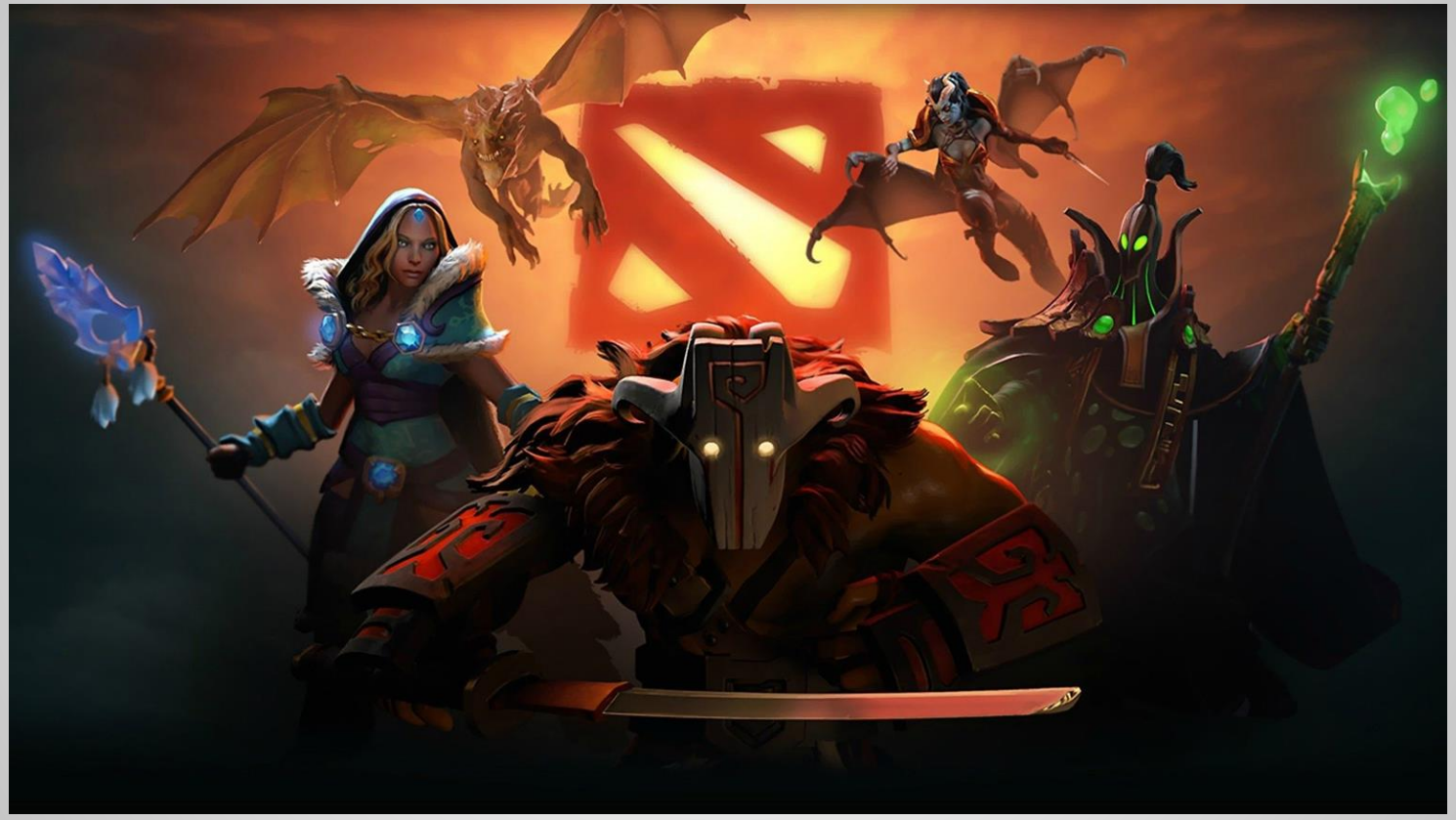
DOTA2 Sentiment-User Analysis



Chien Min Wang, Evan DeCastros, Johnathan Jackson, Yidan Hu, Zhen Wu

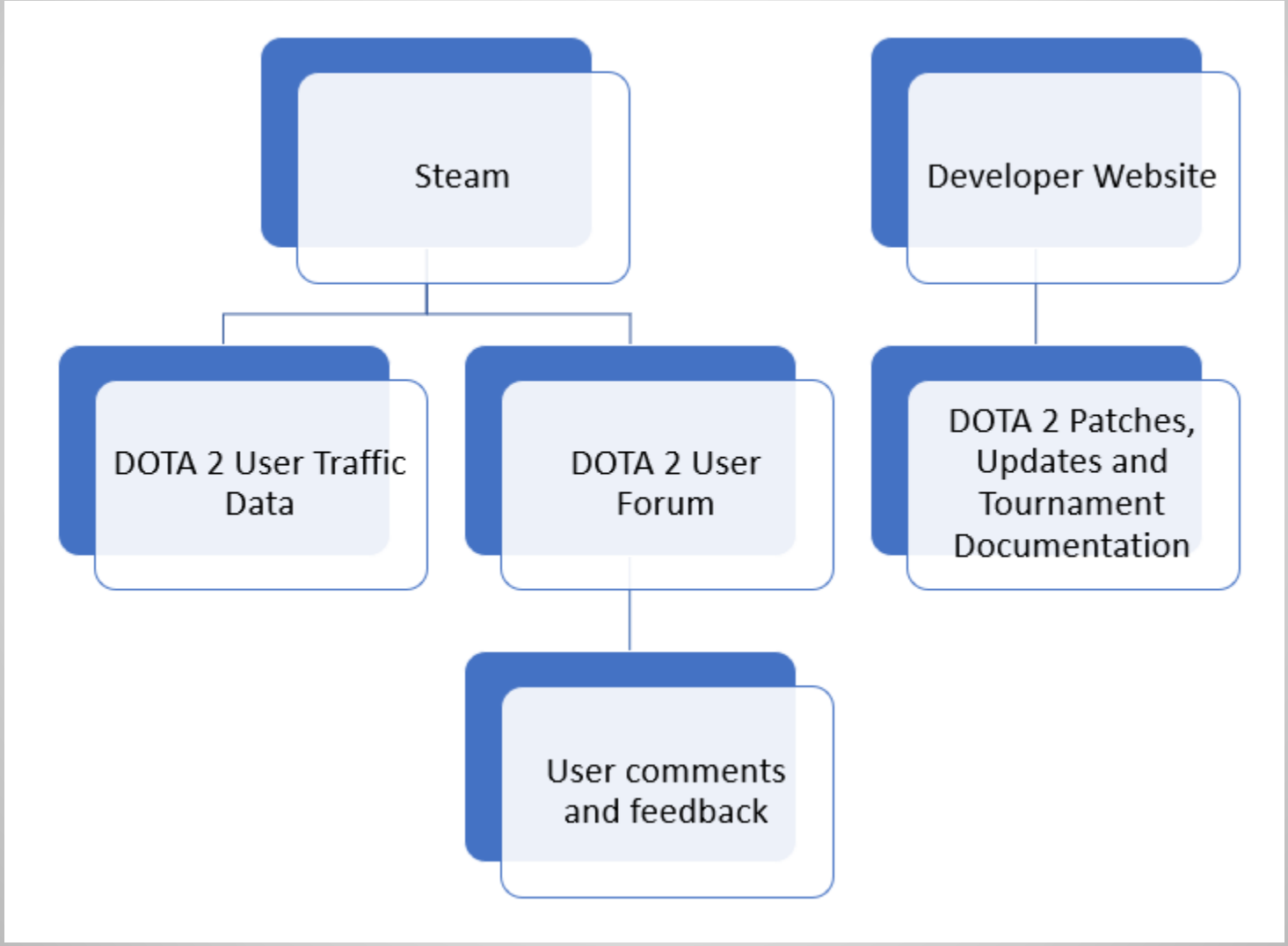
What is DOTA2?

- DOTA2 (Defense of the Ancients) is an international free-to-play online multiplayer game
- The game is played with two teams of five players who each control a "hero" character
- DOTA2 makes money through micro-transactions for cosmetic items
  - Also through sponsored tournaments
- Since September 2013, the game had a peak of 709,000 concurrent users in 2016, but currently has about 480,000 users.

Problem Statement

- Video game entertainment companies face a highly competitive landscape.
- Game designers must either create new games or make entertaining game updates to maintain relevancy.
- One game fitting this profile, DOTA2 is an ongoing multiplayer game that is experiencing user traffic decline
  - The causes must be diagnosed in order to remain successful
  - Can we analyze user feedback and reaction to game content in order to diagnose DOTA's issues?

Data Sources



Methodology

Data Gathering

- Use Python modules to crawl Steam forums for DOTA 2 mentions

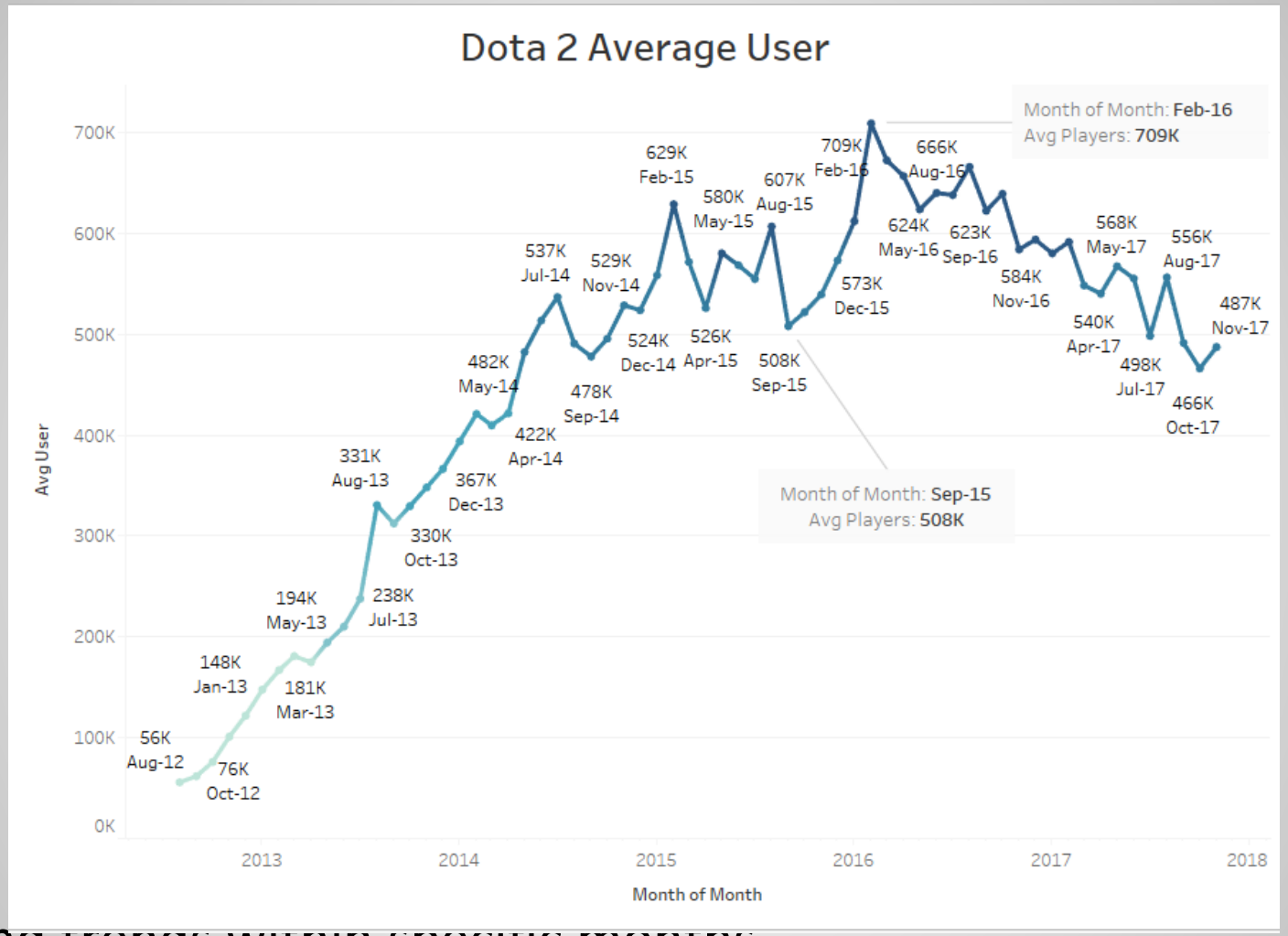
Data Processing

- Create data file containing monthly user traffic and update history
- Use Beautiful Soup to process the html forum data
- Create and modify a word bank for use in future sentiment analysis

Analysis

- Use Python to perform a sentiment analysis on the forum crawls at specified intervals.
- Use this data alongside traffic and update data
  - Using word clouds, and other visualization we can find out what factors are influencing user sentiment

Average Users From Steam



- Analyze to find trends within specific months
- August 2013 was the official end of the beta stage when DOTA2 went public, we will begin our search with that as the starting point

Identifying Key Dates Using User Trends

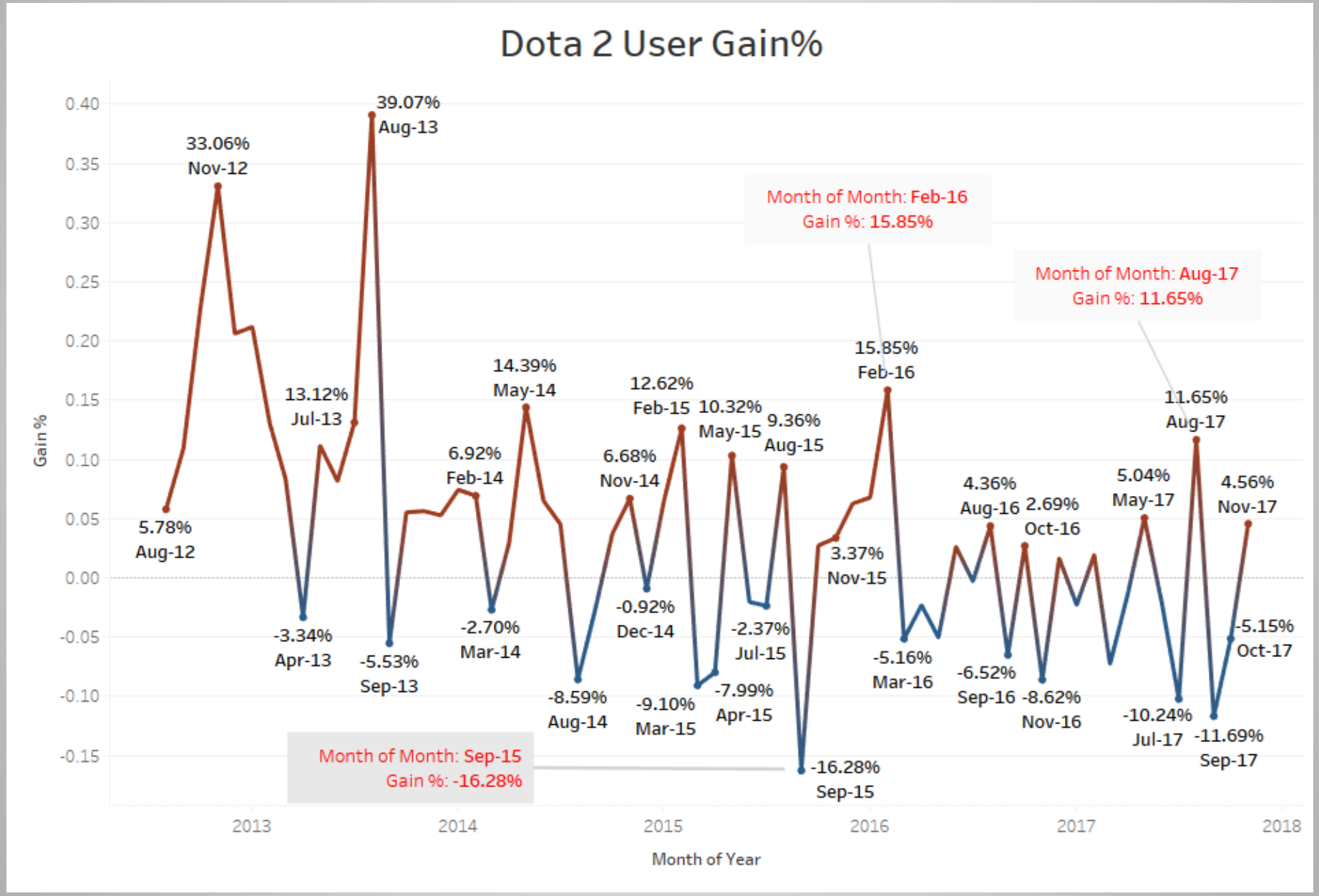
- Pulled average monthly users of DOTA2 from Steam
- What months saw significant % increases or decreases in users?
  - Months after August 2013 - when Beta version of game officially closed
  - Defined significant % change as increase or decrease in users of 10%
  - About 15% of months qualify
- Cross referenced those months with publicly provided lists of tournament dates and game update releases

Iden ends

- Pulled ave
- What mor sers?
  - Months closed
  - Defined 10%
  - About 1
- Cross refe of tourname

Month	Avg Players	Gain	Gain %	Peak	Absolute Change
Last 30 Days	487,610.40	21,483.60	4.61%	861,173	4.61%
Oct-17	466,126.80	-25,323.40	-5.15%	832,550	5.15%
Sep-17	491,450.20	-65,046.10	-11.69%	829,555	11.69%
Aug-17	556,496.30	58,051.90	11.65%	876,395	11.65%
Jul-17	498,444.40	-56,844.70	-10.24%	824,297	10.24%
Jun-17	555,289.10	-12,237.40	-2.16%	923,122	2.16%
May-17	567,526.40	27,248.40	5.04%	972,876	5.04%
Apr-17	540,278.00	-8,157.40	-1.49%	921,318	1.49%
Mar-17	548,435.40	-43,131.80	-7.29%	956,232	7.29%
Feb-17	591,567.30	11,285.80	1.94%	1,040,877	1.94%
Jan-17	580,281.50	-13,639.10	-2.30%	1,007,451	2.30%
Dec-16	593,920.60	9,669.30	1.65%	1,014,671	1.65%
Nov-16	584,251.30	-55,103.80	-8.62%	1,007,270	8.62%
Oct-16	639,355.10	16,771.20	2.69%	1,141,191	2.69%
Sep-16	622,583.90	-43,429.20	-6.52%	1,064,377	6.52%
Aug-16	666,013.10	27,800.40	4.36%	1,117,519	4.36%
Jul-16	638,212.70	-2,014.30	-0.31%	1,084,198	0.31%
Jun-16	640,227.00	16,428.30	2.63%	1,095,994	2.63%
May-16	623,798.70	-33,145.70	-5.05%	1,075,307	5.05%
Apr-16	656,944.40	-15,610.50	-2.32%	1,164,041	2.32%
Mar-16	672,554.90	-36,623.40	-5.16%	1,291,328	5.16%
Feb-16	709,178.30	97,003.50	15.85%	1,248,394	15.85%
Jan-16	612,174.80	38,830.50	6.77%	1,067,949	6.77%

Dates Identified



Crawling Comments from Steam

- How to crawling web with json?
- Scraping Comments
- Checking Language
- Sentiment Analysis

HTML Source Code


```
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possible to play normaly with this hero. <br>Low damage - no invis. WTH??????????????????\t\t<\/div>\r\n\t\t\t\t\t<\/div>\r\n\t\t<\/div>\r\n\t<div
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\u0418h\u1e1d\u0148<\/bdi><\/a>\r\n\t\t\t\t\r\n\t\t\t\t\r\n\t\t\t\t\r\n\t\t\t\t\r\n\t\t\t\t\r\n\r\n\t\t\t\t<span class=\"commentthread_comment_timestamp\"
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ago \r\n\t\t\t<\/span>\r\n\t\t\t\t\t<\/div>\r\n\t\t<div class=\"commentthread comment text\"
```
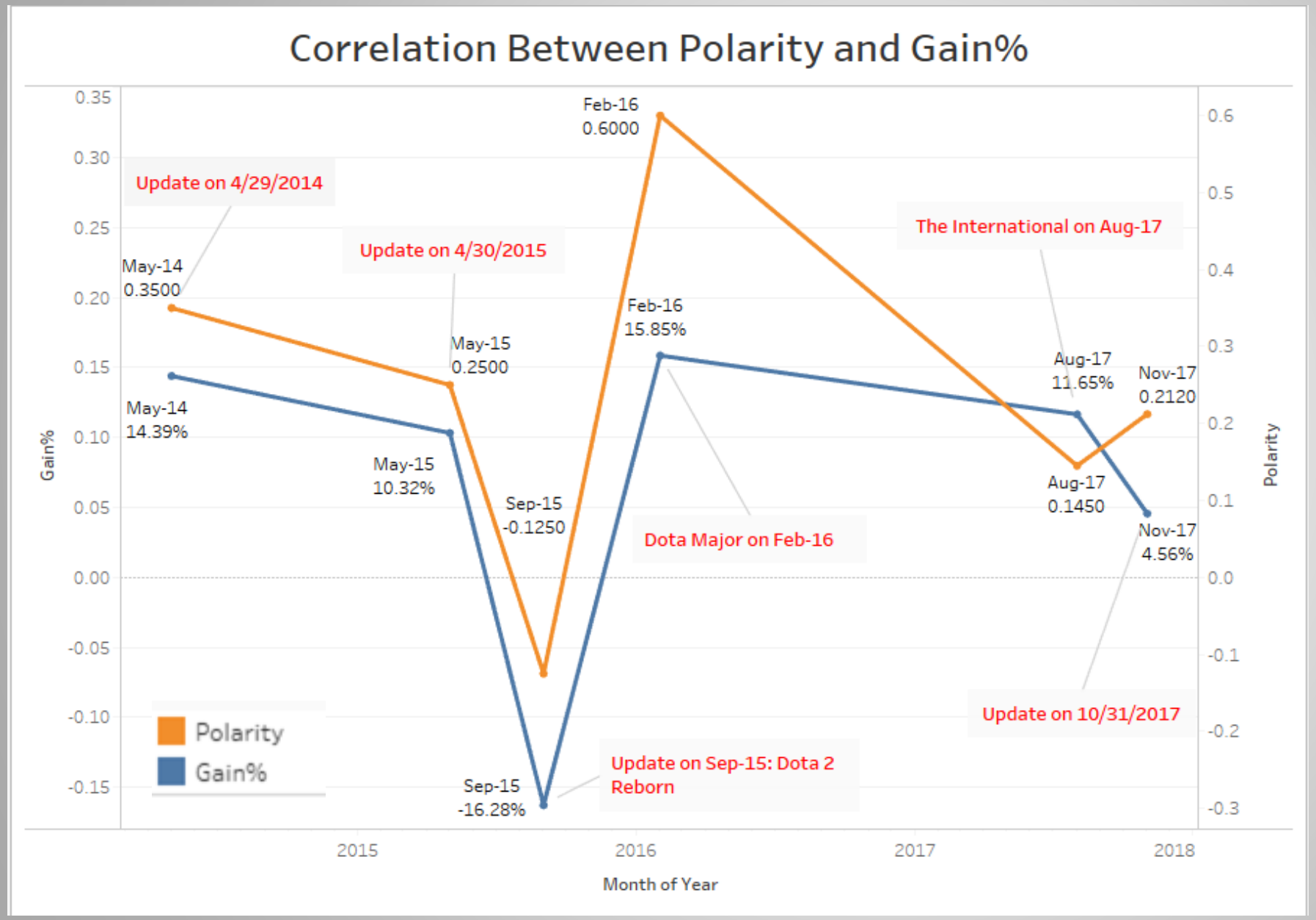

Python Script

```
for i in range(00, 900, 10):

    url = 'https://steamcommunity.com/comment/ClanAnnouncement/render/10358279143322445 5/14494577737709271 03/?start='+str(i)
    r = requests.get(url)
    data = r.json()
    soup = BeautifulSoup(data['comments_html'], 'html.parser', from_encoding = 'big5')


    english_words = []
    d = enchant.Dict("en_US")
    try:
        for div in soup.find_all('div', {'class': "commentthread_comment_content"}):
            string = str(div.find('div', {'class': 'commentthread_comment_text'}).get_text().strip())

            for word in string.split():
                if d.check(word):
                    english_words.append(word)

                comment_list = ' '.join(english_words)


    except UnicodeEncodeError:
        pass
```

Analysis of Steam Sentiments



- Polarity is between -1 ~ 1
- -1 ~ 0: Negative
- 0 ~ 1: Positive

Analysis of some vital updates

Sep 15, 2015 DOTA 2 Reborn update. New game engine was built for Dota. Sentiment polarity=-0.125
Everything familiar was changed.
People want their old engine back.
Too big update may lose users.

Nov-15	539,536.30	17,594.60	3.37%	943,635	3.37%
Oct-15	521,941.70	13,784.90	2.71%	917,306	2.71%
Sep-15	508,156.80	-98,787.10	-16.28%	888,728	16.28%
Aug-15	606,944.00	51,953.00	9.36%	933,942	9.36%
Jul-15	554,991.00	-13,457.30	-2.37%	877,264	2.37%

Analysis of tournament period

- Feb 2016, the Shanghai Major was held, Sentiment polarity=0.6
- As supported by our sentiment analysis, our word cloud shows that user feedback was generally positive
- We can see that the tournament generates positive interests, with “nice” being the most frequent word in the forum
- From this, we can assume that hosting tournaments is a great way to retain positive sentiment

Analysis of some vital updates

Dec 16, 2016 the biggest update ever. Sentiment polarity 0.1
New updates do bring users to game.
Increasing players brings lagging problem.
The sentiment doesn't turn out what we expect it to be.

The International Tournament

- Supporting the correlation that was shown in the Shanghai Tournament, sentiment was also positive during the international
- Positive words in reviews had a much greater frequency than in the previous tournament
- The tournament was able to create an 11% gain in users following a disappointing 10% loss in the previous month
  - Unfortunately, it seems tournament generated interest is merely temporary
  - User traffic the following month decreased by 11%

Month	Avg Players	Gain	Gain %	Peak	Absolute Change
Last 30 Days	489,199.40	1,818.10	0.37%	861,173	0.37%
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Competitions Impact

- Yearly “The International” competition results in an enormous spike in users each year, as does the Shanghai Major
  - Qualifiers in May, Tournament in August for The International
- There are also many other smaller competitions and in game events throughout the year
  - Less of an impact overall
- Can attempt to increase the scale of one or two other competitions each year instead of having just one large international one

Conclusions

- Large scale tournaments generate positive sentiment and an increase in both average and peak users
  - Effect is only temporary
- Smaller tournaments and in-game events have less of an effect
- Smaller updates generate positive sentiment
- Large scale updates such as massive platform changes generate negative sentiment
  - Users don’t like drastic change
  - Effect is more temporary - long term users get used to the changes

Questions?