

User Experience Analysis Based on Game Reviews

Members:

Anqi Zhu; Yue Wu; Yi Liu; Han Wang; Yingshu Chen

Problem Statement

Use text analytics to analyze user perception from game(Disney Emoji Blitz) reviews.

Given a new review, monitor what kind of problems occur to optimize the game

Starting to not like this game

1y ago

★★★★★

Danitillary

I've been playing this game for well over 2 years and I have dropped some serious cash on this game. However, just recently this app has had some major changes.

1. The most recent download doesn't allow for the actual app to open. It just opens to a **blank screen and then crashes**. This seems to be a regular issue since this has happened with other downloads within the last 6 months.

2. I completely deleted the app and reinstalled only for all of my purchases to **disappear**. THANKFULLY I had this connected to my Facebook account or I would've lost everything.

Side note: what was REALLY annoying and a **waste of time**, I had to play through beginner levels and step by step directions for over 30 minutes before the app would go to the main screen to allow me to log in and then reconnect to my actual account and not have to start all over. It was an awful experience!



- Crash
- Data disappear
- Waste time

- Disney lover



Soo fun!!

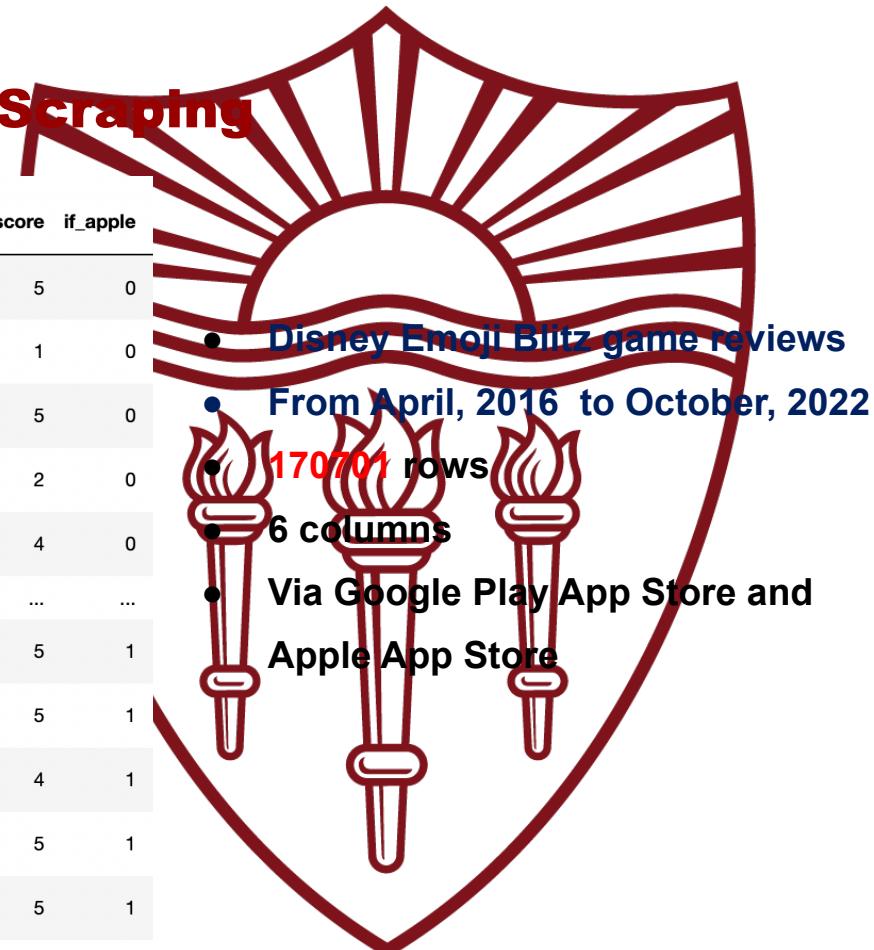
edited 1y ago

Brynleigh22

I got this app a long time ago, and never really paid much attention to it, but then I was getting bored of all the other games I was playing, so I went to Disney Emoji Blitz! Let me tell you something, if you are a **Disney lover**, then this is the game for you! I just started playing this game yesterday and I already have eight emojis! So, what you do in this game is, you basically do what you do in Candy Crush, but you get emojis and other amazing prizes! You have to change your keyboard to be able to send the emojis though, unless you are ok with sending them small. I wish I could put some of the emojis that I have in the review, but it won't let me. Anyway, you also have missions that you have to complete to be able to get some prizes.

Data Collection – Real-time Scraping

Unnamed: 0		userNmae	date	content	score	if_apple
0	0	Jocelyn Sy	2022-10-27 18:10:20	fun	5	0
1	1	crystal may	2022-10-27 12:17:07	aw matter game close progress spent coin gem l...	1	0
2	2	Coreter	2022-10-27 07:07:17	cool	5	0
3	3	Jordan Christie	2022-10-26 15:11:40	use love game recent new go sync progress acco...	2	0
4	4	Heather Nicole	2022-10-26 03:42:00	love game dont know shut time clear make sure ...	4	0
...
170696	170696	ty lol ty	2022-09-26 07:38:26	fun	5	1
170697	170697	Lunas GiGi	2022-09-05 14:14:42	Nan	5	1
170698	170698	pogdw	2022-09-20 21:43:42	fun	4	1
170699	170699	arajuju	2022-08-03 12:04:10	love	5	1
170700	170700	jhhfxhfsygvdte	2022-07-21 16:32:10	cool	5	1



Solution

Data Preprocessing
and clustering

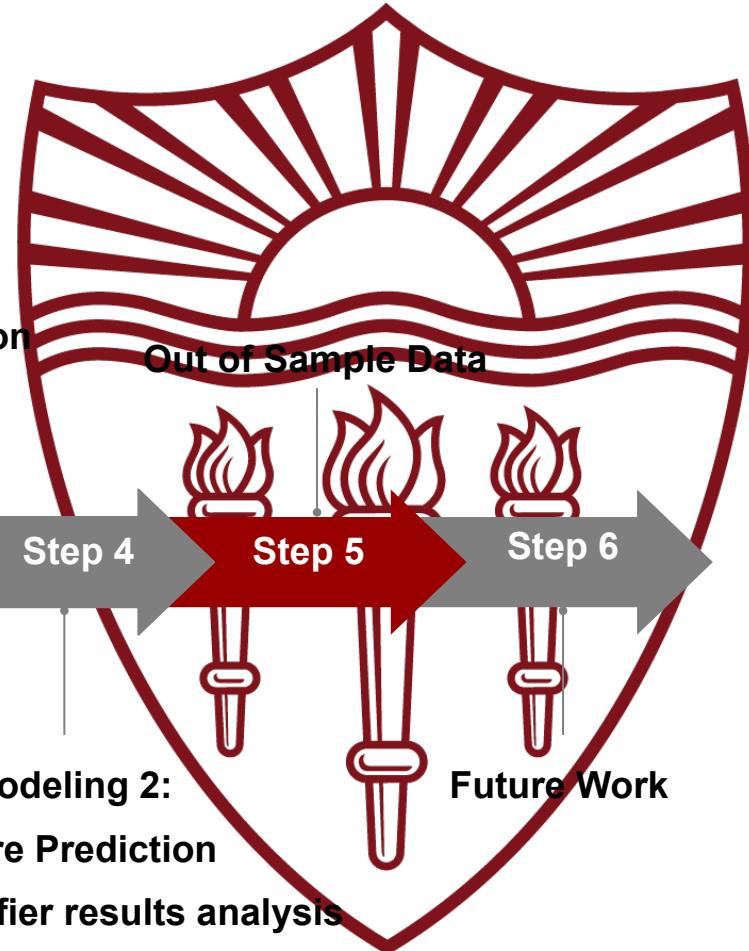
Modeling 1:
Feature Classification



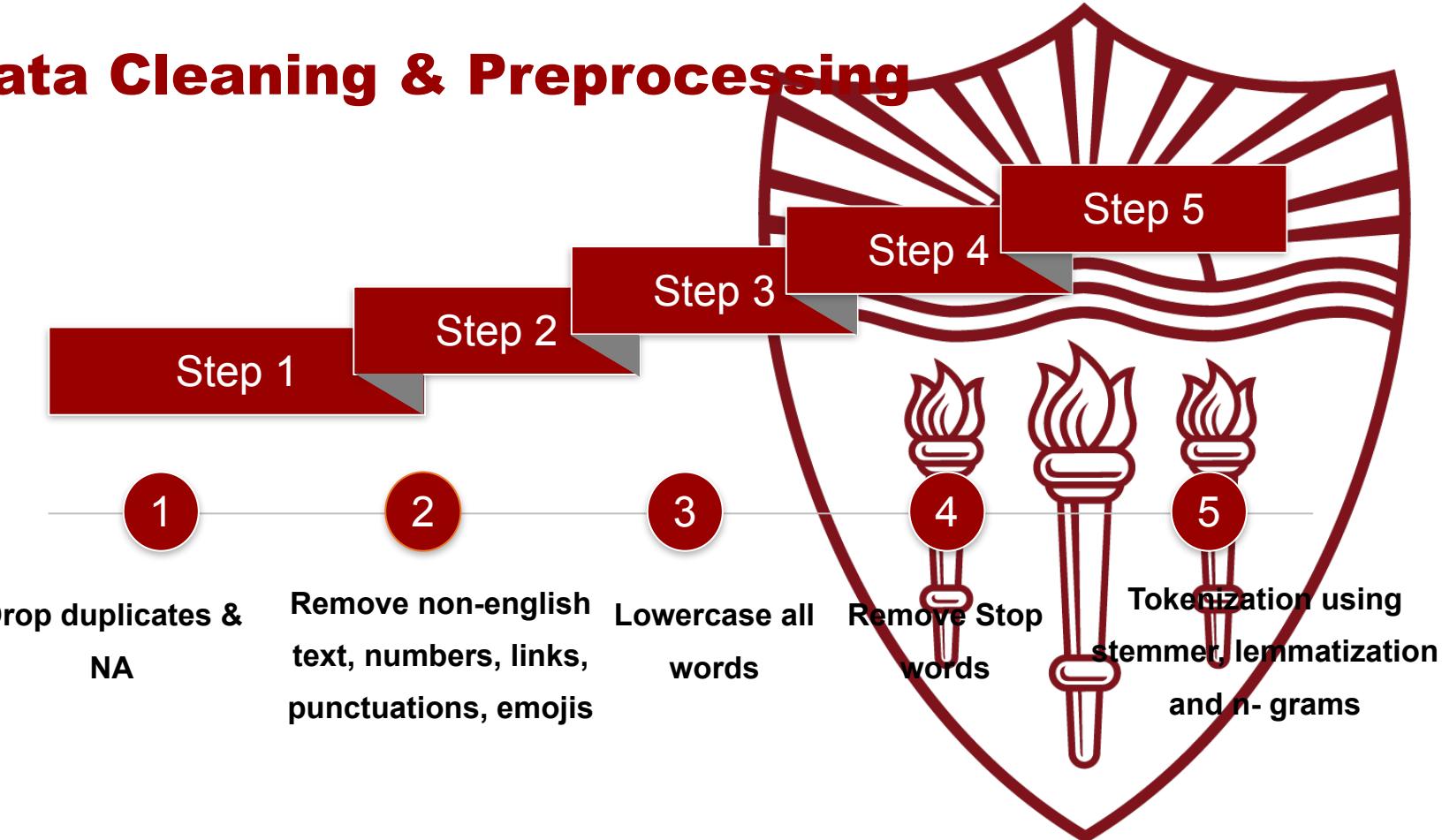
Data Labeling

Modeling 2:
Score Prediction

SGD Classifier results analysis



Data Cleaning & Preprocessing



Data Cleaning & Preprocessing

Processed reviews

Raw reviews

Awful. No matter the updates game randomly clo...

It's really cool!

I used to really love this game but have recen...

I love this game but I don't know why it just ...

...

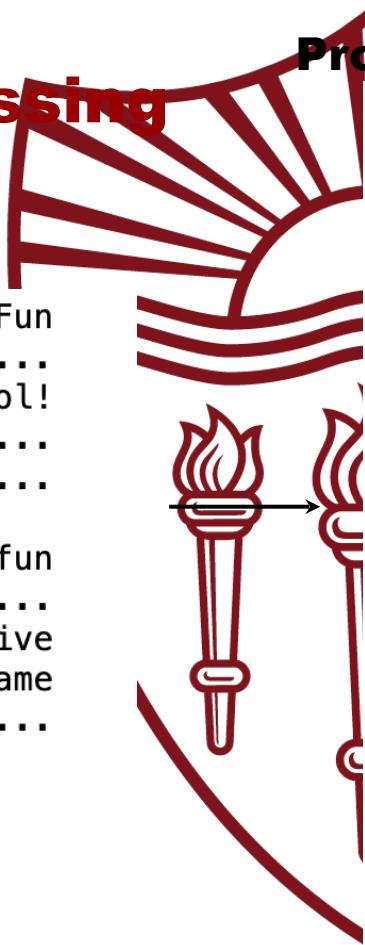
So much fun

Love it very addictive. Got my partner hooked ...

Addictive

It the best came

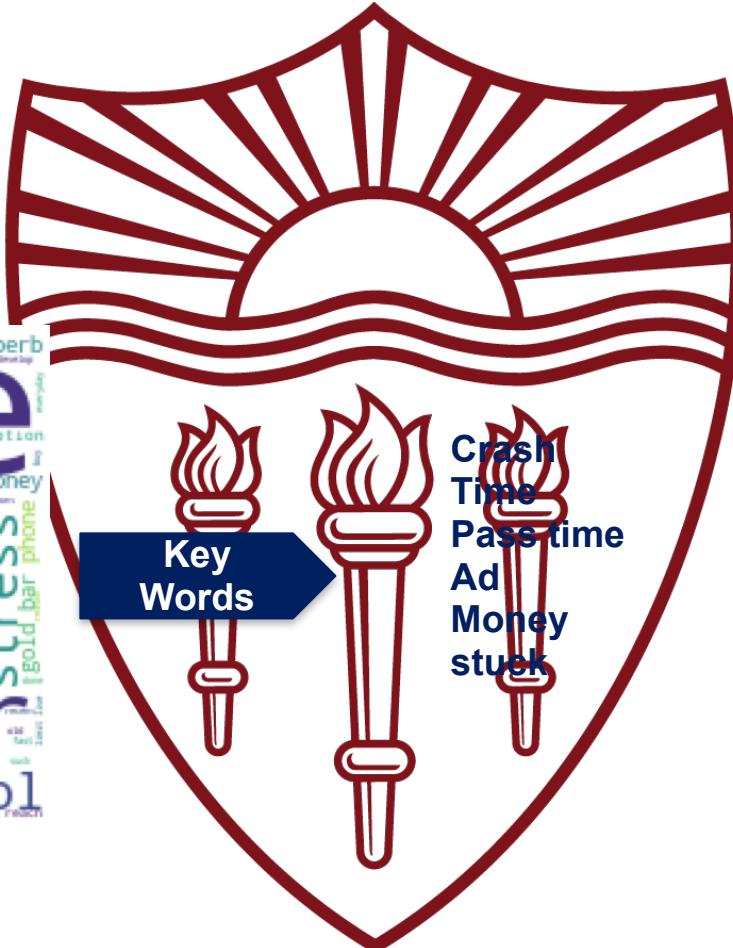
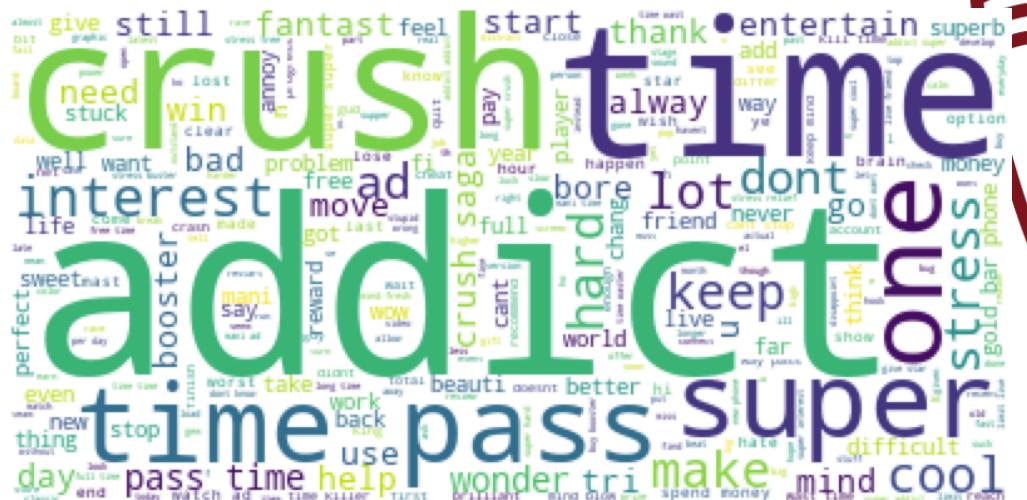
Can you make friends with your Facebook friend...



```
[['fun'],
['awful'],
['matter'],
['update'],
['game'],
['randomly'],
['close'],
['progress'],
['spent'],
['coin'],
['gem'],
['lose'],
['support'],
['help'],
['really', 'cool'],
['used'],
['really'],
['love'],
['game'],
['recently'],
['new'],
['device'],
['go'],
['sync'],
['progress'],
['account'],
['phone'],
['cant'],
['play'],
['level'],
['booster'],
['screen'],
['stay'],
['blank'],
['wont'],
['load']],
['love',
'game',
...]]
```

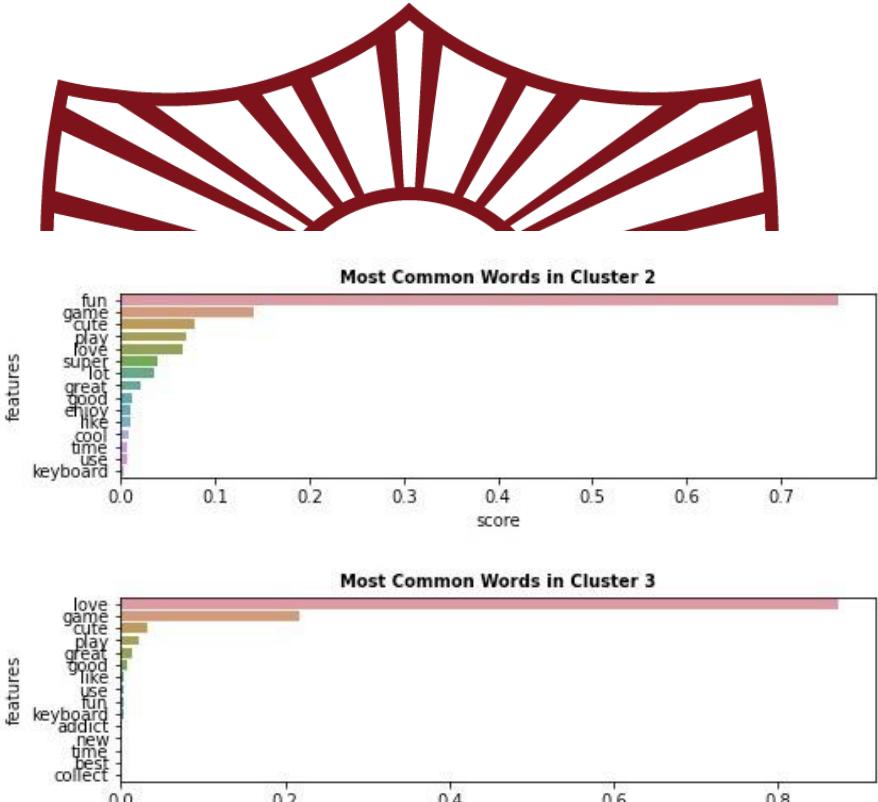
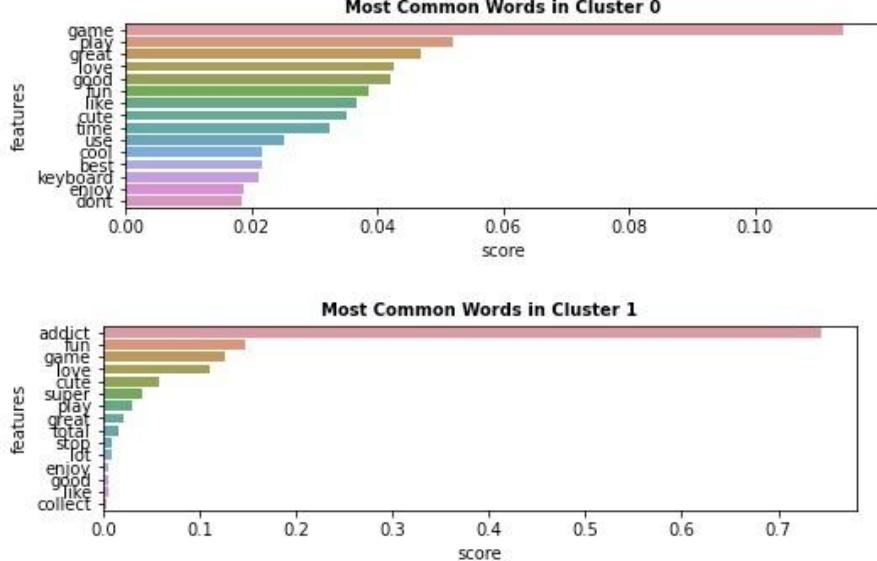
Data Clustering – word cloud

Using word cloud



Data Clustering

- Run TF-IDF Vectorizer on text data
- Using K-means for clustering

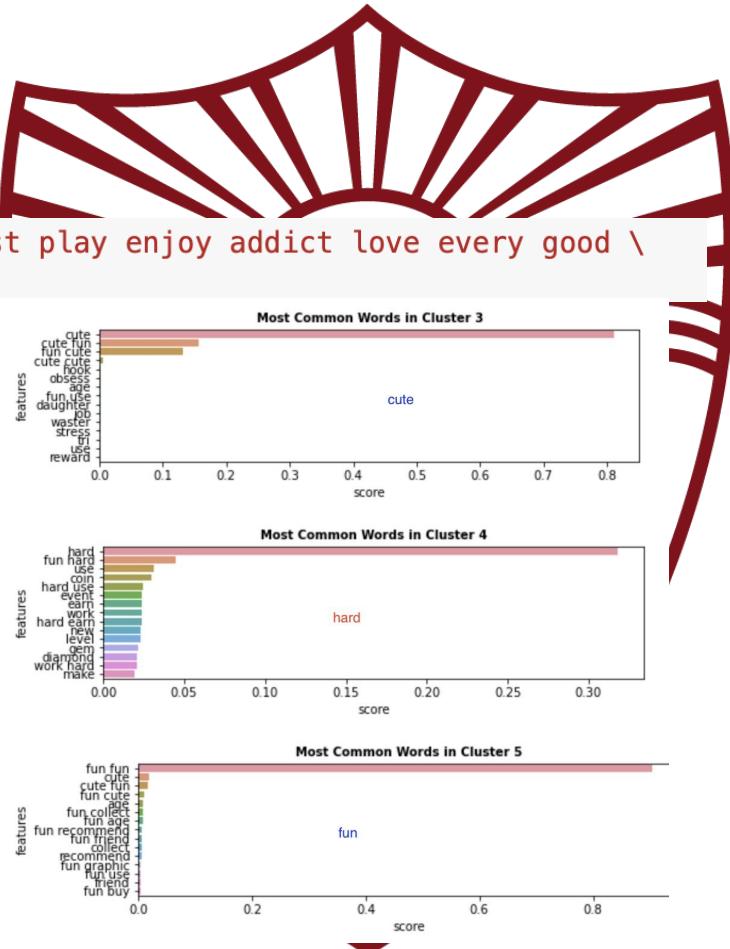
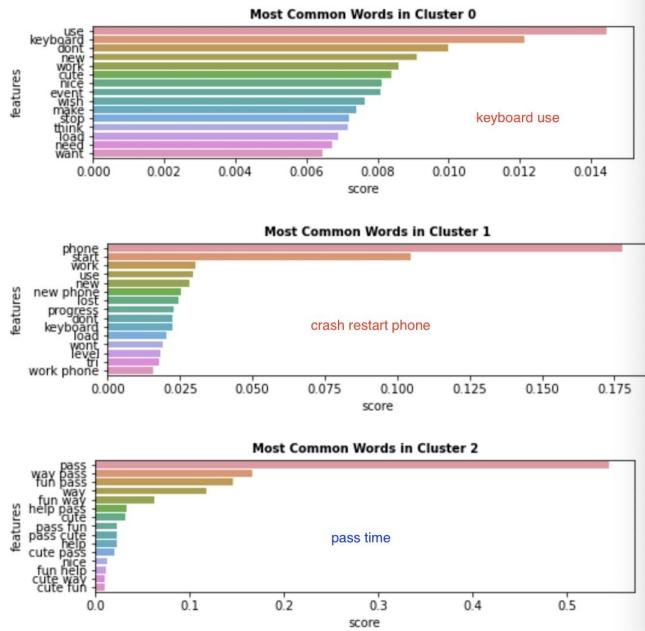


We can retrieve seven or eight useful information such as keyboard, time. But there are still some messy data which are abstract.

Data Clustering

- Adding unuseful words to stop words

```
stop_words = 'game fun like veri super very great best play enjoy addict love every good \
ever would much better even lot nice'
```



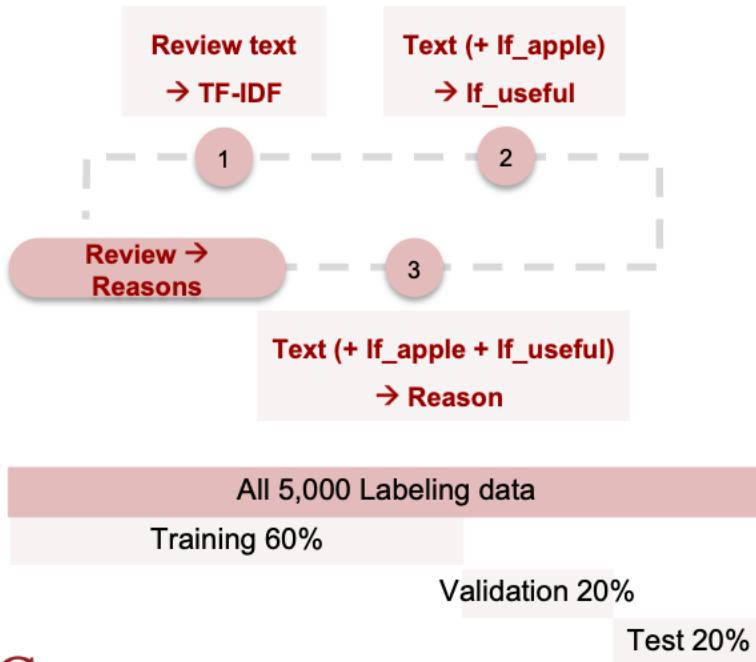
Data Labeling

- Labeled the data into 15 features
- Randomly selected 5000 data from the whole dataset
- Manually labeled 1, 0, -1 under each category, representing players' love, feel nothing and hate this game for certain reasons.

features	meaning
if_useful	If we can retrieval reasons from the reviews
mechanism	Game rules, difficulty, game clearance time
ad	Advertisements
Money	Purchase of gems, coins, character box and other in-app-purchase
UI/UX	Game interface design, music
event	Game held events and missions weekly at regular basis to cater player's love towards Disney movies and deliver awards, like coins, gems, and game props.
keyboard	The game will issue some Disney attachments on regular basis, which can be stored players' keyboard for daily chat with friends.
IP	Preference on Disney
time/life	Pass or waste time
customer service	Deliver support to customers
crash	Screen crashes while playing
data	Data loss
system upgrade	System upgrade
connection	Connected to facebook or other account
other tech	Other technique issues

Feature Classification – Overview

Classify a certain review into one or several related reasons why users like or dislike the game, and those reasons may contribute to their final rating score.



If_useful	Meaning	Example
1	Can retrieve reasons from the text	No adds yet since I played it very nice.
0	Contain no information of reasons	Good game!

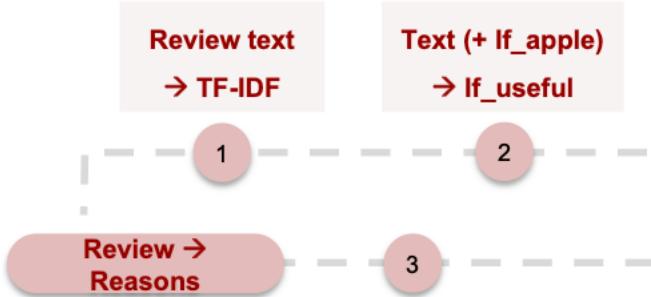
Reason	Meaning	Example - keyboard
1	Users love this feature	I love how I can earn and use emojis while texting.
0	Not involved	Good game!
-1	Users complain about	Keyboard doesn't work.

Best model

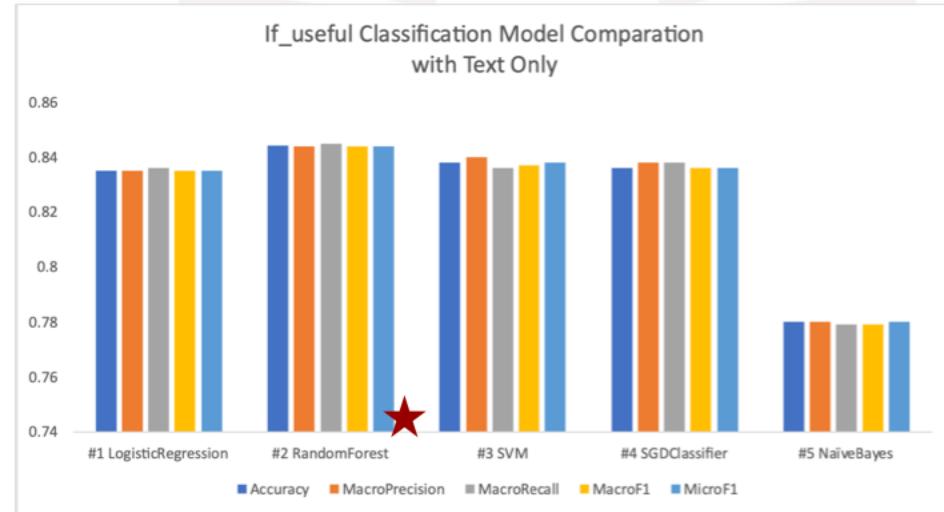
Predict all features for 170,000+ reviews

Feature Classification – If_useful

Given text reviews and the platform feature (if it's from App Store) to predict if a review is useful to extract reasons of why users like or dislike the game.



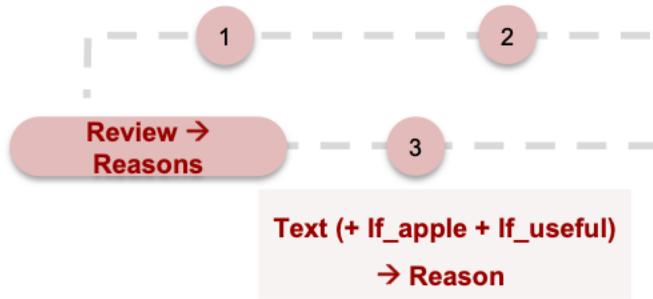
- Train models including different predictors:
 - Text only
 - Text + If_apple
- Train models using different classification methods



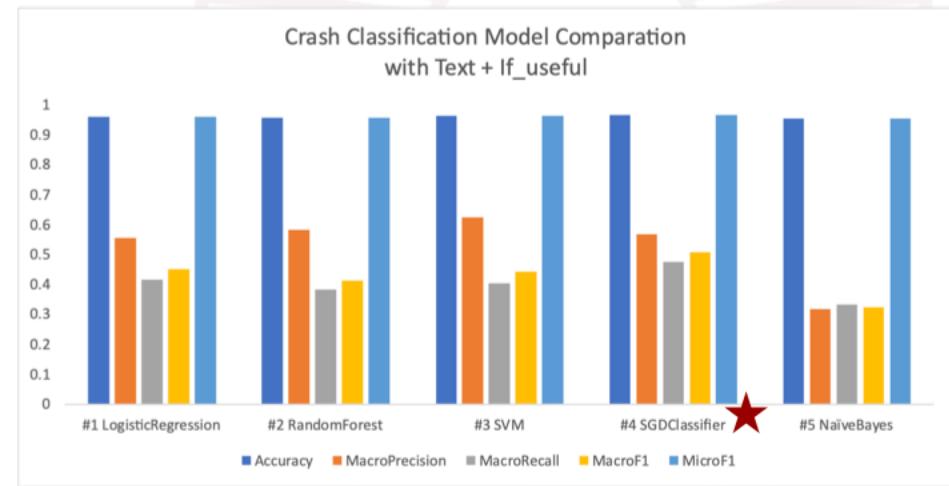
	Accuracy
Random choice – baseline	0.50
Our best model – test	0.83

Feature Classification – Crash

Compare validation results using different predictors, may including 'if_apple' or 'if_useful' or just 'content', and five models, ending with the best model with tuned parameters.



- Train models including different predictors:
 - Text only
 - Text + If_apple
 - Text + If_useful
 - Text + If_apple + If_useful
- Train models using different classification methods



	Accuracy
Random choice – baseline	0.926
Our best model – test	0.958

Feature Classification – All Features

Get the best models of all the 14 features, all the accuracy is far beyond the baseline and used these models to conduct feature classification for all 170,000+ reviews.

	reason	if_apple	if_useful	Final model	baseline_acc	acc	macro precision	micro precision	macro recall	micro recall	macro F1	micro F1
1	mechanism	No	No	LogisticRegression	0.85	0.87	0.60	0.82	0.42	0.87	0.44	0.83
2	ad	No	Yes	Decision Tree	0.85	0.99	0.33	0.98	0.33	0.99	0.33	0.98
3	money	No	No	Decision Tree	0.88	0.94	0.55	0.94	0.52	0.94	0.53	0.94
4	UI/UX	No	No	Decision Tree	0.89	0.93	0.48	0.93	0.45	0.93	0.46	0.93
5	event	No	No	LogisticRegression	0.94	0.97	0.63	0.97	0.61	0.97	0.61	0.97
6	keyboard	No	No	SGDClassifier	0.91	0.92	0.75	0.92	0.60	0.92	0.64	0.92
7	IP	No	No	SGDClassifier	0.92	0.93	0.49	0.93	0.39	0.93	0.40	0.93
8	time/life	No	No	SGDClassifier	0.96	0.98	0.62	0.98	0.48	0.98	0.51	0.98
9	crash	No	Yes	SGDClassifier	0.93	0.96	0.86	0.95	0.65	0.96	0.71	0.95
10	data	No	Yes	SGDClassifier	0.96	0.98	0.47	0.97	0.39	0.98	0.41	0.97
11	system upgrad	No	No	Decision Tree	0.93	0.96	0.46	0.96	0.45	0.96	0.46	0.96
12	connection	No	No	SGDClassifier	0.97	0.99	0.50	0.98	0.42	0.99	0.44	0.98
13	other-tech	Yes	Yes	Decision Tree	0.91	0.97	0.41	0.98	0.45	0.97	0.43	0.98
14	if_useful	No	-	Random Forest	0.50	0.83	0.83	0.83	0.83	0.83	0.83	0.83

Best model

Predict all features for 170,000+ reviews

Modeling: Score Prediction

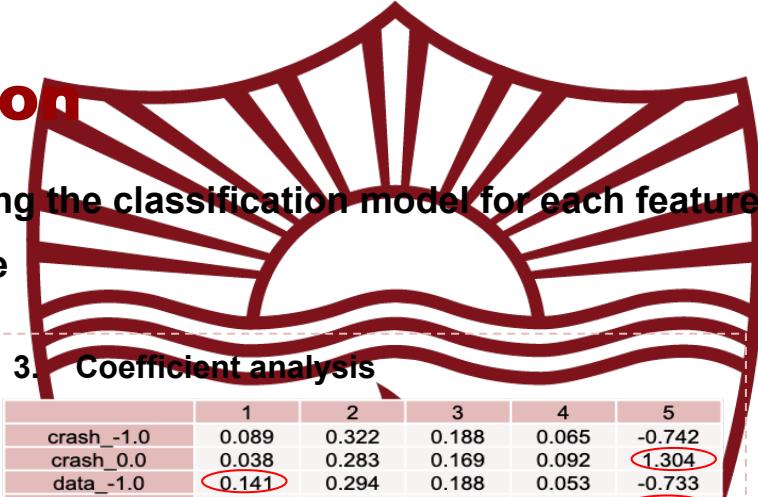
- Predict every feature's value for all reviews using the classification model for each feature
- Use SGDClassifier to predict all reviews' score

	crush_-1.0	crush_0.0	data_-1.0	data_0.0	data_1.0	k
0	0	1	0	1	0	
1	0	1	1	0	0	
2	0	1	0	1	0	



2. F1 score for SGDClassifier model

```
1 f1_score(y_pred,y_test,average = "weighted")  
0.7888527979172103
```



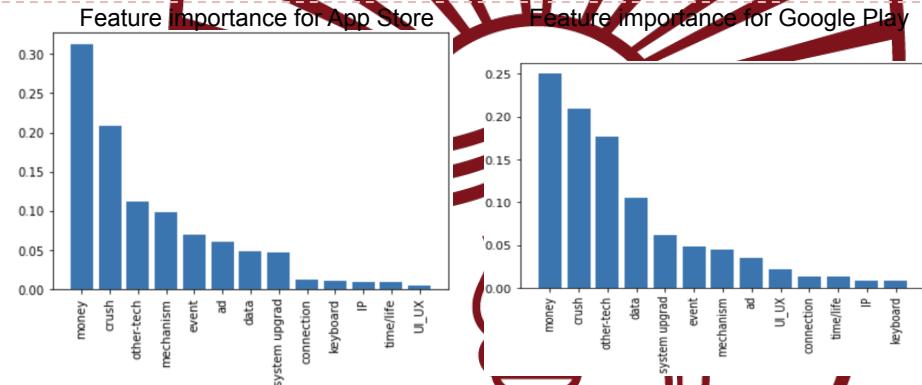
- 37 features in total, here we only show the most important 19 features

Modeling: SGDClassifier Model Result Analysis

4. Build new SGDClassifier using app store dataset and google play dataset separately

0	F1 score
App Store	0.832
Google Play	0.750

Getting feature importance for App Store and Google Play



Findings:

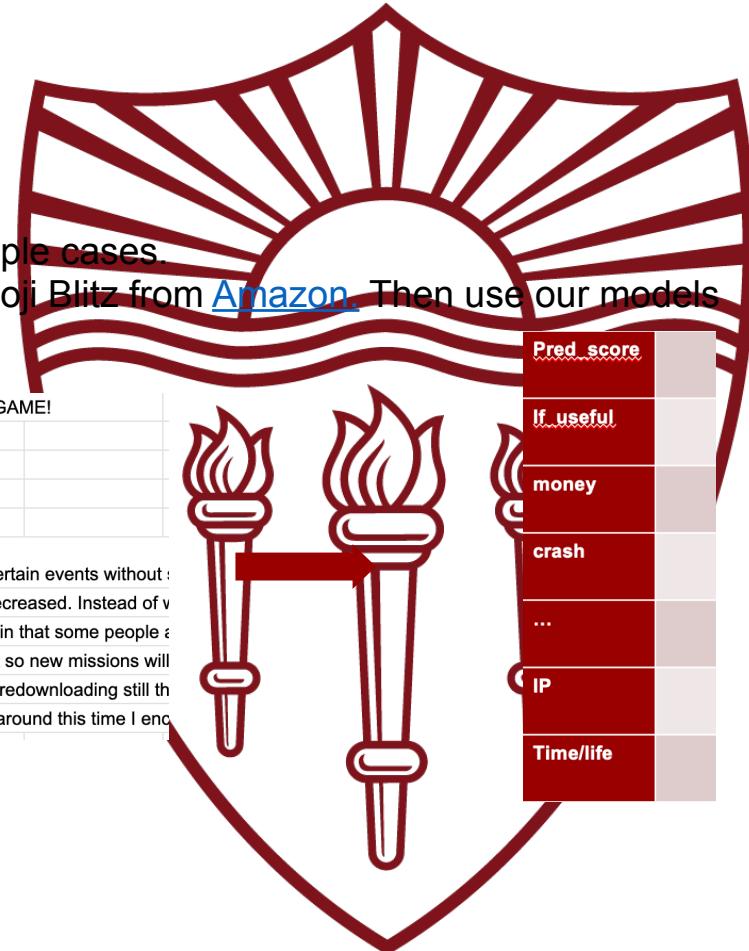
- The SGDClassifier model performs well on predicting the score of a review
- Reviews without mentioning technical terms and money is more likely get high score, negative comment on mechanism and money spending would greatly reduce the score
- Data loss is the most important reason for extreme low score
- Money / cost is more important to App Store user comparing to Google Play user.

Out-of-sample Data

Finally, we use the model to predict some out-of-sample cases.

We randomly get some latest reviews about Disney Emoji Blitz from [Amazon](#). Then use our models to get the 'reasons matrix' and predict scores.

- 5 I love this game. It is so much fun to get Disney caricatures and send them to people I LOVE THIS GAME!
- 5 It incredible
- 5 I enjoy almost anything Disney and getting to collect the emojis makes it a fun challenge.
- 5 I play this every single day ♥
- 5 Love that you can earn emojis to use in your texts. A must for Disney fans!
- 1 I love this game but I wish you would stop requiring specific emojis in order to complete an event.
- 3 I love this game and enjoy playing it but one thing that gets me is the fact that you can't complete certain events without :
- 1 I've noticed how cheap, not inexpensive, this game has become. The mission/Quest Pass prizes decreased. Instead of v
- 3 fun but greatly flawed theres two main issues with how the game is designed: 1) it has not factored in that some people e
- 1 Was a great game, not so much anymore. When game updates I have to uninstall and try to force it so new missions will
- 1 I don't know what has changed but it freezes on me all the time lags so bad. I tried uninstalling and redownloading still th
- 1 It would be absolutely wonderful if they would create other ways to save game progress. Last year around this time I enc



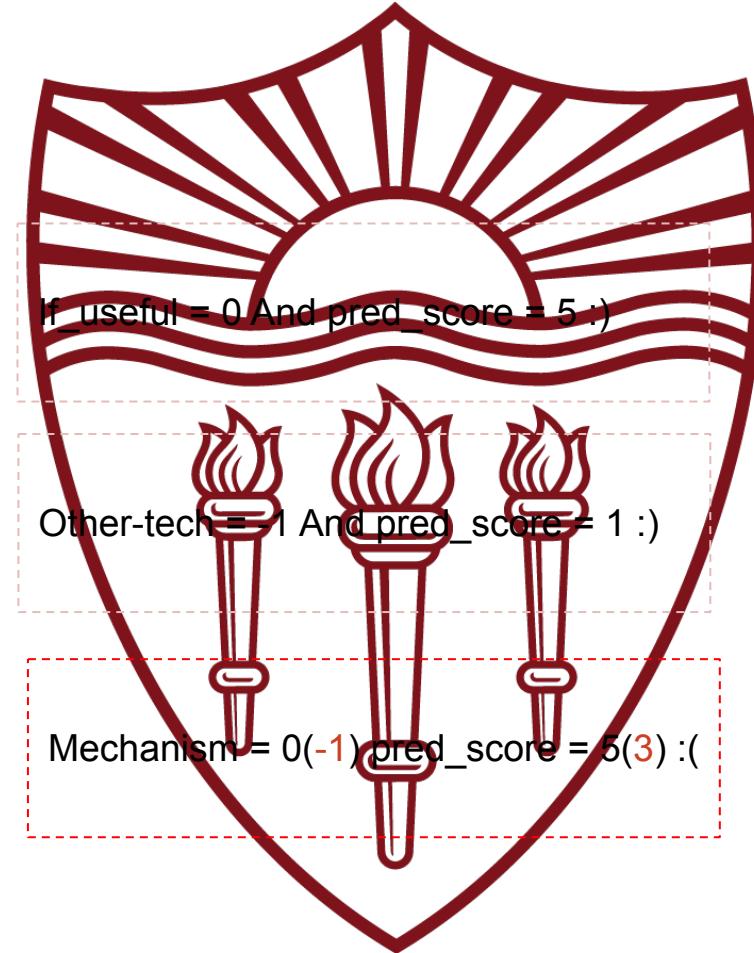
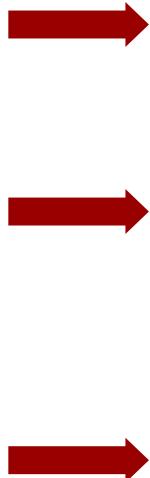
Out-of-sample Data

Result: accuracy of score prediction - 72.2%

- 5 It incredible
5 I play this every single day ❤️

1 I don't know what has changed but it freezes on me all the time lags so bad. I tried uninstalling and redownloading still the same. It takes me so long for it even to load then once I play it glitches and freezes. So upset cause I been playing for so long and I love it just wish it would work again

3 I love this game but I wish you would stop requiring specific emojis in order to complete an event.
I love this game and enjoy playing it but one thing that gets me is the fact that you can't complete certain events without specific emojis. How are we expected to get the emojis if we don't have a chance to win them? I'd love to be able to play a game and fully enjoy it without having stipulations. Life can be tough enough, a game shouldn't be. Update after my last feedback: I did notice one event had "required emojis" or wait so many hours to unlock the level, all events should have some kind of option to continue playing even with out the required emojis. Keep doing that!



Insights & Discussion

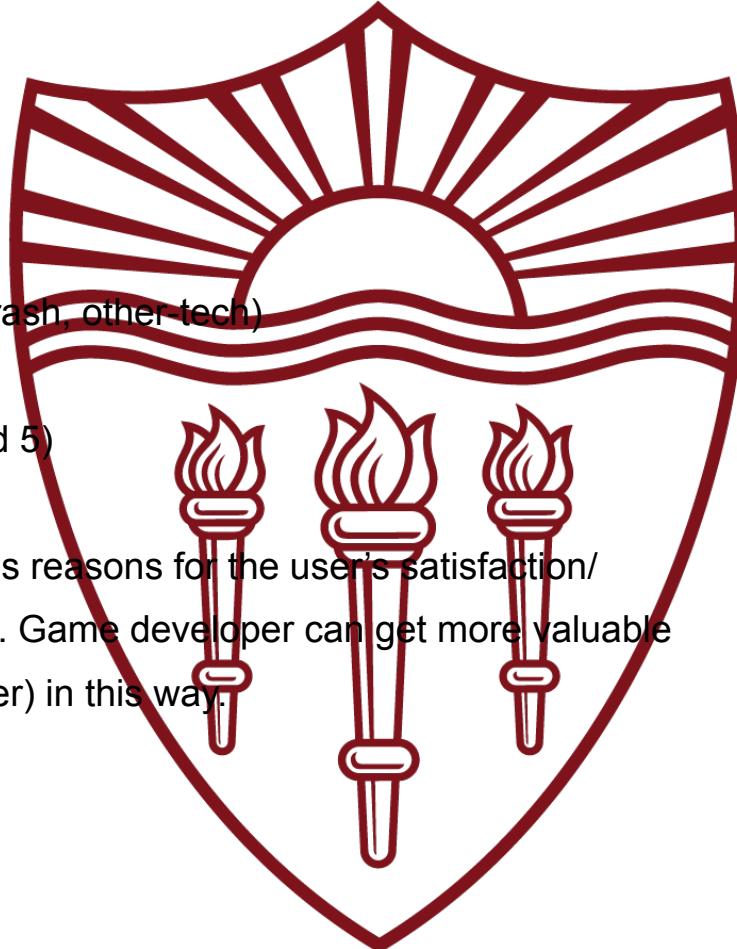
Reason Predictor

- The models perform good on important features (Crash, other-tech)

Score Predictor

- The models perform good on extreme scores (1 and 5)

Every reviews related to this game can be interpreted as reasons for the user's satisfaction/dissatisfaction and possible score might given by users. Game developer can get more valuable but 'invisible' feedback from any social media (like twitter) in this way.



Future Work

- 1. Data of other platforms
- 2. More “neutral” reviews

- 1. More reasonable features
- 2. Using LDA to capture features more automatically

- 1. Try spell-checking and auto-correction of the texts (\$ to money)
- 2. Try more NLP models from Transformers

Data

Features

Models

Thanks

Members:

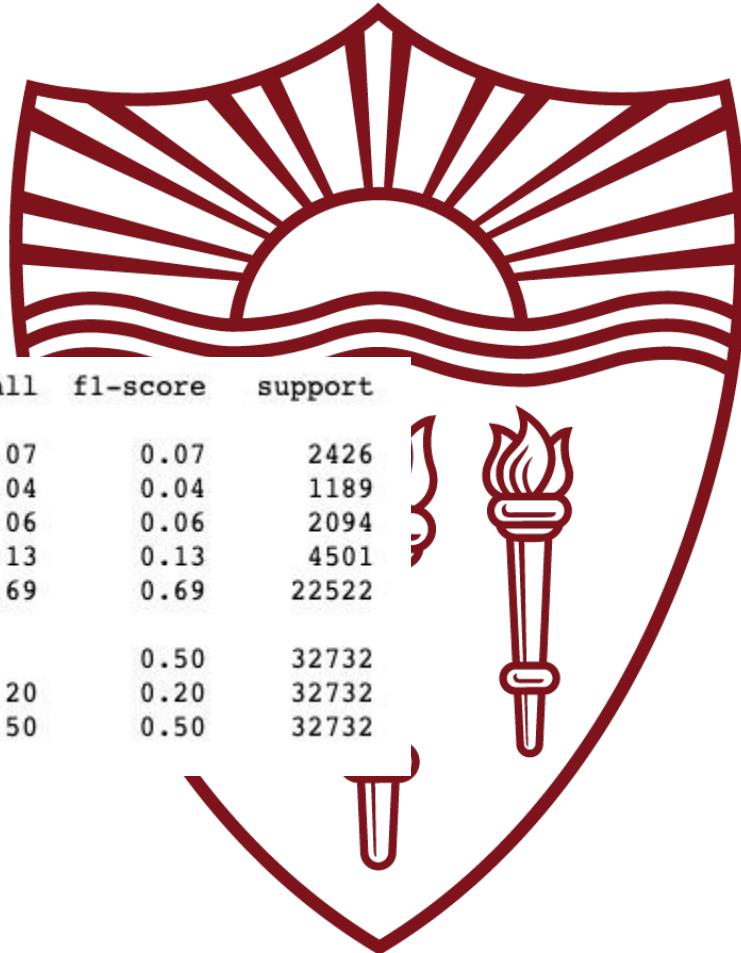
Anqi Zhu; Yue Wu; Yi Liu; Han Wang; Yingshu Chen



Appendix

Score prediction baseline

	precision	recall	f1-score	support
1	0.07	0.07	0.07	2426
2	0.04	0.04	0.04	1189
3	0.06	0.06	0.06	2094
4	0.13	0.13	0.13	4501
5	0.69	0.69	0.69	22522
accuracy			0.50	32732
macro avg	0.20	0.20	0.20	32732
weighted avg	0.50	0.50	0.50	32732



Appendix

SGD performs good, and it has the best performance on the neutral reviews.

	accuracy	Macro-precision	Weighted-precision	Macro-recall	Weighted-recall	Macro-F score	Weighted-F score
SGD	0.70	0.33	0.58	0.25	0.70	0.24	0.61
RF	0.70	0.35	0.60	0.29	0.70	0.30	0.63
Voting Regressor	0.70	0.33	0.58	0.26	0.70	0.25	0.61