Predicting Win Rates for the Top 10%

Players

By Jeremy Brown

What Is PlayerUnknown's Battlegrounds?

- Free-for-all shooter
- Begin without any equipment
- Last player standing out of 100
- 3 modes: Solo, Duo, and Squad

Why Is PUBG Important?

- **Fastest growing game** of 2017
- Steam's Top Sellers, Most Concurrent Players 2017
- Nascent eSport

Can we predict who is tournament worthy?

Data Collected

27,000,000 PC Players
-> 11,000,000

Filters:

- Region - *North America*
- Game Mode - *Solo*
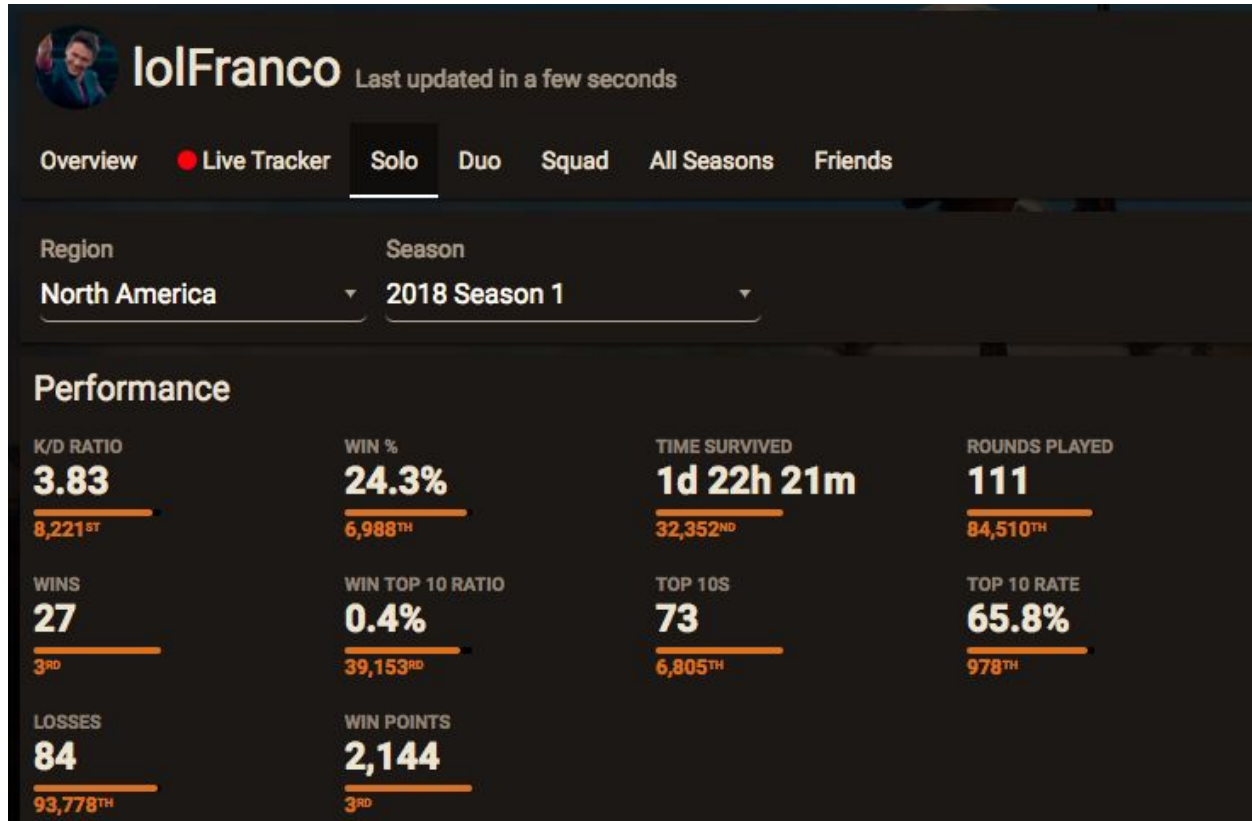
~190,000 -> **~19,000**

Player Features

- Behavior within a round
  - *Kills, heals, distance walked*
- Across all rounds played
  - *Longest time survived, most kills within a round*
- Outcomes of rounds played
  - *Wins, Top Tens, Rounds Played*

Data Collection - *pubgtracker.com*

Rating Leaderboards

First 1 Next Last

Rank	Gamer		Rating	# Games
1	🥇 Marrled-Men	Top 1%	2,605	109
2	🥈 sryloveWJhQVQ	Top 1%	2,572	45
3	🥉 lolFranco	Top 1%	2,570	111
4	Huya_Liyw	Top 1%	2,567	61
5	NNNNNNNNNMM	Top 1%	2,541	37
6	Ceta	Top 1%	2,540	207
7	annmslove666	Top 1%	2,534	90
8	SpecTranZ	Top 1%	2,525	118
9	China-Xiao-Jie	Top 1%	2,525	95
10	lllllll1llllllll	Top 1%	2,523	56

Data Collection (continued)

Data Cleaning & Feature Engineering
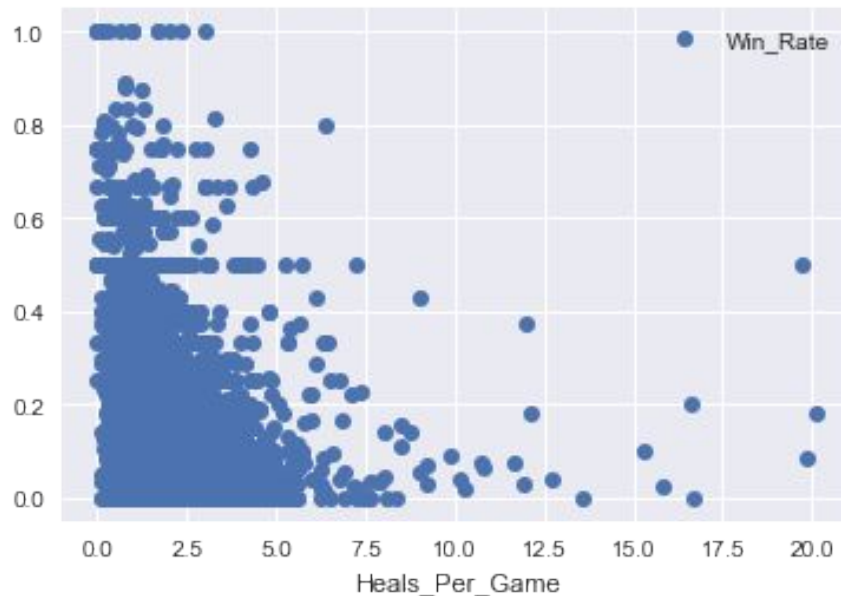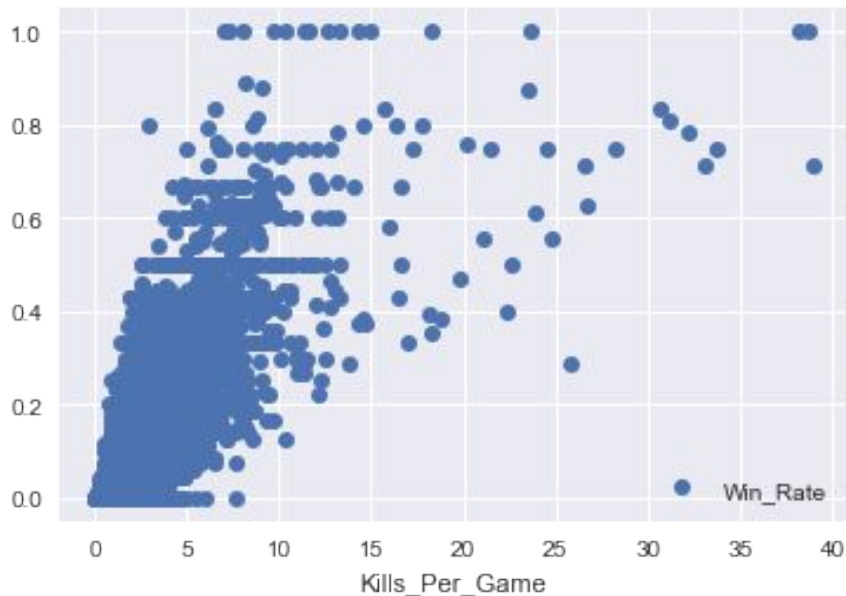
- Very clean data!
  - No missing values
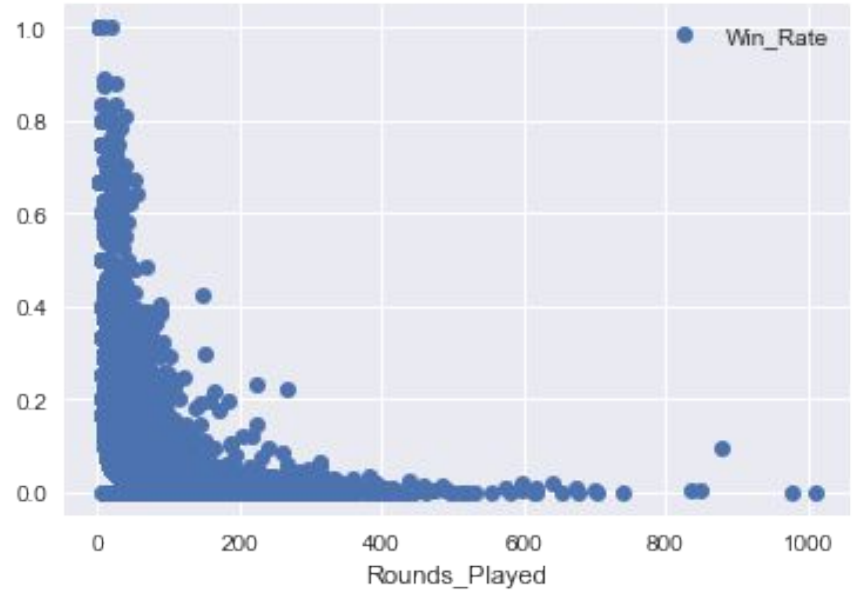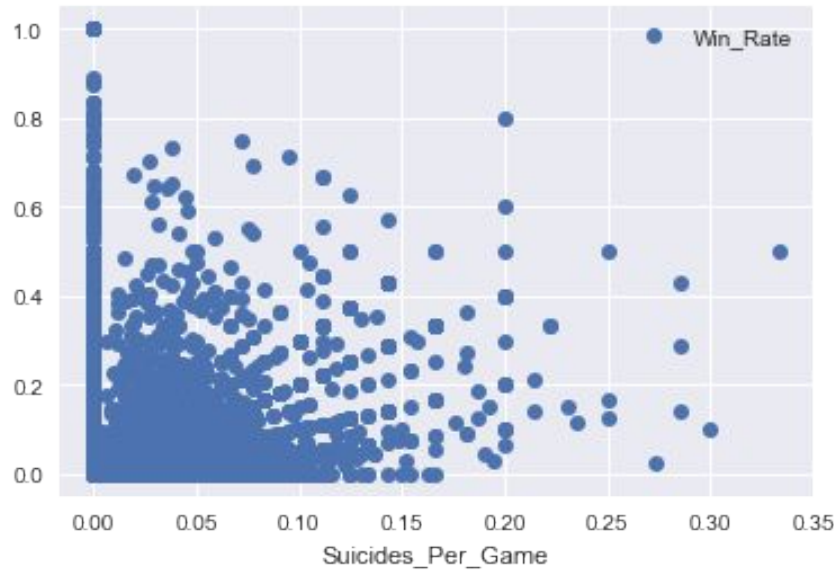- Calculated rates myself
- 29 total features

Exploratory Data Analysis

Mean Win Rate: 5.97%

Median Win Rate: 2.63%

Exploratory Data Analysis (continued)

Modelling Process

OLS Linear Regression

- R^2: 0.739
- High P values:
  - *Damage dealt*
  - *Kills*
  - *Most Kills in a Round*
  - *Vehicle Destroys*

… with Test/Train Split

- R^2: 0.731

… with Cross Validation and Feature Selection based on P values

- R^2: 0.733

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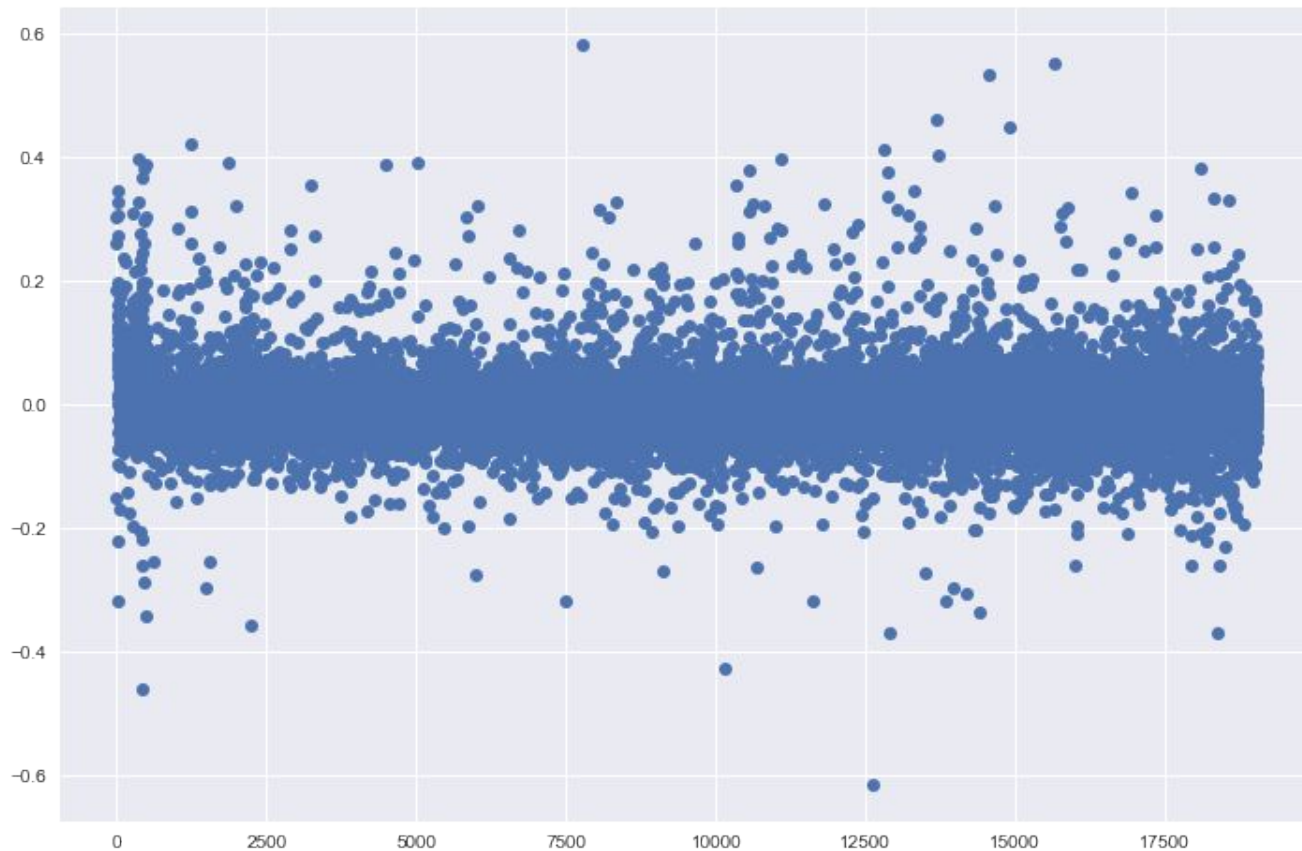# Modelling Process - Regularization

Ridge Regression - R^2: 0.732

Lasso Regression - **R^2: 0.748**

Most significant features:

- Number of Rounds Played
- Kills Per Game
- Damage Dealt Per Game

Residuals Plot

Conclusions

- Model can predict win rate
- Useful for eSports teams
- Next steps:
    - Collect more players
    - Collect more features

Thank You!

Feature List

- Assists
- Boosts
- Damage_Dealt
- Headshot_Kills
- Heals
- Kills
- Longest_Kill
- Longest_Time_Survived
- Max_Kill_Streak
- Ride_Distance
- Road_Kills
- Round_Most_Kills
- Rounds_Played
- Suicides
- Time_Survived

- Top_10s
- Vehicle_Destroys
- Walk_Distance
- Assists_Per_Game
  Boosts_Per_Game
- Damage_Dealt_Per_Game
- Heals_Per_Game
  Kills_Per_Game
- Ride_Distance_Per_Game
- Road_Kills_Per_Game
- Suicides_Per_Game
- Time_Survived_Per_Game
- Vehicle_Destroys_Per_Game
- Walk_Distance_Per_Game

OLS Regression Results

Dep. Variable:	Win_Rate	**R-squared:**	0.739
Model:	OLS	**Adj. R-squared:**	0.739
Method:	Least Squares	**F-statistic:**	1858.
Date:	Fri, 26 Jan 2018	**Prob (F-statistic):**	0.00
Time:	09:34:45	**Log-Likelihood:**	29607.
No. Observations:	19033	**AIC:**	-5.915e+04
Df Residuals:	19003	**BIC:**	-5.892e+04
Df Model:	29		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
Intercept	-0.2650	0.008	-33.497	0.000	-0.280	-0.249
Assists	-0.0011	0.000	-5.187	0.000	-0.002	-0.001
Boosts	-0.0001	1.74e-05	-7.425	0.000	-0.000	-9.5e-05
Damage_Dealt	-3.212e-07	6.87e-07	-0.467	0.640	-1.67e-06	1.03e-06
Headshot_Kills	0.0097	0.001	16.062	0.000	0.009	0.011
Heals	6.471e-05	9.44e-06	6.853	0.000	4.62e-05	8.32e-05
Kills	-6.512e-05	7.05e-05	-0.924	0.356	-0.000	7.3e-05
Longest_Kill	1.458e-05	3.19e-06	4.573	0.000	8.33e-06	2.08e-05
Longest_Time_Survived	0.0048	0.000	19.537	0.000	0.004	0.005
Max_Kill_Streaks	-0.0052	0.000	-11.611	0.000	-0.006	-0.004
Ride_Distance	-2.842e-08	1.58e-08	-1.803	0.071	-5.93e-08	2.48e-09
Road_Kills	0.0017	0.000	4.439	0.000	0.001	0.002
Round_Most_Kills	-0.0001	0.000	-0.734	0.463	-0.000	0.000
Rounds_Played	0.0009	3.52e-05	24.703	0.000	0.001	0.001
Suicides	0.0024	0.001	4.649	0.000	0.001	0.003
Time_Survived	-8.503e-05	5.57e-06	-15.272	0.000	-9.59e-05	-7.41e-05
Top_10s	0.0018	0.000	12.577	0.000	0.002	0.002
Vehicle_Destroys	0.0001	0.000	0.271	0.786	-0.001	0.001
Walk_Distance	1.076e-07	3.52e-08	3.058	0.002	3.86e-08	1.77e-07

	coef	std err	t	P>|t|	[0.025	0.975]
Assists_Per_Game	0.0608	0.008	7.851	0.000	0.046	0.076
Boosts_Per_Game	0.0168	0.001	20.123	0.000	0.015	0.018
Damage_Dealt_Per_Game	0.0001	2.32e-05	5.373	0.000	7.92e-05	0.000
Heals_Per_Game	-0.0106	0.001	-16.559	0.000	-0.012	-0.009
Kills_Per_Game	0.0197	0.002	8.218	0.000	0.015	0.024
Ride_Distance_Per_Game	1.245e-06	8.92e-07	1.396	0.163	-5.04e-07	2.99e-06
Road_Kills_Per_Game	-0.1371	0.016	-8.541	0.000	-0.169	-0.106
Suicides_Per_Game	-0.1337	0.021	-6.341	0.000	-0.175	-0.092
Time_Survived_Per_Game	0.0072	0.000	23.312	0.000	0.007	0.008
Vehicle_Destroys_Per_Game	0.0277	0.016	1.776	0.076	-0.003	0.058
Walk_Distance_Per_Game	-2.686e-06	2.01e-06	-1.339	0.181	-6.62e-06	1.25e-06

Omnibus:	6884.712	Durbin-Watson:	1.930
Prob(Omnibus):	0.000	Jarque-Bera (JB):	166969.864
Skew:	1.186	Prob(JB):	0.00
Kurtosis:	17.315	Cond. No.	7.65e+06