

Predicting MOBA Balance Outcomes

Trevor Fisher

Galvanize, 1/14/16



KyrandisX has slain Kamikaze Miko!

35

16

16

16

16

16

16

16

16

16

GenghisKai 18

Woobler 18

KyrandisX 18

529

0

1.31

437

73

118

1378

0.6

0.1

17

204

1816 / 2396

+5.3

! ?

16

16

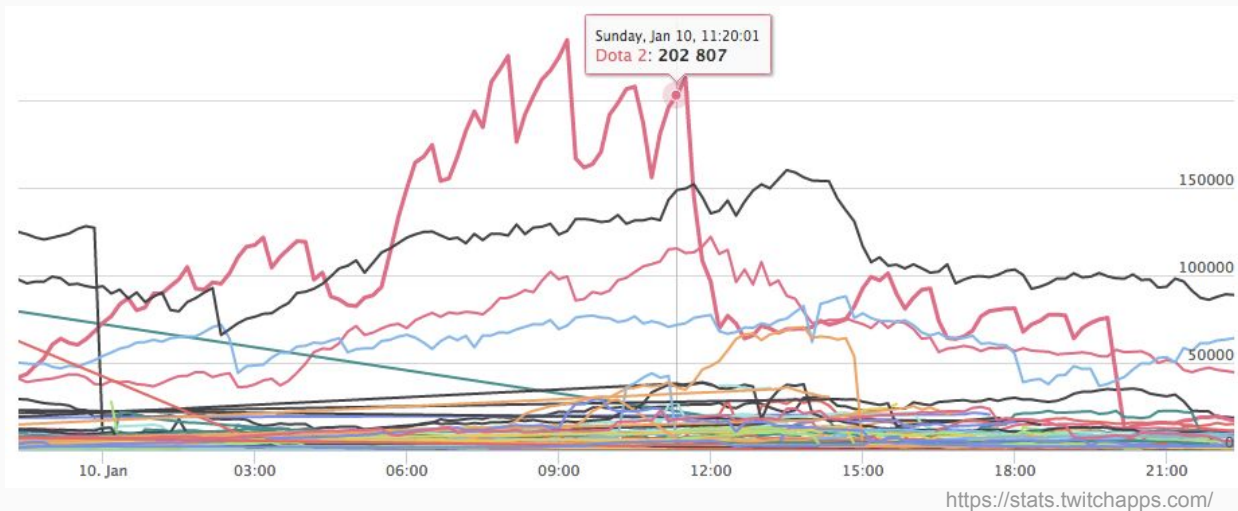
16

16

16

What's a MOBA?

- The most-played and most-viewed genre in eSports
- Market leaders are League of Legends and Dota 2



What's a MOBA?

- Typically 5v5 team PC games where players cooperate to tackle objectives
- For each game, each team bans 5 characters and selects 5 characters
- Characters are chosen according to perceived strength and synergy
- Periodic “Balance Patches” are released to address strength disparities














GAMEPLAY UPDATE 6.86

GENERAL

- Added Arcane Rune
+ [Show details](#)
- Creep bounty increases by 1 gold per normal upgrade cycle [?]
- Siege damage against heroes increased from 75% to 85% [?]
- Hero base HP increased from 150 to 180
- Creeps now arrive slightly closer to the top dire tower and bottom Radiant tower
- Random Draft hero pool increased from 24 to 50
- Added Random Draft to Ranked Matchmaking
- Random Draft now uses the same picking mechanics as Ranked All Pick








Core research question

Can I predict the effect of a balance patch on professional play?

HERO	P+B	PICK	BAN	WIN	LOSE	WIN%	P+B %	
	468	76	392	43	33	56	98.5	
	463	257	206	132	125	51	97.4	
	443	168	275	95	73	56	93.2	
	432	211	221	94	117	44	90.9	
	415	157	258	81	76	51	87.3	
	415	217	198	120	97	55	87.3	▲1
	402	238	164	123	115	51	84.6	
	384	227	157	115	112	50	80.8	
	379	215	164	114	101	53	79.7	▲1
	313	119	194	63	56	52	65.8	▲1
	301	65	236	34	31	52	63.3	▲1

Patch 6.85



HERO	P+B	PICK	BAN	WIN	LOSE	WIN%	P+B %	
	405	215	190	107	108	49	91.0	
	389	224	165	116	108	51	87.4	
	346	138	208	74	64	53	77.7	
	343	202	141	107	95	52	77.0	▲1
	322	199	123	105	94	52	72.3	
	313	124	189	63	61	50	70.3	
	301	68	233	37	31	54	67.6	

Patch 6.86

Data sourcing



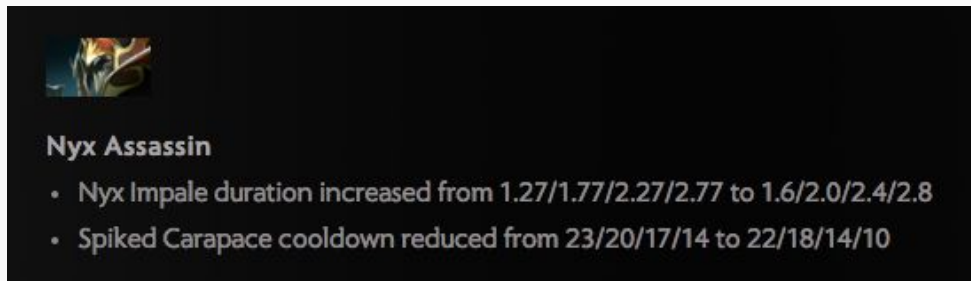
Historical data for professional games

- hero pick/ban%
- hero win rates
- same-team hero pairings
- hero head-to-head performances



Hero and patch information

- raw text of patch notes
- hero roles



- Over the past 10 patches, there have been about 1200 hero changes
- I labeled 100 as positive or negative and predicted the rest with boosting

Challenges:

- Language used in writing patch notes has changed since 2012
- “Increased” is not always positive; “Reduced” is not always negative
- Many changes are numerical and not caught by NLP

Hero interactions

- Unchanged Heroes can still benefit significantly from improvements to synergistic partners



- Similarly, Heroes can benefit or suffer from changes to their “counterpicks”

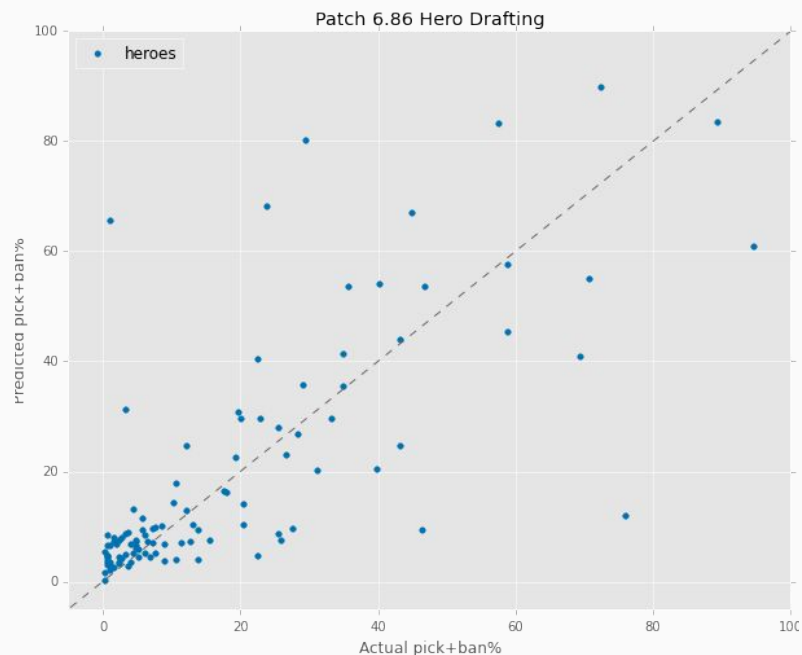


Modeling

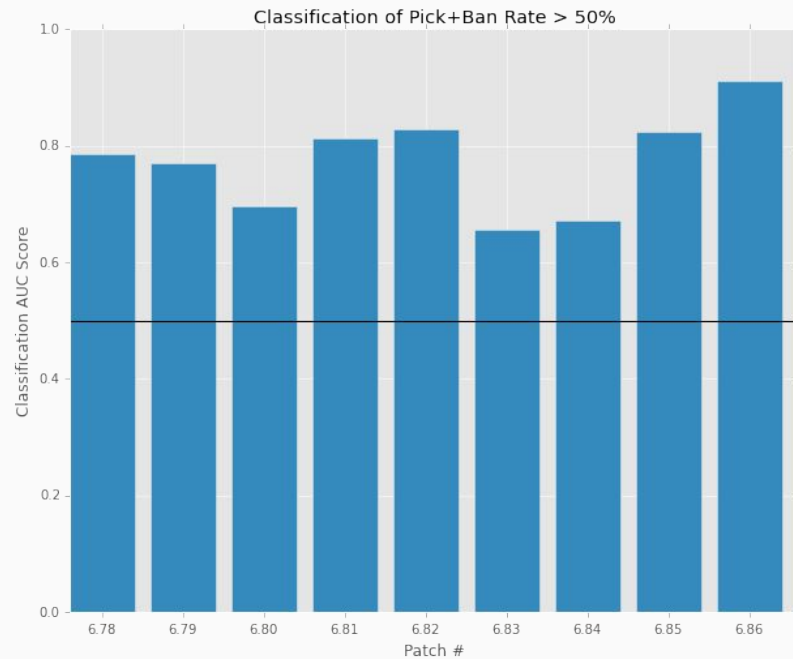
- Target: post-patch pick+ban rate (%) in competitive games
- Core features:
 - previous popularity and performance
 - probability that changes made to hero will improve hero (from NLP)
 - composite measure of +/- change to hero's common pairings
 - composite measure of +/- change to hero's common opponents
- Models: Gradient Boosting Regressor, Gradient Boosting Classifier
- Classification problem: identify heroes with > 50% pick+ban rate

Model Results

Regression

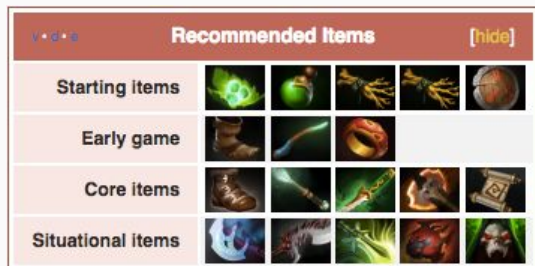


Classification



Next steps

- Hero-item interactions (another round of NLP!)



- Scrape/NLP player attitudes to identify untapped potential in advance
- Explore other use cases

Thank you!

Trevor Fisher
trefish22@gmail.com
github.com/shime-saba/moba_balance_prediction