R_avg_opp_DISTANCE_att	0.7132151
## 113	R_avg_opp_SIG_STR_att	R_avg_opp_SIG_STR_landed	0.9328448
## 114	R_avg_opp_SIG_STR_att	R_avg_opp_TOTAL_STR_att	0.9386157
## 115	R_avg_opp_SIG_STR_att	R_avg_opp_TOTAL_STR_landed	0.7499221
## 116	R_avg_opp_SIG_STR_att	R_avg_HEAD_att	0.7836968
## 117	R_avg_opp_SIG_STR_att	R_avg_opp_HEAD_att	0.9797040
## 118	R_avg_opp_SIG_STR_att	R_avg_opp_HEAD_landed	0.8765787
## 119	R_avg_opp_SIG_STR_att	R_avg_opp_BODY_att	0.7354388
## 120	R_avg_opp_SIG_STR_att	R_avg_DISTANCE_att	0.8217177
## 121	R_avg_opp_SIG_STR_att	R_avg_DISTANCE_landed	0.7895253
## 122	R_avg_opp_SIG_STR_att	R_avg_opp_DISTANCE_att	0.9619851
## 123	R_avg_opp_SIG_STR_att	R_avg_opp_DISTANCE_landed	0.9183848
## 124	R_avg_opp_SIG_STR_att	R_total_time_fought.seconds.	0.7017999
## 125	R_avg_opp_SIG_STR_landed	R_avg_opp_TOTAL_STR_att	0.9120505
## 126	R_avg_opp_SIG_STR_landed	R_avg_opp_TOTAL_STR_landed	0.8482146
## 127	R_avg_opp_SIG_STR_landed	R_avg_opp_HEAD_att	0.8946591
## 128	R_avg_opp_SIG_STR_landed	R_avg_opp_HEAD_landed	0.9384223
## 129	R_avg_opp_SIG_STR_landed	R_avg_opp_BODY_att	0.7568271
## 130	R_avg_opp_SIG_STR_landed	R_avg_opp_BODY_landed	0.7669409
## 131	R_avg_opp_SIG_STR_landed	R_avg_DISTANCE_att	0.7195722
## 132	R_avg_opp_SIG_STR_landed	R_avg_opp_DISTANCE_att	0.8490700
## 133	R_avg_opp_SIG_STR_landed	R_avg_opp_DISTANCE_landed	0.9108089
## 134	R_avg_TOTAL_STR_att	R_avg_TOTAL_STR_landed	0.9059841
## 135	R_avg_TOTAL_STR_att	R_avg_HEAD_att	0.8857994
## 136	R_avg_TOTAL_STR_att	R_avg_HEAD_landed	0.8116560
## 137	R_avg_TOTAL_STR_att	R_avg_DISTANCE_att	0.8212364
## 138	R_avg_TOTAL_STR_att	R_avg_DISTANCE_landed	0.7713165
## 139	R_avg_TOTAL_STR_att	R_total_time_fought.seconds.	0.7708151
## 140	R_avg_TOTAL_STR_landed	R_avg_HEAD_landed	0.7258637
## 141	R_avg_TOTAL_STR_landed	R_total_time_fought.seconds.	0.7060119
## 142	R_avg_opp_TOTAL_STR_att	R_avg_opp_TOTAL_STR_landed	0.9152831
## 143	R_avg_opp_TOTAL_STR_att	R_avg_opp_HEAD_att	0.9169421
## 144	R_avg_opp_TOTAL_STR_att	R_avg_opp_HEAD_landed	0.8585794
## 145	R_avg_opp_TOTAL_STR_att	R_avg_opp_BODY_att	0.7065597
## 146	R_avg_opp_TOTAL_STR_att	R_avg_DISTANCE_att	0.7107664
## 147	R_avg_opp_TOTAL_STR_att	R_avg_opp_DISTANCE_att	0.8527206
## 148	R_avg_opp_TOTAL_STR_att	R_avg_opp_DISTANCE_landed	0.8167996
## 149	R_avg_opp_TOTAL_STR_att	R_total_time_fought.seconds.	0.7641923
## 150	R_avg_opp_TOTAL_STR_landed	R_avg_opp_HEAD_att	0.7165803
## 151	R_avg_opp_TOTAL_STR_landed	R_avg_opp_HEAD_landed	0.7974931
## 152	R_avg_TD_att	R_avg_TD_landed	0.8056923
## 153	R_avg_TD_landed	R_avg_CTRL_time.seconds.	0.7421101
## 154	R_avg_opp_TD_att	R_avg_opp_TD_landed	0.7270188
## 155	R_avg_opp_TD_landed	R_avg_opp_CTRL_time.seconds.	0.7313163
## 156	R_avg_HEAD_att	R_avg_HEAD_landed	0.8889608
## 157	R_avg_HEAD_att	R_avg_opp_HEAD_att	0.7780111
## 158	R_avg_HEAD_att	R_avg_DISTANCE_att	0.9355201
## 159	R_avg_HEAD_att	R_avg_DISTANCE_landed	0.8599000

## 160	R_avg_HEAD_att	R_avg_opp_DISTANCE_att	0.8099033
## 161	R_avg_HEAD_att	R_avg_opp_DISTANCE_landed	0.7528976
## 162	R_avg_HEAD_landed	R_avg_DISTANCE_att	0.7541327
## 163	R_avg_HEAD_landed	R_avg_DISTANCE_landed	0.8078788
## 164	R_avg_opp_HEAD_att	R_avg_opp_HEAD_landed	0.9040279
## 165	R_avg_opp_HEAD_att	R_avg_DISTANCE_att	0.8031134
## 166	R_avg_opp_HEAD_att	R_avg_DISTANCE_landed	0.7614953
## 167	R_avg_opp_HEAD_att	R_avg_opp_DISTANCE_att	0.9429450
## 168	R_avg_opp_HEAD_att	R_avg_opp_DISTANCE_landed	0.8807164
## 169	R_avg_opp_HEAD_landed	R_avg_opp_DISTANCE_att	0.7881156
## 170	R_avg_opp_HEAD_landed	R_avg_opp_DISTANCE_landed	0.8389928
## 171	R_avg_BODY_att	R_avg_BODY_landed	0.9476314
## 172	R_avg_opp_BODY_att	R_avg_opp_BODY_landed	0.9517748
## 173	R_avg_opp_BODY_att	R_avg_opp_DISTANCE_landed	0.7096931
## 174	R_avg_LEG_att	R_avg_LEG_landed	0.9832987
## 175	R_avg_opp_LEG_att	R_avg_opp_LEG_landed	0.9772009
## 176	R_avg_DISTANCE_att	R_avg_DISTANCE_landed	0.9370718
## 177	R_avg_DISTANCE_att	R_avg_opp_DISTANCE_att	0.8586451
## 178	R_avg_DISTANCE_att	R_avg_opp_DISTANCE_landed	0.8077451
## 179	R_avg_DISTANCE_landed	R_avg_opp_DISTANCE_att	0.8256149
## 180	R_avg_DISTANCE_landed	R_avg_opp_DISTANCE_landed	0.7782799
## 181	R_avg_opp_DISTANCE_att	R_avg_opp_DISTANCE_landed	0.9456386
## 182	R_avg_CLINCH_att	R_avg_CLINCH_landed	0.9680924
## 183	R_avg_opp_CLINCH_att	R_avg_opp_CLINCH_landed	0.9620589
## 184	R_avg_GROUND_att	R_avg_GROUND_landed	0.9709510
## 185	R_avg_opp_GROUND_att	R_avg_opp_GROUND_landed	0.9636685
## 186	R_total_rounds_fought	R_wins	0.9196141
## 187	R_total_rounds_fought	R_losses	0.7768172
## 188	R_total_rounds_fought	R_win_by_Decision_Unanimous	0.7217403
## 189	R_current_win_streak	R_longest_win_streak	0.7294437
## 190	R_longest_win_streak	R_wins	0.8216567
## 191	R_wins	R_win_by_Decision_Unanimous	0.7058710
## 192	R_wins	R_win_by_KO.TKO	0.7837114

##	Var1	Var2	Correlation
## 1	B_avg_SIG_STR_att	B_avg_SIG_STR_landed	0.9182874
## 2	B_avg_SIG_STR_att	B_avg_opp_SIG_STR_att	0.7899174
## 3	B_avg_SIG_STR_att	B_avg_opp_SIG_STR_landed	0.7159620
## 4	B_avg_SIG_STR_att	B_avg_TOTAL_STR_att	0.9197062
## 5	B_avg_SIG_STR_att	B_avg_TOTAL_STR_landed	0.7342415
## 6	B_avg_SIG_STR_att	B_avg_opp_TOTAL_STR_att	0.7125382
## 7	B_avg_SIG_STR_att	B_avg_HEAD_att	0.9754138
## 8	B_avg_SIG_STR_att	B_avg_HEAD_landed	0.8733349
## 9	B_avg_SIG_STR_att	B_avg_opp_HEAD_att	0.7692529
## 10	B_avg_SIG_STR_att	B_avg_BODY_att	0.7143081
## 11	B_avg_SIG_STR_att	B_avg_DISTANCE_att	0.9633431
## 12	B_avg_SIG_STR_att	B_avg_DISTANCE_landed	0.9063783
## 13	B_avg_SIG_STR_att	B_avg_opp_DISTANCE_att	0.8216589
## 14	B_avg_SIG_STR_att	B_avg_opp_DISTANCE_landed	0.7749512
## 15	B_avg_SIG_STR_att	B_total_time_fought.seconds.	0.7687732
## 16	B_avg_SIG_STR_landed	B_avg_TOTAL_STR_att	0.8828518
## 17	B_avg_SIG_STR_landed	B_avg_TOTAL_STR_landed	0.8411312
## 18	B_avg_SIG_STR_landed	B_avg_HEAD_att	0.8549752
## 19	B_avg_SIG_STR_landed	B_avg_HEAD_landed	0.9287620

## 20	B_avg_SIG_STR_landed	B_avg_BODY_att	0.7416201
## 21	B_avg_SIG_STR_landed	B_avg_BODY_landed	0.7604075
## 22	B_avg_SIG_STR_landed	B_avg_DISTANCE_att	0.8370466
## 23	B_avg_SIG_STR_landed	B_avg_DISTANCE_landed	0.9191141
## 24	B_avg_opp_SIG_STR_att	B_avg_opp_SIG_STR_landed	0.9233250
## 25	B_avg_opp_SIG_STR_att	B_avg_TOTAL_STR_att	0.7185448
## 26	B_avg_opp_SIG_STR_att	B_avg_opp_TOTAL_STR_att	0.9346906
## 27	B_avg_opp_SIG_STR_att	B_avg_opp_TOTAL_STR_landed	0.7618872
## 28	B_avg_opp_SIG_STR_att	B_avg_HEAD_att	0.7850767
## 29	B_avg_opp_SIG_STR_att	B_avg_opp_HEAD_att	0.9785850
## 30	B_avg_opp_SIG_STR_att	B_avg_opp_HEAD_landed	0.8640453
## 31	B_avg_opp_SIG_STR_att	B_avg_opp_BODY_att	0.7144357
## 32	B_avg_opp_SIG_STR_att	B_avg_DISTANCE_att	0.8199851
## 33	B_avg_opp_SIG_STR_att	B_avg_DISTANCE_landed	0.7246686
## 34	B_avg_opp_SIG_STR_att	B_avg_opp_DISTANCE_att	0.9496770
## 35	B_avg_opp_SIG_STR_att	B_avg_opp_DISTANCE_landed	0.8907622
## 36	B_avg_opp_SIG_STR_att	B_total_time_fought.seconds.	0.8016489
## 37	B_avg_opp_SIG_STR_landed	B_avg_opp_TOTAL_STR_att	0.8983849
## 38	B_avg_opp_SIG_STR_landed	B_avg_opp_TOTAL_STR_landed	0.8618466
## 39	B_avg_opp_SIG_STR_landed	B_avg_HEAD_att	0.7068221
## 40	B_avg_opp_SIG_STR_landed	B_avg_opp_HEAD_att	0.8843366
## 41	B_avg_opp_SIG_STR_landed	B_avg_opp_HEAD_landed	0.9402921
## 42	B_avg_opp_SIG_STR_landed	B_avg_opp_BODY_att	0.7093249
## 43	B_avg_opp_SIG_STR_landed	B_avg_opp_BODY_landed	0.7373582
## 44	B_avg_opp_SIG_STR_landed	B_avg_DISTANCE_att	0.7348490
## 45	B_avg_opp_SIG_STR_landed	B_avg_opp_DISTANCE_att	0.8433829
## 46	B_avg_opp_SIG_STR_landed	B_avg_opp_DISTANCE_landed	0.9156668
## 47	B_avg_opp_SIG_STR_landed	B_total_time_fought.seconds.	0.7441038
## 48	B_avg_TOTAL_STR_att	B_avg_TOTAL_STR_landed	0.9173012
## 49	B_avg_TOTAL_STR_att	B_avg_HEAD_att	0.9085602
## 50	B_avg_TOTAL_STR_att	B_avg_HEAD_landed	0.8723451
## 51	B_avg_TOTAL_STR_att	B_avg_opp_HEAD_att	0.7086270
## 52	B_avg_TOTAL_STR_att	B_avg_DISTANCE_att	0.8303067
## 53	B_avg_TOTAL_STR_att	B_avg_DISTANCE_landed	0.7908105
## 54	B_avg_TOTAL_STR_att	B_avg_opp_DISTANCE_att	0.7243133
## 55	B_avg_TOTAL_STR_att	B_total_time_fought.seconds.	0.8155320
## 56	B_avg_TOTAL_STR_landed	B_avg_HEAD_att	0.7021384
## 57	B_avg_TOTAL_STR_landed	B_avg_HEAD_landed	0.8284438
## 58	B_avg_TOTAL_STR_landed	B_total_time_fought.seconds.	0.7008874
## 59	B_avg_opp_TOTAL_STR_att	B_avg_opp_TOTAL_STR_landed	0.9189696
## 60	B_avg_opp_TOTAL_STR_att	B_avg_opp_HEAD_att	0.9244037
## 61	B_avg_opp_TOTAL_STR_att	B_avg_opp_HEAD_landed	0.8631325
## 62	B_avg_opp_TOTAL_STR_att	B_avg_DISTANCE_att	0.7250163
## 63	B_avg_opp_TOTAL_STR_att	B_avg_opp_DISTANCE_att	0.8334491
## 64	B_avg_opp_TOTAL_STR_att	B_avg_opp_DISTANCE_landed	0.7830301
## 65	B_avg_opp_TOTAL_STR_att	B_total_time_fought.seconds.	0.8363379
## 66	B_avg_opp_TOTAL_STR_landed	B_avg_opp_HEAD_att	0.7449819
## 67	B_avg_opp_TOTAL_STR_landed	B_avg_opp_HEAD_landed	0.8407556
## 68	B_avg_opp_TOTAL_STR_landed	B_total_time_fought.seconds.	0.7458124
## 69	B_avg_TD_att	B_avg_TD_landed	0.8343629
## 70	B_avg_TD_att	B_avg_CTRL_time.seconds.	0.7249677
## 71	B_avg_TD_landed	B_avg_CTRL_time.seconds.	0.8068907
## 72	B_avg_opp_TD_att	B_avg_opp_TD_landed	0.7398933
## 73	B_avg_opp_TD_att	B_avg_opp_CTRL_time.seconds.	0.7098550

## 74	B_avg_opp_TD_landed	B_avg_opp_CTRL_time.seconds.	0.7545234
## 75	B_avg_HEAD_att	B_avg_HEAD_landed	0.8864049
## 76	B_avg_HEAD_att	B_avg_opp_HEAD_att	0.7678359
## 77	B_avg_HEAD_att	B_avg_DISTANCE_att	0.9392859
## 78	B_avg_HEAD_att	B_avg_DISTANCE_landed	0.8448489
## 79	B_avg_HEAD_att	B_avg_opp_DISTANCE_att	0.8269571
## 80	B_avg_HEAD_att	B_avg_opp_DISTANCE_landed	0.7807608
## 81	B_avg_HEAD_att	B_total_time_fought.seconds.	0.7442413
## 82	B_avg_HEAD_landed	B_avg_DISTANCE_att	0.7790079
## 83	B_avg_HEAD_landed	B_avg_DISTANCE_landed	0.8319934
## 84	B_avg_opp_HEAD_att	B_avg_opp_HEAD_landed	0.8901416
## 85	B_avg_opp_HEAD_att	B_avg_DISTANCE_att	0.7984241
## 86	B_avg_opp_HEAD_att	B_avg_DISTANCE_landed	0.7093186
## 87	B_avg_opp_HEAD_att	B_avg_opp_DISTANCE_att	0.9164047
## 88	B_avg_opp_HEAD_att	B_avg_opp_DISTANCE_landed	0.8407602
## 89	B_avg_opp_HEAD_att	B_total_time_fought.seconds.	0.7636890
## 90	B_avg_opp_HEAD_landed	B_avg_opp_DISTANCE_att	0.7632988
## 91	B_avg_opp_HEAD_landed	B_avg_opp_DISTANCE_landed	0.8330112
## 92	B_avg_BODY_att	B_avg_BODY_landed	0.9640823
## 93	B_avg_BODY_att	B_avg_DISTANCE_landed	0.7109864
## 94	B_avg_BODY_landed	B_avg_DISTANCE_landed	0.7013647
## 95	B_avg_opp_BODY_att	B_avg_opp_BODY_landed	0.9541825
## 96	B_avg_opp_BODY_att	B_avg_opp_DISTANCE_att	0.7130109
## 97	B_avg_opp_BODY_att	B_avg_opp_DISTANCE_landed	0.7196871
## 98	B_avg_opp_BODY_landed	B_avg_opp_DISTANCE_landed	0.7042406
## 99	B_avg_LEG_att	B_avg_LEG_landed	0.9898692
## 100	B_avg_opp_LEG_att	B_avg_opp_LEG_landed	0.9688008
## 101	B_avg_DISTANCE_att	B_avg_DISTANCE_landed	0.9304680
## 102	B_avg_DISTANCE_att	B_avg_opp_DISTANCE_att	0.8626285
## 103	B_avg_DISTANCE_att	B_avg_opp_DISTANCE_landed	0.8116982
## 104	B_avg_DISTANCE_att	B_total_time_fought.seconds.	0.7232618
## 105	B_avg_DISTANCE_landed	B_avg_opp_DISTANCE_att	0.7594731
## 106	B_avg_DISTANCE_landed	B_avg_opp_DISTANCE_landed	0.7079149
## 107	B_avg_opp_DISTANCE_att	B_avg_opp_DISTANCE_landed	0.9323528
## 108	B_avg_opp_DISTANCE_att	B_total_time_fought.seconds.	0.7461940
## 109	B_avg_CLINCH_att	B_avg_CLINCH_landed	0.9674331
## 110	B_avg_opp_CLINCH_att	B_avg_opp_CLINCH_landed	0.9775834
## 111	B_avg_GROUND_att	B_avg_GROUND_landed	0.9717542
## 112	B_avg_opp_GROUND_att	B_avg_opp_GROUND_landed	0.9278062
## 113	B_total_rounds_fought	B_longest_win_streak	0.7350706
## 114	B_total_rounds_fought	B_wins	0.9207559
## 115	B_total_rounds_fought	B_losses	0.8470012
## 116	B_total_rounds_fought	B_win_by_KO.TKO	0.8094623
## 117	B_total_title_bouts	B_wins	0.7009979
## 118	B_longest_win_streak	B_wins	0.8387082
## 119	B_longest_win_streak	B_win_by_KO.TKO	0.8220957
## 120	B_wins	B_losses	0.7178792
## 121	B_wins	B_win_by_KO.TKO	0.8624718
## 122	B_Height_cms	B_Reach_cms	0.7492387
## 123	R_avg_SIG_STR_att	R_avg_SIG_STR_landed	0.9240477
## 124	R_avg_SIG_STR_att	R_avg_opp_SIG_STR_att	0.7461648
## 125	R_avg_SIG_STR_att	R_avg_TOTAL_STR_att	0.9308051
## 126	R_avg_SIG_STR_att	R_avg_TOTAL_STR_landed	0.7623906
## 127	R_avg_SIG_STR_att	R_avg_HEAD_att	0.9751869

## 128	R_avg_SIG_STR_att	R_avg_HEAD_landed	0.8692451
## 129	R_avg_SIG_STR_att	R_avg_opp_HEAD_att	0.7194065
## 130	R_avg_SIG_STR_att	R_avg_DISTANCE_att	0.9218940
## 131	R_avg_SIG_STR_att	R_avg_DISTANCE_landed	0.8722774
## 132	R_avg_SIG_STR_att	R_avg_opp_DISTANCE_att	0.7950456
## 133	R_avg_SIG_STR_att	R_avg_opp_DISTANCE_landed	0.7033285
## 134	R_avg_SIG_STR_att	R_total_time_fought.seconds.	0.7166259
## 135	R_avg_SIG_STR_landed	R_avg_TOTAL_STR_att	0.9018733
## 136	R_avg_SIG_STR_landed	R_avg_TOTAL_STR_landed	0.8644768
## 137	R_avg_SIG_STR_landed	R_avg_HEAD_att	0.8754661
## 138	R_avg_SIG_STR_landed	R_avg_HEAD_landed	0.9358436
## 139	R_avg_SIG_STR_landed	R_avg_DISTANCE_att	0.7814873
## 140	R_avg_SIG_STR_landed	R_avg_DISTANCE_landed	0.8431420
## 141	R_avg_opp_SIG_STR_att	R_avg_opp_SIG_STR_landed	0.9114124
## 142	R_avg_opp_SIG_STR_att	R_avg_opp_TOTAL_STR_att	0.9161760
## 143	R_avg_opp_SIG_STR_att	R_avg_HEAD_att	0.7193723
## 144	R_avg_opp_SIG_STR_att	R_avg_opp_HEAD_att	0.9738763
## 145	R_avg_opp_SIG_STR_att	R_avg_opp_HEAD_landed	0.8511631
## 146	R_avg_opp_SIG_STR_att	R_avg_DISTANCE_att	0.8073687
## 147	R_avg_opp_SIG_STR_att	R_avg_DISTANCE_landed	0.7550758
## 148	R_avg_opp_SIG_STR_att	R_avg_opp_DISTANCE_att	0.9553872
## 149	R_avg_opp_SIG_STR_att	R_avg_opp_DISTANCE_landed	0.8884946
## 150	R_avg_opp_SIG_STR_att	R_total_time_fought.seconds.	0.7244858
## 151	R_avg_opp_SIG_STR_landed	R_avg_opp_TOTAL_STR_att	0.8799384
## 152	R_avg_opp_SIG_STR_landed	R_avg_opp_TOTAL_STR_landed	0.8223772
## 153	R_avg_opp_SIG_STR_landed	R_avg_opp_HEAD_att	0.8537808
## 154	R_avg_opp_SIG_STR_landed	R_avg_opp_HEAD_landed	0.9250951
## 155	R_avg_opp_SIG_STR_landed	R_avg_opp_BODY_att	0.7405834
## 156	R_avg_opp_SIG_STR_landed	R_avg_opp_BODY_landed	0.7244870
## 157	R_avg_opp_SIG_STR_landed	R_avg_opp_DISTANCE_att	0.8092565
## 158	R_avg_opp_SIG_STR_landed	R_avg_opp_DISTANCE_landed	0.8892614
## 159	R_avg_TOTAL_STR_att	R_avg_TOTAL_STR_landed	0.9263812
## 160	R_avg_TOTAL_STR_att	R_avg_HEAD_att	0.9198862
## 161	R_avg_TOTAL_STR_att	R_avg_HEAD_landed	0.8727719
## 162	R_avg_TOTAL_STR_att	R_avg_DISTANCE_att	0.7861504
## 163	R_avg_TOTAL_STR_att	R_avg_DISTANCE_landed	0.7412976
## 164	R_avg_TOTAL_STR_att	R_total_time_fought.seconds.	0.7620852
## 165	R_avg_TOTAL_STR_landed	R_avg_HEAD_att	0.7415003
## 166	R_avg_TOTAL_STR_landed	R_avg_HEAD_landed	0.8412615
## 167	R_avg_opp_TOTAL_STR_att	R_avg_opp_TOTAL_STR_landed	0.9037127
## 168	R_avg_opp_TOTAL_STR_att	R_avg_opp_HEAD_att	0.8955511
## 169	R_avg_opp_TOTAL_STR_att	R_avg_opp_HEAD_landed	0.8401342
## 170	R_avg_opp_TOTAL_STR_att	R_avg_opp_DISTANCE_att	0.8122502
## 171	R_avg_opp_TOTAL_STR_att	R_avg_opp_DISTANCE_landed	0.7576147
## 172	R_avg_opp_TOTAL_STR_att	R_total_time_fought.seconds.	0.7851644
## 173	R_avg_opp_TOTAL_STR_landed	R_avg_opp_HEAD_landed	0.7870917
## 174	R_avg_TD_att	R_avg_TD_landed	0.8733247
## 175	R_avg_TD_att	R_avg_CTRL_time.seconds.	0.7489257
## 176	R_avg_TD_landed	R_avg_CTRL_time.seconds.	0.7943096
## 177	R_avg_opp_TD_att	R_avg_opp_TD_landed	0.7559554
## 178	R_avg_opp_TD_landed	R_avg_opp_CTRL_time.seconds.	0.7665658
## 179	R_avg_HEAD_att	R_avg_HEAD_landed	0.8948488
## 180	R_avg_HEAD_att	R_avg_DISTANCE_att	0.8893309
## 181	R_avg_HEAD_att	R_avg_DISTANCE_landed	0.8151441

## 182	R_avg_HEAD_att	R_avg_opp_DISTANCE_att	0.7653236
## 183	R_avg_HEAD_landed	R_avg_DISTANCE_att	0.7080199
## 184	R_avg_HEAD_landed	R_avg_DISTANCE_landed	0.7558715
## 185	R_avg_opp_HEAD_att	R_avg_opp_HEAD_landed	0.8761845
## 186	R_avg_opp_HEAD_att	R_avg_DISTANCE_att	0.7779857
## 187	R_avg_opp_HEAD_att	R_avg_DISTANCE_landed	0.7330197
## 188	R_avg_opp_HEAD_att	R_avg_opp_DISTANCE_att	0.9281579
## 189	R_avg_opp_HEAD_att	R_avg_opp_DISTANCE_landed	0.8280559
## 190	R_avg_opp_HEAD_landed	R_avg_opp_DISTANCE_att	0.7335600
## 191	R_avg_opp_HEAD_landed	R_avg_opp_DISTANCE_landed	0.7913456
## 192	R_avg_BODY_att	R_avg_BODY_landed	0.9608770
## 193	R_avg_opp_BODY_att	R_avg_opp_BODY_landed	0.9699752
## 194	R_avg_LEG_att	R_avg_LEG_landed	0.9832062
## 195	R_avg_opp_LEG_att	R_avg_opp_LEG_landed	0.9811172
## 196	R_avg_DISTANCE_att	R_avg_DISTANCE_landed	0.9382246
## 197	R_avg_DISTANCE_att	R_avg_opp_DISTANCE_att	0.8656323
## 198	R_avg_DISTANCE_att	R_avg_opp_DISTANCE_landed	0.7805911
## 199	R_avg_DISTANCE_landed	R_avg_opp_DISTANCE_att	0.8119716
## 200	R_avg_DISTANCE_landed	R_avg_opp_DISTANCE_landed	0.7222526
## 201	R_avg_opp_DISTANCE_att	R_avg_opp_DISTANCE_landed	0.9228416
## 202	R_avg_CLINCH_att	R_avg_CLINCH_landed	0.9848565
## 203	R_avg_opp_CLINCH_att	R_avg_opp_CLINCH_landed	0.9763739
## 204	R_avg_GROUND_att	R_avg_GROUND_landed	0.9299727
## 205	R_avg_opp_GROUND_att	R_avg_opp_GROUND_landed	0.9823530
## 206	R_total_rounds_fought	R_longest_win_streak	0.7337441
## 207	R_total_rounds_fought	R_wins	0.9216351
## 208	R_total_rounds_fought	R_losses	0.8393195
## 209	R_total_rounds_fought	R_win_by_Decision_Unanimous	0.7105071
## 210	R_total_rounds_fought	R_win_by_KO.TKO	0.7885613
## 211	R_longest_win_streak	R_wins	0.8361258
## 212	R_longest_win_streak	R_win_by_KO.TKO	0.8101398
## 213	R_wins	R_losses	0.7216711
## 214	R_wins	R_win_by_KO.TKO	0.8504976
## 215	R_Height_cms	R_Reach_cms	0.7695223

There are so many predictor variables (over 100), we need to reduce that number. First, creating correlation matrix to identify variables that are highly correlated with each other. It would be much to visualize all combinations, so we will only extract high correlation combos (correlation > 0.7), for each class dataframe.

over 180 combinations in every class have high correlation. A lot.

Now need to deal with multicollinearity and perform variable selection. Will use ridge regression (to reduce multicollinearity) and lasso (to select variables). This is known as Elastic Net (linear regression model that includes both the L1 penalty of Lasso and the L2 penalty of Ridge regression). Elastic Net combines both L2 and L1 penalties of ridge regression and lasso. It controls the mixing of the two penalties through a parameter (lambda).

#scale numerical predictors

## [1]	"B_avg_KD"	"B_avg_opp_KD"
## [3]	"B_avg_SIG_STR_pct"	"B_avg_opp_SIG_STR_pct"
## [5]	"B_avg_TD_pct"	"B_avg_opp_TD_pct"
## [7]	"B_avg_SUB_ATT"	"B_avg_opp_SUB_ATT"
## [9]	"B_avg_REV"	"B_avg_opp_REV"
## [11]	"B_avg_SIG_STR_att"	"B_avg_SIG_STR_landed"

## [13]	"B_avg_opp_SIG_STR_att"	"B_avg_opp_SIG_STR_landed"
## [15]	"B_avg_TOTAL_STR_att"	"B_avg_TOTAL_STR_landed"
## [17]	"B_avg_opp_TOTAL_STR_att"	"B_avg_opp_TOTAL_STR_landed"
## [19]	"B_avg_TD_att"	"B_avg_TD_landed"
## [21]	"B_avg_opp_TD_att"	"B_avg_opp_TD_landed"
## [23]	"B_avg_HEAD_att"	"B_avg_HEAD_landed"
## [25]	"B_avg_opp_HEAD_att"	"B_avg_opp_HEAD_landed"
## [27]	"B_avg_BODY_att"	"B_avg_BODY_landed"
## [29]	"B_avg_opp_BODY_att"	"B_avg_opp_BODY_landed"
## [31]	"B_avg_LEG_att"	"B_avg_LEG_landed"
## [33]	"B_avg_opp_LEG_att"	"B_avg_opp_LEG_landed"
## [35]	"B_avg_DISTANCE_att"	"B_avg_DISTANCE_landed"
## [37]	"B_avg_opp_DISTANCE_att"	"B_avg_opp_DISTANCE_landed"
## [39]	"B_avg_CLINCH_att"	"B_avg_CLINCH_landed"
## [41]	"B_avg_opp_CLINCH_att"	"B_avg_opp_CLINCH_landed"
## [43]	"B_avg_GROUND_att"	"B_avg_GROUND_landed"
## [45]	"B_avg_opp_GROUND_att"	"B_avg_opp_GROUND_landed"
## [47]	"B_avg_CTRL_time.seconds."	"B_avg_opp_CTRL_time.seconds."
## [49]	"B_total_time_fought.seconds."	"B_total_rounds_fought"
## [51]	"B_total_title_bouts"	"B_current_win_streak"
## [53]	"B_current_lose_streak"	"B_longest_win_streak"
## [55]	"B_wins"	"B_losses"
## [57]	"B_win_by_Decision_Majority"	"B_win_by_Decision_Split"
## [59]	"B_win_by_Decision_Unanimous"	"B_win_by_KO.TKO"
## [61]	"B_win_by_Submission"	"B_win_by_TKO_Doctor_Stoppage"
## [63]	"B_Height_cms"	"B_Reach_cms"
## [65]	"B_Weight_lbs"	"R_avg_KD"
## [67]	"R_avg_opp_KD"	"R_avg_SIG_STR_pct"
## [69]	"R_avg_opp_SIG_STR_pct"	"R_avg_TD_pct"
## [71]	"R_avg_opp_TD_pct"	"R_avg_SUB_ATT"
## [73]	"R_avg_opp_SUB_ATT"	"R_avg_REV"
## [75]	"R_avg_opp_REV"	"R_avg_SIG_STR_att"
## [77]	"R_avg_SIG_STR_landed"	"R_avg_opp_SIG_STR_att"
## [79]	"R_avg_opp_SIG_STR_landed"	"R_avg_TOTAL_STR_att"
## [81]	"R_avg_TOTAL_STR_landed"	"R_avg_opp_TOTAL_STR_att"
## [83]	"R_avg_opp_TOTAL_STR_landed"	"R_avg_TD_att"
## [85]	"R_avg_TD_landed"	"R_avg_opp_TD_att"
## [87]	"R_avg_opp_TD_landed"	"R_avg_HEAD_att"
## [89]	"R_avg_HEAD_landed"	"R_avg_opp_HEAD_att"
## [91]	"R_avg_opp_HEAD_landed"	"R_avg_BODY_att"
## [93]	"R_avg_BODY_landed"	"R_avg_opp_BODY_att"
## [95]	"R_avg_opp_BODY_landed"	"R_avg_LEG_att"
## [97]	"R_avg_LEG_landed"	"R_avg_opp_LEG_att"
## [99]	"R_avg_opp_LEG_landed"	"R_avg_DISTANCE_att"
## [101]	"R_avg_DISTANCE_landed"	"R_avg_opp_DISTANCE_att"
## [103]	"R_avg_opp_DISTANCE_landed"	"R_avg_CLINCH_att"
## [105]	"R_avg_CLINCH_landed"	"R_avg_opp_CLINCH_att"
## [107]	"R_avg_opp_CLINCH_landed"	"R_avg_GROUND_att"
## [109]	"R_avg_GROUND_landed"	"R_avg_opp_GROUND_att"
## [111]	"R_avg_opp_GROUND_landed"	"R_avg_CTRL_time.seconds."
## [113]	"R_avg_opp_CTRL_time.seconds."	"R_total_time_fought.seconds."
## [115]	"R_total_rounds_fought"	"R_total_title_bouts"
## [117]	"R_current_win_streak"	"R_current_lose_streak"
## [119]	"R_longest_win_streak"	"R_wins"


```
## [121] "R_losses" "R_win_by_Decision_Majority"
## [123] "R_win_by_Decision_Split" "R_win_by_Decision_Unanimous"
## [125] "R_win_by_KO.TKO" "R_win_by_Submission"
## [127] "R_win_by_TKO_Doctor_Stoppage" "R_Height_cms"
## [129] "R_Reach_cms" "R_Weight_lbs"
## [131] "B_age" "R_age"
```

I scaled the numerical predictors for each dataset because these techniques are sensitive to scale.

```
#transform categorical predictors
```

I will transform the categorical variables (including our response variable) into numerical format so they can be used in Elastic Net. I will do this by using dummy variables. I am removing the additional dummy variable for the response, so it is only in the context of Red winning or losing (1 = Red win, 0 = Red lose).

```
#create test and train datasets
```

use 70% of dataset as training set and 30% as test set. separate the response variable from the predictor variables

```
#final model (class 1)
```

```
## Accuracy
## 0.5741445
```

```
## Precision
## 0.552795
```

```
## Recall
## 0.6899225
```

```
## F1
## 0.6137931
```

```
## 142 x 1 sparse Matrix of class "dgCMatrix"
## s1
## (Intercept) -0.0736716598
## B_avg_KD 0.0014036834
## B_avg_opp_KD .
## B_avg_SIG_STR_pct .
## B_avg_opp_SIG_STR_pct 0.0837715078
## B_avg_TD_pct -0.0347620006
## B_avg_opp_TD_pct 0.0038311339
## B_avg_SUB_ATT -0.0480111658
## B_avg_opp_SUB_ATT .
## B_avg_REV 0.0548621515
## B_avg_opp_REV -0.0556104712
## B_avg_SIG_STR_att -0.0204455652
## B_avg_SIG_STR_landed -0.0665826184
## B_avg_opp_SIG_STR_att .
## B_avg_opp_SIG_STR_landed .
## B_avg_TOTAL_STR_att .
## B_avg_TOTAL_STR_landed .
## B_avg_opp_TOTAL_STR_att .
## B_avg_opp_TOTAL_STR_landed 0.0524613361
```

## B_avg_TD_att	.
## B_avg_TD_landed	-0.0914117417
## B_avg_opp_TD_att	-0.0337506203
## B_avg_opp_TD_landed	.
## B_avg_HEAD_att	-0.0006072196
## B_avg_HEAD_landed	-0.0599452527
## B_avg_opp_HEAD_att	.
## B_avg_opp_HEAD_landed	.
## B_avg_BODY_att	-0.0047310702
## B_avg_BODY_landed	-0.0041510173
## B_avg_opp_BODY_att	.
## B_avg_opp_BODY_landed	.
## B_avg_LEG_att	-0.0408225424
## B_avg_LEG_landed	.
## B_avg_opp_LEG_att	.
## B_avg_opp_LEG_landed	0.0054794856
## B_avg_DISTANCE_att	.
## B_avg_DISTANCE_landed	-0.0354664650
## B_avg_opp_DISTANCE_att	.
## B_avg_opp_DISTANCE_landed	.
## B_avg_CLINCH_att	.
## B_avg_CLINCH_landed	.
## B_avg_opp_CLINCH_att	0.0569685984
## B_avg_opp_CLINCH_landed	0.0444915849
## B_avg_GROUND_att	-0.0024245793
## B_avg_GROUND_landed	-0.0257325457
## B_avg_opp_GROUND_att	.
## B_avg_opp_GROUND_landed	.
## B_avg_CTRL_time.seconds.	.
## B_avg_opp_CTRL_time.seconds.	0.0063447036
## B_total_time_fought.seconds.	.
## B_total_rounds_fought	-0.0235702236
## B_total_title_bouts	.
## B_current_win_streak	.
## B_current_lose_streak	0.0167716860
## B_longest_win_streak	.
## B_wins	-0.0323464578
## B_losses	.
## B_win_by_Decision_Majority	-0.0370641053
## B_win_by_Decision_Split	-0.0053255608
## B_win_by_Decision_Unanimous	-0.0227663568
## B_win_by_KO.TKO	-0.0321522592
## B_win_by_Submission	.
## B_win_by_TKO_Doctor_Stoppage	.
## B_Height_cms	0.0369867508
## B_Reach_cms	.
## B_Weight_lbs	0.0120668309
## R_avg_KD	-0.0407314076
## R_avg_opp_KD	-0.0727215895
## R_avg_SIG_STR_pct	0.0586457464
## R_avg_opp_SIG_STR_pct	-0.0677250487
## R_avg_TD_pct	.
## R_avg_opp_TD_pct	.
## R_avg_SUB_ATT	0.0647081730

## R_avg_opp_SUB_ATT	-0.0737540781
## R_avg_REV	0.0395248531
## R_avg_opp_REV	-0.1368955955
## R_avg_SIG_STR_att	.
## R_avg_SIG_STR_landed	0.0612084236
## R_avg_opp_SIG_STR_att	.
## R_avg_opp_SIG_STR_landed	.
## R_avg_TOTAL_STR_att	.
## R_avg_TOTAL_STR_landed	.
## R_avg_opp_TOTAL_STR_att	.
## R_avg_opp_TOTAL_STR_landed	.
## R_avg_TD_att	0.0635145980
## R_avg_TD_landed	.
## R_avg_opp_TD_att	.
## R_avg_opp_TD_landed	.
## R_avg_HEAD_att	.
## R_avg_HEAD_landed	0.0762480775
## R_avg_opp_HEAD_att	.
## R_avg_opp_HEAD_landed	-0.0350532180
## R_avg_BODY_att	.
## R_avg_BODY_landed	.
## R_avg_opp_BODY_att	.
## R_avg_opp_BODY_landed	.
## R_avg_LEG_att	.
## R_avg_LEG_landed	.
## R_avg_opp_LEG_att	0.0095344647
## R_avg_opp_LEG_landed	.
## R_avg_DISTANCE_att	.
## R_avg_DISTANCE_landed	0.0324892279
## R_avg_opp_DISTANCE_att	.
## R_avg_opp_DISTANCE_landed	.
## R_avg_CLINCH_att	0.0099675275
## R_avg_CLINCH_landed	.
## R_avg_opp_CLINCH_att	.
## R_avg_opp_CLINCH_landed	.
## R_avg_GROUND_att	.
## R_avg_GROUND_landed	.
## R_avg_opp_GROUND_att	-0.0130824767
## R_avg_opp_GROUND_landed	.
## R_avg_CTRL_time.seconds.	.
## R_avg_opp_CTRL_time.seconds.	.
## R_total_time_fought.seconds.	0.0398275493
## R_total_rounds_fought	.
## R_total_title_bouts	0.0823532977
## R_current_win_streak	.
## R_current_lose_streak	.
## R_longest_win_streak	0.0507386208
## R_wins	.
## R_losses	-0.0072814512
## R_win_by_Decision_Majority	-0.0547554627
## R_win_by_Decision_Split	-0.0604551157
## R_win_by_Decision_Unanimous	.
## R_win_by_KO.TKO	.
## R_win_by_Submission	0.0846637587

```
## R_win_by_TKO_Doctor_Stoppage 0.0285365808
## R_Height_cms -0.0074759752
## R_Reach_cms .
## R_Weight_lbs .
## B_age 0.2049593370
## R_age -0.1524061627
## title_boutFALSE .
## title_boutTRUE .
## B_StanceOrthodox .
## B_StanceSouthpaw .
## B_StanceSwitch .
## R_StanceOrthodox -0.1484045305
## R_StanceSouthpaw .
## R_StanceSwitch 0.1436997643
## id .
```

Now moving to models, perform cross-validation to find best lambda value. Will use to find the optimal lambda and alpha parameters. Alpha is the mixing parameter between Lasso (alpha = 1) and Ridge (alpha = 0) regression. Run cross-validation for each alpha value to find the optimal lambda. Find the combination that gives the best performance (e.g., the lowest deviance). Fit the Elastic Net model using the optimal alpha and lambda values. Evaluate the model on test set to check its performance.

Accuracy: proportion of the total number of predictions that were correct. Precision: ratio of correctly predicted positive observations to the total predicted positives. Recall (Sensitivity): ratio of correctly predicted positive observations to all observations in the actual class. F1-Score: weighted average of Precision and Recall.

Repeat with classes 2-4

#final model (class 2)

```
## Accuracy
## 0.5881007
```

```
## Precision
## 0.6483051
```

```
## Recall
## 0.612
```

```
## F1
## 0.6296296
```

```
## 142 x 1 sparse Matrix of class "dgCMatrix"
## s1
## (Intercept) -0.52931518
## B_avg_KD .
## B_avg_opp_KD .
## B_avg_SIG_STR_pct .
## B_avg_opp_SIG_STR_pct 0.02896176
## B_avg_TD_pct -0.05601958
## B_avg_opp_TD_pct .
## B_avg_SUB_ATT .
## B_avg_opp_SUB_ATT .
```

## B_avg_REV	.
## B_avg_opp_REV	-0.03641632
## B_avg_SIG_STR_att	.
## B_avg_SIG_STR_landed	.
## B_avg_opp_SIG_STR_att	.
## B_avg_opp_SIG_STR_landed	.
## B_avg_TOTAL_STR_att	.
## B_avg_TOTAL_STR_landed	.
## B_avg_opp_TOTAL_STR_att	.
## B_avg_opp_TOTAL_STR_landed	.
## B_avg_TD_att	-0.08512887
## B_avg_TD_landed	.
## B_avg_opp_TD_att	.
## B_avg_opp_TD_landed	.
## B_avg_HEAD_att	.
## B_avg_HEAD_landed	.
## B_avg_opp_HEAD_att	.
## B_avg_opp_HEAD_landed	.
## B_avg_BODY_att	.
## B_avg_BODY_landed	.
## B_avg_opp_BODY_att	.
## B_avg_opp_BODY_landed	.
## B_avg_LEG_att	.
## B_avg_LEG_landed	.
## B_avg_opp_LEG_att	.
## B_avg_opp_LEG_landed	.
## B_avg_DISTANCE_att	.
## B_avg_DISTANCE_landed	.
## B_avg_opp_DISTANCE_att	.
## B_avg_opp_DISTANCE_landed	.
## B_avg_CLINCH_att	.
## B_avg_CLINCH_landed	.
## B_avg_opp_CLINCH_att	.
## B_avg_opp_CLINCH_landed	.
## B_avg_GROUND_att	.
## B_avg_GROUND_landed	.
## B_avg_opp_GROUND_att	.
## B_avg_opp_GROUND_landed	.
## B_avg_CTRL_time.seconds.	.
## B_avg_opp_CTRL_time.seconds.	0.18580600
## B_total_time_fought.seconds.	.
## B_total_rounds_fought	.
## B_total_title_bouts	-0.06080349
## B_current_win_streak	-0.09953285
## B_current_lose_streak	.
## B_longest_win_streak	.
## B_wins	.
## B_losses	.
## B_win_by_Decision_Majority	.
## B_win_by_Decision_Split	0.10231847
## B_win_by_Decision_Unanimous	.
## B_win_by_KO.TKO	.
## B_win_by_Submission	.
## B_win_by_TKO_Doctor_Stoppage	0.05014786

## B_Height_cms	.
## B_Reach_cms	.
## B_Weight_lbs	-0.09626111
## R_avg_KD	0.01392291
## R_avg_opp_KD	.
## R_avg_SIG_STR_pct	.
## R_avg_opp_SIG_STR_pct	-0.09229031
## R_avg_TD_pct	.
## R_avg_opp_TD_pct	.
## R_avg_SUB_ATT	0.03848666
## R_avg_opp_SUB_ATT	.
## R_avg_REV	.
## R_avg_opp_REV	.
## R_avg_SIG_STR_att	.
## R_avg_SIG_STR_landed	.
## R_avg_opp_SIG_STR_att	.
## R_avg_opp_SIG_STR_landed	.
## R_avg_TOTAL_STR_att	.
## R_avg_TOTAL_STR_landed	.
## R_avg_opp_TOTAL_STR_att	.
## R_avg_opp_TOTAL_STR_landed	.
## R_avg_TD_att	0.02514946
## R_avg_TD_landed	0.07644537
## R_avg_opp_TD_att	0.03965540
## R_avg_opp_TD_landed	.
## R_avg_HEAD_att	.
## R_avg_HEAD_landed	.
## R_avg_opp_HEAD_att	.
## R_avg_opp_HEAD_landed	.
## R_avg_BODY_att	.
## R_avg_BODY_landed	.
## R_avg_opp_BODY_att	.
## R_avg_opp_BODY_landed	.
## R_avg_LEG_att	.
## R_avg_LEG_landed	.
## R_avg_opp_LEG_att	.
## R_avg_opp_LEG_landed	.
## R_avg_DISTANCE_att	.
## R_avg_DISTANCE_landed	.
## R_avg_opp_DISTANCE_att	.
## R_avg_opp_DISTANCE_landed	.
## R_avg_CLINCH_att	-0.03244548
## R_avg_CLINCH_landed	.
## R_avg_opp_CLINCH_att	.
## R_avg_opp_CLINCH_landed	.
## R_avg_GROUND_att	0.06235639
## R_avg_GROUND_landed	.
## R_avg_opp_GROUND_att	.
## R_avg_opp_GROUND_landed	.
## R_avg_CTRL_time.seconds.	0.02930244
## R_avg_opp_CTRL_time.seconds.	.
## R_total_time_fought.seconds.	.
## R_total_rounds_fought	.
## R_total_title_bouts	.

```

## R_current_win_streak      .
## R_current_lose_streak    -0.04523644
## R_longest_win_streak      0.19429302
## R_wins                    .
## R_losses                  .
## R_win_by_Decision_Majority .
## R_win_by_Decision_Split  -0.09606610
## R_win_by_Decision_Unanimous .
## R_win_by_KO.TKO          .
## R_win_by_Submission       0.03056205
## R_win_by_TKO_Doctor_Stoppage .
## R_Height_cms              .
## R_Reach_cms               .
## R_Weight_lbs              .
## B_age                     0.29422848
## R_age                     -0.12290034
## title_boutFALSE           0.41919414
## title_boutTRUE            .
## B_StanceOrthodox           0.09298650
## B_StanceSouthpaw          .
## B_StanceSwitch             .
## R_StanceOrthodox           .
## R_StanceSouthpaw           0.19661258
## R_StanceSwitch             .
## id                         .

```

#final model (class 3)

```

## Accuracy
## 0.5755396

```

```

## Precision
## 0.552

```

```

## Recall
## 0.5267176

```

```

## F1
## 0.5390625

```

```

## 144 x 1 sparse Matrix of class "dgCMatrix"
## s1
## (Intercept) 0.0586365538
## B_avg_KD -0.0865036087
## B_avg_opp_KD 0.0085009693
## B_avg_SIG_STR_pct .
## B_avg_opp_SIG_STR_pct .
## B_avg_TD_pct .
## B_avg_opp_TD_pct 0.0641004040
## B_avg_SUB_ATT -0.0354970294
## B_avg_opp_SUB_ATT .
## B_avg_REV .

```

## B_avg_opp_REV	.
## B_avg_SIG_STR_att	.
## B_avg_SIG_STR_landed	.
## B_avg_opp_SIG_STR_att	.
## B_avg_opp_SIG_STR_landed	.
## B_avg_TOTAL_STR_att	.
## B_avg_TOTAL_STR_landed	.
## B_avg_opp_TOTAL_STR_att	0.0062870835
## B_avg_opp_TOTAL_STR_landed	0.0542810228
## B_avg_TD_att	-0.0806732321
## B_avg_TD_landed	-0.0424500483
## B_avg_opp_TD_att	-0.1585511832
## B_avg_opp_TD_landed	.
## B_avg_HEAD_att	-0.0491188861
## B_avg_HEAD_landed	-0.0215857171
## B_avg_opp_HEAD_att	.
## B_avg_opp_HEAD_landed	.
## B_avg_BODY_att	0.0767080291
## B_avg_BODY_landed	0.0659440928
## B_avg_opp_BODY_att	.
## B_avg_opp_BODY_landed	.
## B_avg_LEG_att	0.0038035871
## B_avg_LEG_landed	.
## B_avg_opp_LEG_att	.
## B_avg_opp_LEG_landed	.
## B_avg_DISTANCE_att	-0.0059047291
## B_avg_DISTANCE_landed	.
## B_avg_opp_DISTANCE_att	.
## B_avg_opp_DISTANCE_landed	.
## B_avg_CLINCH_att	.
## B_avg_CLINCH_landed	0.0042858830
## B_avg_opp_CLINCH_att	.
## B_avg_opp_CLINCH_landed	0.0518626839
## B_avg_GROUND_att	.
## B_avg_GROUND_landed	.
## B_avg_opp_GROUND_att	.
## B_avg_opp_GROUND_landed	.
## B_avg_CTRL_time.seconds.	-0.0073448543
## B_avg_opp_CTRL_time.seconds.	0.0361505869
## B_total_time_fought.seconds.	-0.0387801194
## B_total_rounds_fought	.
## B_total_title_bouts	-0.0453490965
## B_current_win_streak	-0.0876331868
## B_current_lose_streak	.
## B_longest_win_streak	-0.0692127996
## B_wins	.
## B_losses	0.0749032041
## B_win_by_Decision_Majority	0.0693937833
## B_win_by_Decision_Split	.
## B_win_by_Decision_Unanimous	-0.0341081448
## B_win_by_KO.TKO	0.0453830119
## B_win_by_Submission	.
## B_win_by_TKO_Doctor_Stoppage	0.0029594677
## B_Height_cms	-0.1004673300

## B_Reach_cms	-0.0405207959
## B_Weight_lbs	.
## R_avg_KD	.
## R_avg_opp_KD	.
## R_avg_SIG_STR_pct	0.0611588323
## R_avg_opp_SIG_STR_pct	.
## R_avg_TD_pct	-0.0184428511
## R_avg_opp_TD_pct	-0.0219544178
## R_avg_SUB_ATT	-0.0448335554
## R_avg_opp_SUB_ATT	0.0084037919
## R_avg_REV	.
## R_avg_opp_REV	0.0312156452
## R_avg_SIG_STR_att	.
## R_avg_SIG_STR_landed	0.0015576441
## R_avg_opp_SIG_STR_att	.
## R_avg_opp_SIG_STR_landed	-0.0155231941
## R_avg_TOTAL_STR_att	.
## R_avg_TOTAL_STR_landed	0.0085628340
## R_avg_opp_TOTAL_STR_att	.
## R_avg_opp_TOTAL_STR_landed	.
## R_avg_TD_att	0.1284595596
## R_avg_TD_landed	.
## R_avg_opp_TD_att	.
## R_avg_opp_TD_landed	.
## R_avg_HEAD_att	.
## R_avg_HEAD_landed	.
## R_avg_opp_HEAD_att	-0.0355467549
## R_avg_opp_HEAD_landed	-0.0536749807
## R_avg_BODY_att	0.0302663277
## R_avg_BODY_landed	.
## R_avg_opp_BODY_att	.
## R_avg_opp_BODY_landed	-0.0520413235
## R_avg_LEG_att	0.0609950299
## R_avg_LEG_landed	0.0396069134
## R_avg_opp_LEG_att	0.0653166228
## R_avg_opp_LEG_landed	0.0135140761
## R_avg_DISTANCE_att	.
## R_avg_DISTANCE_landed	.
## R_avg_opp_DISTANCE_att	.
## R_avg_opp_DISTANCE_landed	.
## R_avg_CLINCH_att	0.0417559095
## R_avg_CLINCH_landed	0.0544745174
## R_avg_opp_CLINCH_att	.
## R_avg_opp_CLINCH_landed	.
## R_avg_GROUND_att	.
## R_avg_GROUND_landed	0.0076888029
## R_avg_opp_GROUND_att	-0.0265854317
## R_avg_opp_GROUND_landed	-0.0498816395
## R_avg_CTRL_time.seconds.	.
## R_avg_opp_CTRL_time.seconds.	.
## R_total_time_fought.seconds.	0.0044360056
## R_total_rounds_fought	0.0109443235
## R_total_title_bouts	.
## R_current_win_streak	0.0108903808

```

## R_current_lose_streak      .
## R_longest_win_streak      .
## R_wins                    0.0195056112
## R_losses                  .
## R_win_by_Decision_Majority 0.0264246614
## R_win_by_Decision_Split   -0.0036839253
## R_win_by_Decision_Unanimous .
## R_win_by_KO.TKO           0.0002694866
## R_win_by_Submission        .
## R_win_by_TKO_Doctor_Stoppage 0.0029399990
## R_Height_cms              .
## R_Reach_cms                0.0495504073
## R_Weight_lbs               0.0806298412
## B_age                      0.1491856154
## R_age                      -0.0532097049
## title_boutFALSE            0.0283952558
## title_boutTRUE            -0.0284285831
## B_StanceOpen Stance        .
## B_StanceOrthodox           0.0284266255
## B_StanceSouthpaw           -0.1473001676
## B_StanceSwitch             0.5079927898
## R_StanceOpen Stance        .
## R_StanceOrthodox           .
## R_StanceSouthpaw           0.0144480792
## R_StanceSwitch             .
## id                         .

```

#final model (class 4)

```

## Accuracy
## 0.5263158

```

```

## Precision
## 0.4761905

```

```

## Recall
## 0.4651163

```

```

## F1
## 0.4705882

```

```

## 142 x 1 sparse Matrix of class "dgCMatrix"
##              s1
## (Intercept)  0.047214909
## B_avg_KD      .
## B_avg_opp_KD   .
## B_avg_SIG_STR_pct .
## B_avg_opp_SIG_STR_pct .
## B_avg_TD_pct   .
## B_avg_opp_TD_pct .
## B_avg_SUB_ATT  .
## B_avg_opp_SUB_ATT .

```

```

## B_avg_REV .
## B_avg_opp_REV .
## B_avg_SIG_STR_att .
## B_avg_SIG_STR_landed .
## B_avg_opp_SIG_STR_att .
## B_avg_opp_SIG_STR_landed .
## B_avg_TOTAL_STR_att .
## B_avg_TOTAL_STR_landed .
## B_avg_opp_TOTAL_STR_att .
## B_avg_opp_TOTAL_STR_landed .
## B_avg_TD_att .
## B_avg_TD_landed .
## B_avg_opp_TD_att .
## B_avg_opp_TD_landed .
## B_avg_HEAD_att .
## B_avg_HEAD_landed .
## B_avg_opp_HEAD_att .
## B_avg_opp_HEAD_landed .
## B_avg_BODY_att .
## B_avg_BODY_landed .
## B_avg_opp_BODY_att .
## B_avg_opp_BODY_landed .
## B_avg_LEG_att .
## B_avg_LEG_landed .
## B_avg_opp_LEG_att .
## B_avg_opp_LEG_landed .
## B_avg_DISTANCE_att .
## B_avg_DISTANCE_landed .
## B_avg_opp_DISTANCE_att .
## B_avg_opp_DISTANCE_landed .
## B_avg_CLINCH_att .
## B_avg_CLINCH_landed .
## B_avg_opp_CLINCH_att .
## B_avg_opp_CLINCH_landed .
## B_avg_GROUND_att .
## B_avg_GROUND_landed .
## B_avg_opp_GROUND_att 0.205375633
## B_avg_opp_GROUND_landed .
## B_avg_CTRL_time.seconds .
## B_avg_opp_CTRL_time.seconds .
## B_total_time_fought.seconds .
## B_total_rounds_fought .
## B_total_title_bouts .
## B_current_win_streak .
## B_current_lose_streak .
## B_longest_win_streak .
## B_wins .
## B_losses .
## B_win_by_Decision_Majority .
## B_win_by_Decision_Split .
## B_win_by_Decision_Unanimous .
## B_win_by_KO.TKO .
## B_win_by_Submission .
## B_win_by_TKO_Doctor_Stoppage .

```

```

## B_Height_cms .
## B_Reach_cms .
## B_Weight_lbs .
## R_avg_KD .
## R_avg_opp_KD .
## R_avg_SIG_STR_pct .
## R_avg_opp_SIG_STR_pct .
## R_avg_TD_pct .
## R_avg_opp_TD_pct .
## R_avg_SUB_ATT .
## R_avg_opp_SUB_ATT .
## R_avg_REV .
## R_avg_opp_REV .
## R_avg_SIG_STR_att .
## R_avg_SIG_STR_landed .
## R_avg_opp_SIG_STR_att .
## R_avg_opp_SIG_STR_landed .
## R_avg_TOTAL_STR_att .
## R_avg_TOTAL_STR_landed .
## R_avg_opp_TOTAL_STR_att .
## R_avg_opp_TOTAL_STR_landed .
## R_avg_TD_att .
## R_avg_TD_landed .
## R_avg_opp_TD_att .
## R_avg_opp_TD_landed .
## R_avg_HEAD_att .
## R_avg_HEAD_landed .
## R_avg_opp_HEAD_att .
## R_avg_opp_HEAD_landed .
## R_avg_BODY_att .
## R_avg_BODY_landed .
## R_avg_opp_BODY_att .
## R_avg_opp_BODY_landed .
## R_avg_LEG_att .
## R_avg_LEG_landed .
## R_avg_opp_LEG_att .
## R_avg_opp_LEG_landed .
## R_avg_DISTANCE_att .
## R_avg_DISTANCE_landed .
## R_avg_opp_DISTANCE_att .
## R_avg_opp_DISTANCE_landed .
## R_avg_CLINCH_att .
## R_avg_CLINCH_landed .
## R_avg_opp_CLINCH_att -0.029531775
## R_avg_opp_CLINCH_landed -0.003057574
## R_avg_GROUND_att .
## R_avg_GROUND_landed .
## R_avg_opp_GROUND_att .
## R_avg_opp_GROUND_landed .
## R_avg_CTRL_time.seconds .
## R_avg_opp_CTRL_time.seconds .
## R_total_time_fought.seconds .
## R_total_rounds_fought .
## R_total_title_bouts .

```

```

## R_current_win_streak      .
## R_current_lose_streak     .
## R_longest_win_streak      .
## R_wins                    .
## R_losses                  -0.029805959
## R_win_by_Decision_Majority .
## R_win_by_Decision_Split   .
## R_win_by_Decision_Unanimous .
## R_win_by_KO.TKO           .
## R_win_by_Submission        .
## R_win_by_TKO_Doctor_Stoppage .
## R_Height_cms              .
## R_Reach_cms                .
## R_Weight_lbs               .
## B_age                      .
## R_age                     -0.113313650
## title_boutFALSE           .
## title_boutTRUE            .
## B_StanceOrthodox           .
## B_StanceSouthpaw           .
## B_StanceSwitch             .
## R_StanceOrthodox           .
## R_StanceSouthpaw           .
## R_StanceSwitch             .
## id                          .

```

Focusing on Predictive Accuracy

The elastic net models ran above indicate the most important predictors in determining a fight's winner within our weight class segmentation. Below we will explore including nonlinear and interaction effects to attempt to improve predictive accuracy with interpretability as less of a priority.