Yash Dua

Quantifying Improvement

How to Get Good (with Data Science)

Is it possible?

What does it take to improve at a skill?

Is it possible?

The Pillars of Improvement

1 **Fundamentals**

2 **Raw Practice**

Why LoL?

All digital

Is a skill

Lots of relevant data recorded

Methodology

Sources

Op.gg (LoL stats)
Wol.gg (# hours spent)
Riot API

Tools

pandas
$y_{it} = \beta' x_{it} + \mu_i + \epsilon_{it}$

NumPy

python™

Seabor

Model

OLS Linear Regression

Features

01

Fundamentals
Avg. CS, Avg. Dmg To Champs + 7 more

02

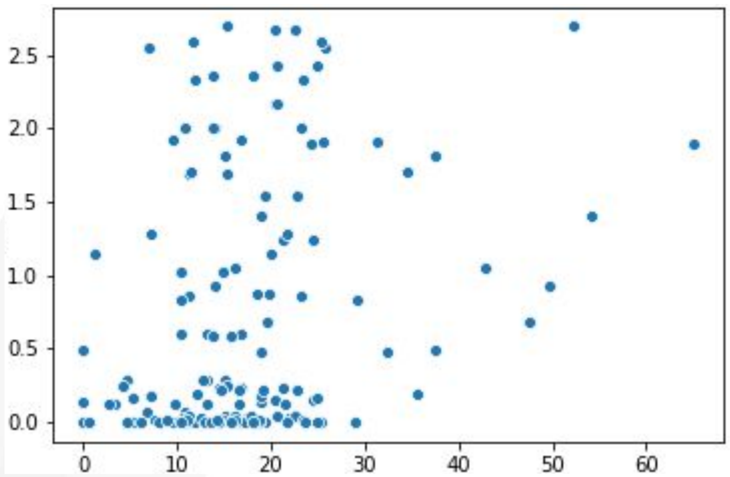
Raw Practice
Hours Played

03

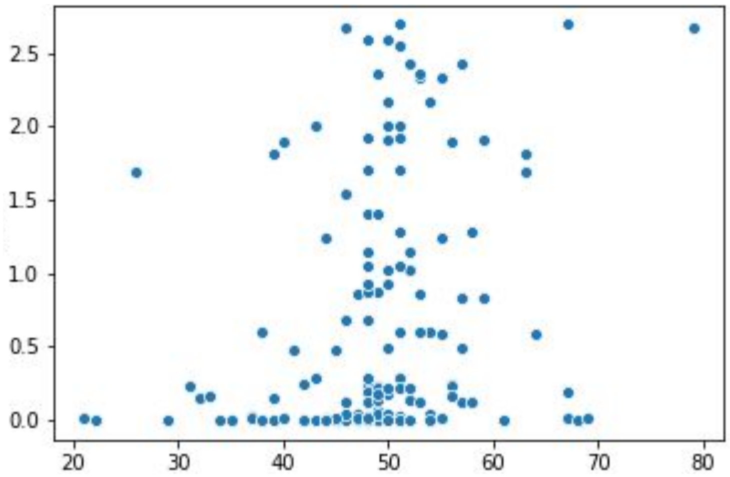
External
Winrate, Champ Pool

Bands of Performance

X vs. Rank



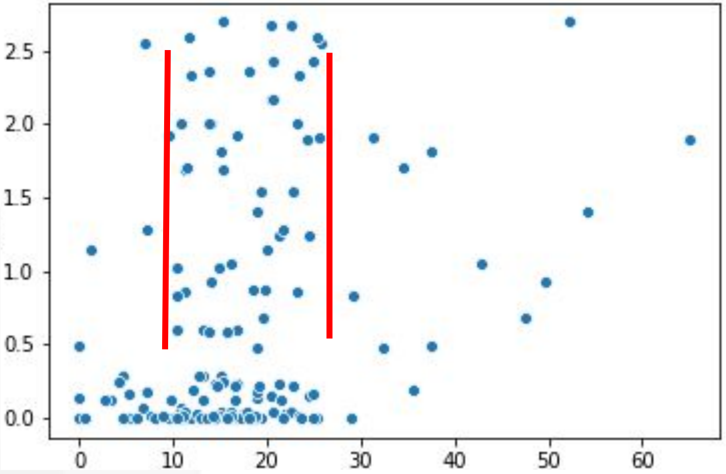
Vision Score



Winrate

Bands of Performance

X vs. Rank



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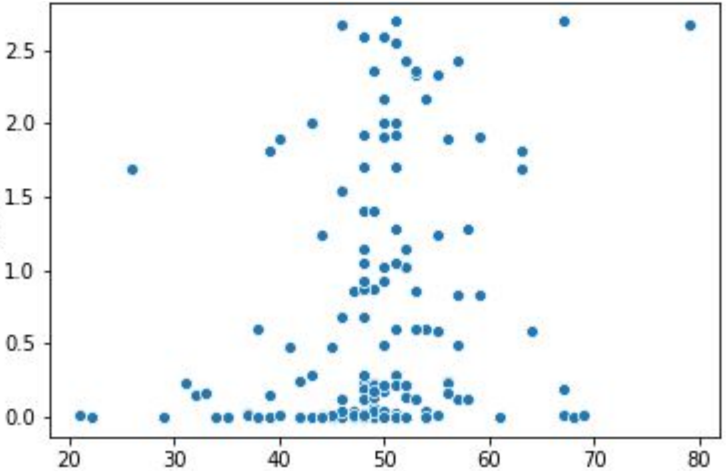

Winrate

Bands of Performance

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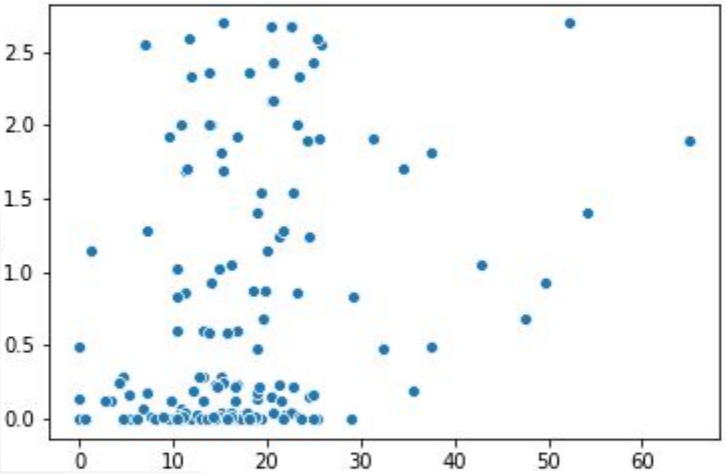
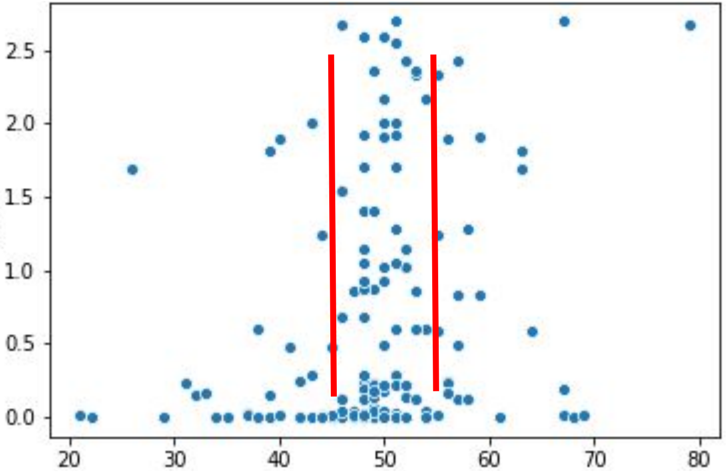
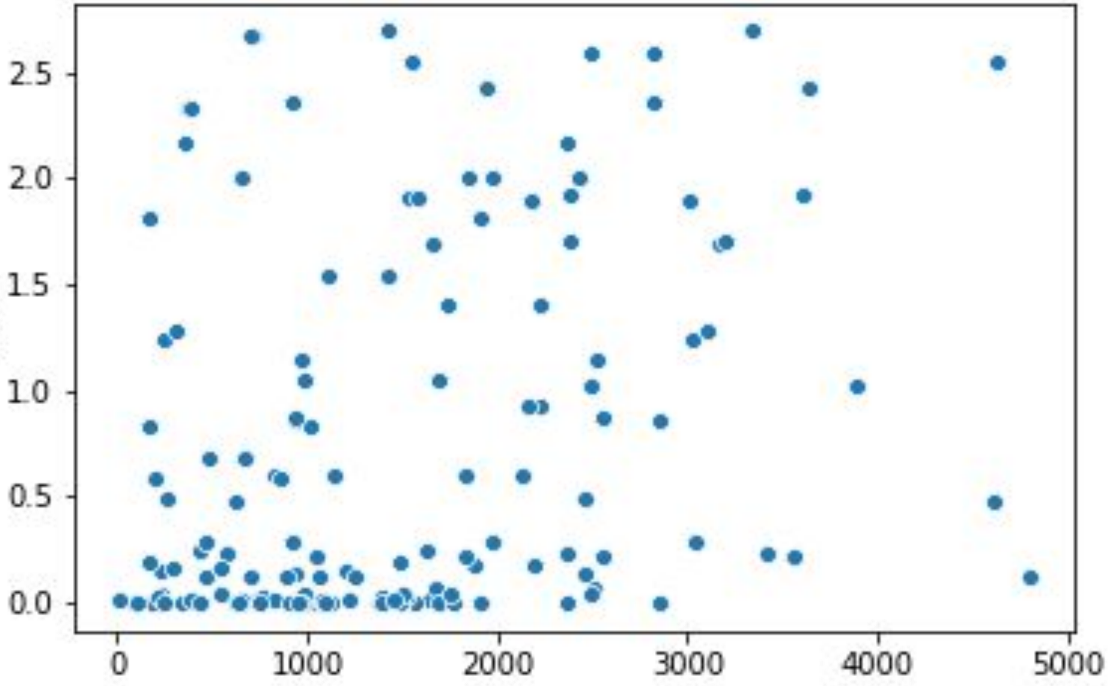


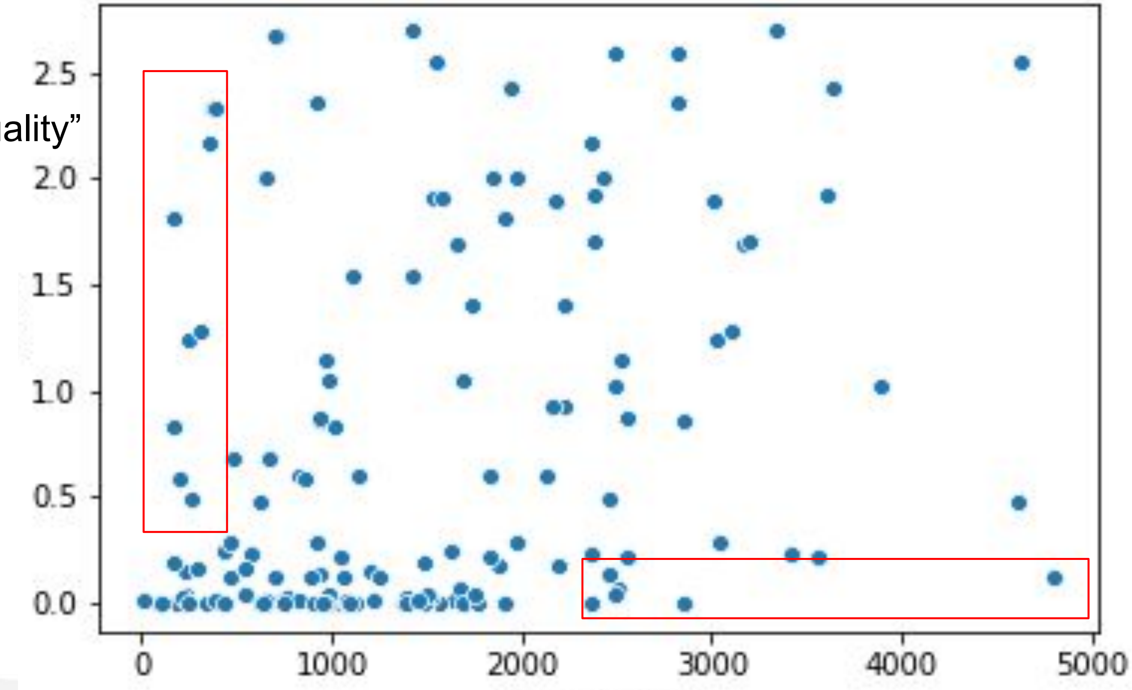
Vision Score



Winrate



Hours



“High quality” hours

“Low quality” hours

Hours

28.6%

of improvement comes from fundamentals and raw practice

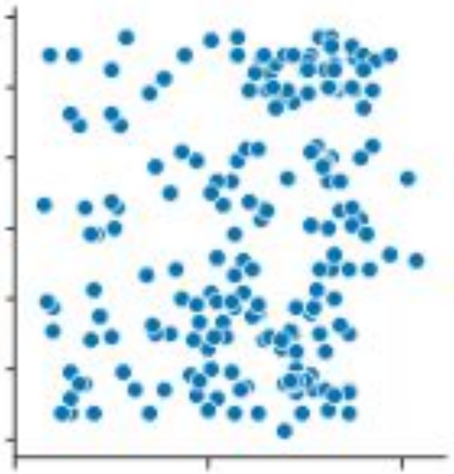
Recommendations

Perfect practice makes perfect

Be patient, but critical

Thank you!

Appendix



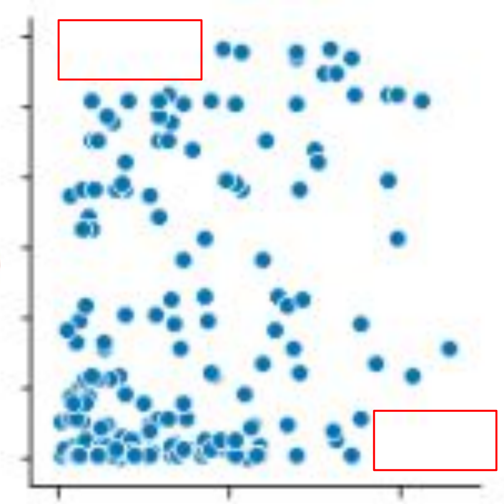
Avg CS vs Rank from larger dataset w/ unscaled rank, from an intermediate unsaved dataset

Rank scaling formula:
((total number of users on leaderboard + 1) - (actual rank))^3

Reason for scaling: Attempt to reflect uneven distributions of playerbase across rank and to show that, after a certain point, the same numeric increase in rank requires a much larger increase in skill compared to before.

Ideal curve: stepwise function with a higher exponent after a certain rank, and a gradual plateau beginning near the top 100/top 200 players

Appendix



Hours played vs rank unscaled, from an intermediate unsaved dataset

Boxes show no player of highest caliber has less than some amt of hrs, no low enough ranked player has more than some amt of hrs

Appendix

```
['summoner_name',
 'rank',
 'champ_pool',
 'winrate',
 'avg_kda',
 'avg_cs',
 'hours_played',
 'avg_dmg_obj',
 'avg_gold_spent',
 'avg_cc_score',
 'avg_dmg_champs',
 'avg_dmg_taken',
 'avg_vision_score',
 'avg_dps']
```

Dep. Variable:	rank	**R-squared:**	0.342
Model:	OLS	**Adj. R-squared:**	0.286
Method:	Least Squares	**F-statistic:**	6.145
Date:	Fri, 19 Jul 2019	**Prob (F-statistic):**	4.60e-08
Time:	03:11:27	**Log-Likelihood:**	-6037.3
No. Observations:	142	**AIC:**	1.210e+04
Df Residuals:	130	**BIC:**	1.213e+04
Df Model:	11		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
Intercept	-2.166e+18	5.93e+17	-3.653	0.000	-3.34e+18	-9.93e+17
champ_pool	-5.643e+15	7.33e+16	-0.077	0.939	-1.51e+17	1.39e+17
winrate	1.644e+16	8.41e+15	1.956	0.053	-1.89e+14	3.31e+16
avg_kda	3.885e+16	7.25e+16	0.536	0.593	-1.05e+17	1.82e+17
avg_cs	4.579e+15	1.65e+15	2.781	0.006	1.32e+15	7.84e+15
hours_played	2.164e+14	6.31e+13	3.427	0.001	9.15e+13	3.41e+14
avg_dmg_obj	-1.967e+13	1.76e+13	-1.116	0.266	-5.45e+13	1.52e+13
avg_gold_spent	7.096e+13	5.98e+13	1.187	0.237	-4.73e+13	1.89e+14
avg_cc_score	-2.588e+15	8.47e+15	-0.306	0.760	-1.93e+16	1.42e+16
avg_dmg_taken	-1.111e+13	1.56e+13	-0.713	0.477	-4.2e+13	1.97e+13
avg_vision_score	3.291e+16	8.07e+15	4.076	0.000	1.69e+16	4.89e+16
avg_dps	2.463e+15	1.76e+15	1.398	0.164	-1.02e+15	5.95e+15

Omnibus:	9.928	**Durbin-Watson:**	1.325
Prob(Omnibus):	0.007	**Jarque-Bera (JB):**	10.744
Skew:	0.670	**Prob(JB):**	0.00464
Kurtosis:	2.862	**Cond. No.**	2.64e+05

Appendix

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