



HOW SUCCESSFUL IS AN APP RATING?

PREPARED BY: GRACE CHONG

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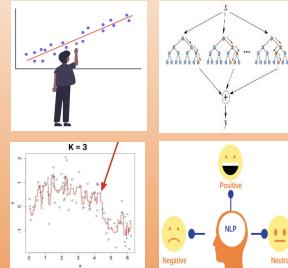
<https://www.linkedin.com/in/grace-chong-3021b8223/>

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Problem Statement

- RiotGames to understand Severity between Users and Developers
- Tracking crucial key App's metrics



Findings and Conclusion
Machine Learning

Machine Learning

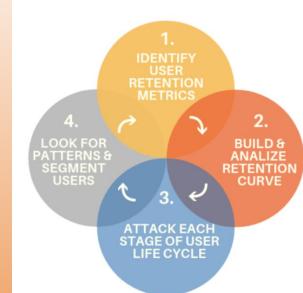
Inspiration

The Play Store apps data has enormous potential to drive app-making businesses to success. Actionable insights can be drawn for developers to work on and capture the PlayStore market! Explore and analyze the data to discover key factors responsible for app engagement

4

Findings and Conclusion

- Predict best model in future behaviour of Users based on findings



5

Recommendation

- RiotGames DataScientists promoting several approaches for Management to make final decision.



1.0: PROBLEM STATEMENT

1.1:BACKGROUND PROBLEM



Established 2020



International Game
Developer and Publisher
from Riot Games



Little or no historical
End-user behavioural
statistical App data

Revenue



Default

2.0: EDA

2.1 : EDA CSV EXTRACTED DATA DESCRIPTION

CSV Files	appstore.csv	app_user_reviews.csv	Remarks
Rows	10842	64296	
Columns	13	5	
Selected Features	8	5	
Float	1	2	
Integer	0	0	
Object	12	3	
Missing	1487	26868	Replaced NULL Values: Numerical: Mean, Label-Encode Object: Median, Label-Encode

2.2: IMPORTANCE OF TARGET APP RATING AND APP SENTIMENT ANALYSIS:

- Continuous Target: Rating (Customer Experience)

- Minimum Target Variable: 1.0

- Maximum Target Variable: 5.0

- Object Target: Sentiment Scores (Customer Satisfaction)

- Positive

Negative

Neutral

Non-Defaulted Apps:

end users exhibited similar behaviours, where people will download

apps only through good sentiments and good rating

Defaulted Anns:

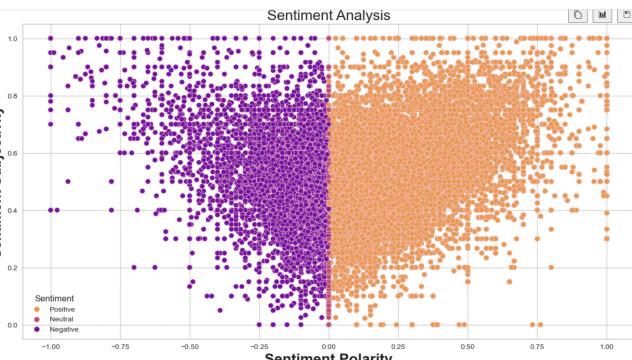
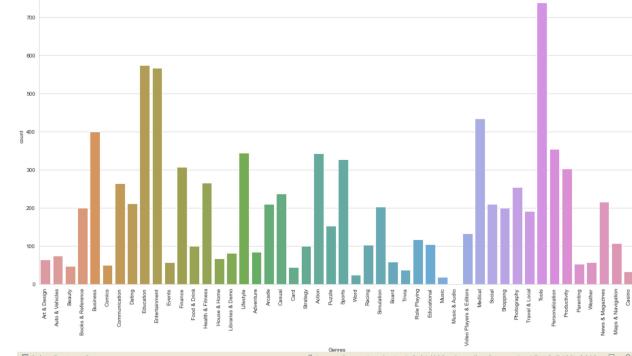
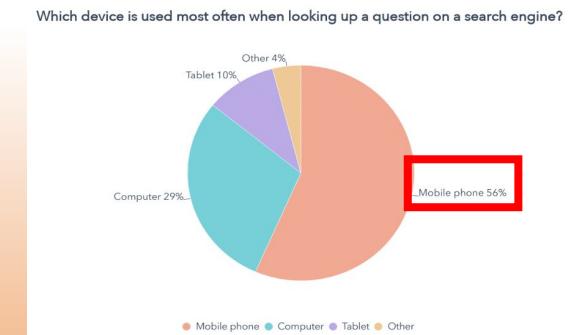
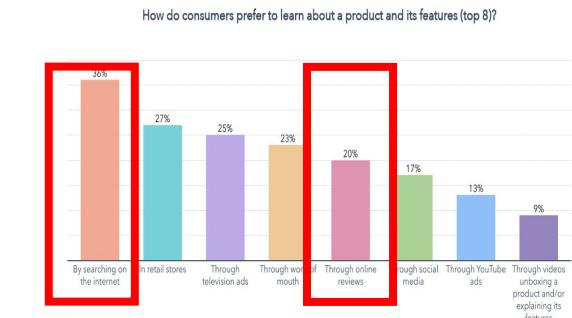
End users can also exhibit unique behaviours through

falsifying app sentiments and falsifying rating

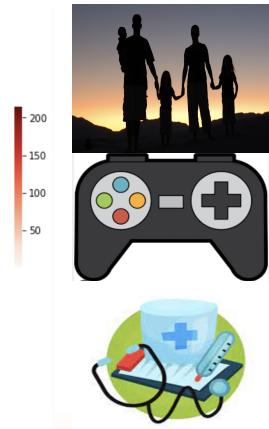
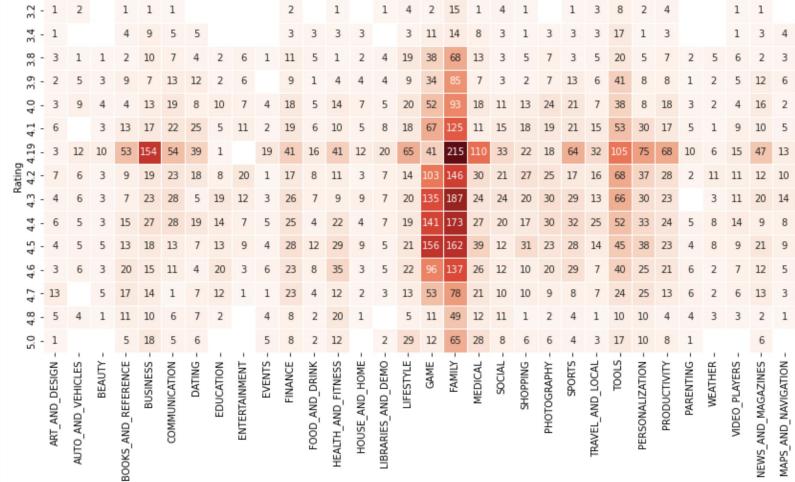
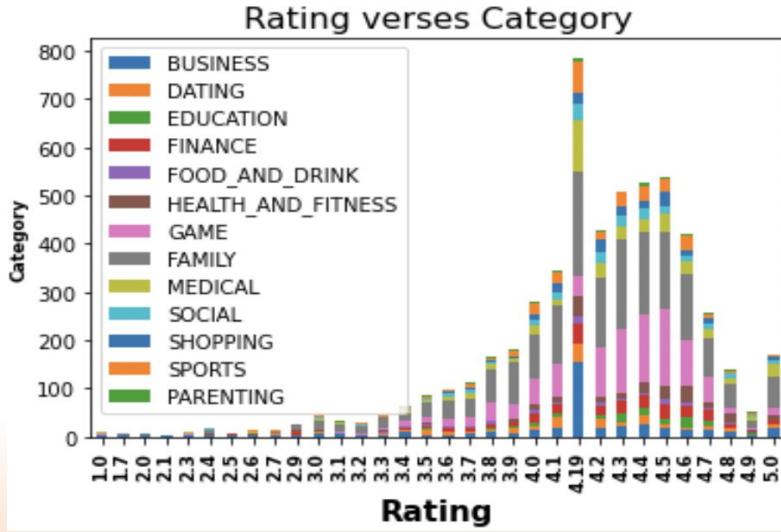
that also contributes to inconclusive data, i.e. Bots

As such, we need to focus more on such outliers to differentiate Defaulted Apps

And Non-Defaulted Apps to make sure App Integrity is not affected



2.3 HOW GENRES RELATES TO APP RATING ?

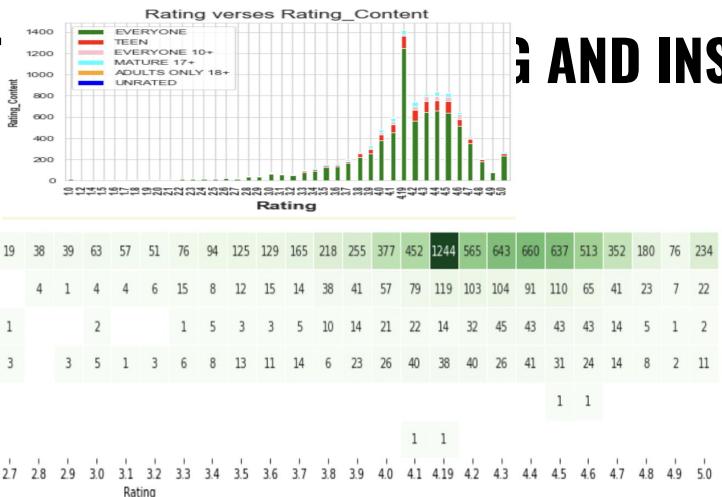


- Statistics tells FAMILY showed most populated Rating followed by GAME and then MEDICAL.
- We can tell most end-users has higher number of downloads regioned around FAMILY , this also somehow correlates to their life preferences.

Age reflection in Interest of

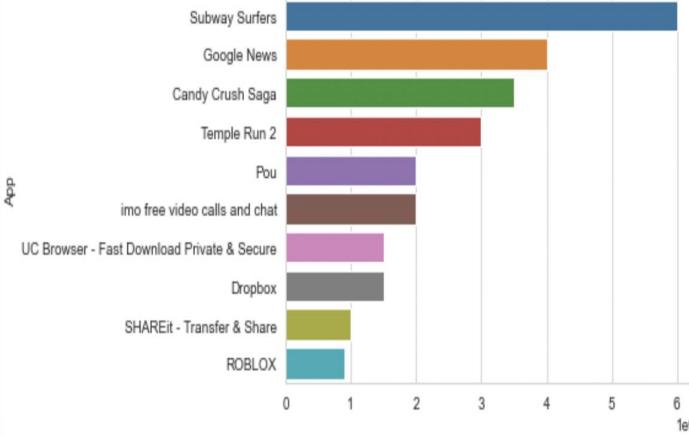
App Category of number of Installs

2.4 HOW RATING RELATES TO APPS AND INSTALLS ?



EVERYONE - 15	1	3	3	4	8	7	9	10	8	13	18	16	15	24	19	38	39	63	57	51	76	94	125	129	218	255	377	452	1244	565	643	180	76	234											
TEEN -																																													
EVERYONE 10+ -																																													
MATURE 17+ - 1																																													
ADULTS ONLY 18+ -																																													
UNRATED -																																													
10	12	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	41	41	42	43	43	44	44	45	46	47	47	48	48	49	49	50

Top 10 Installed Apps



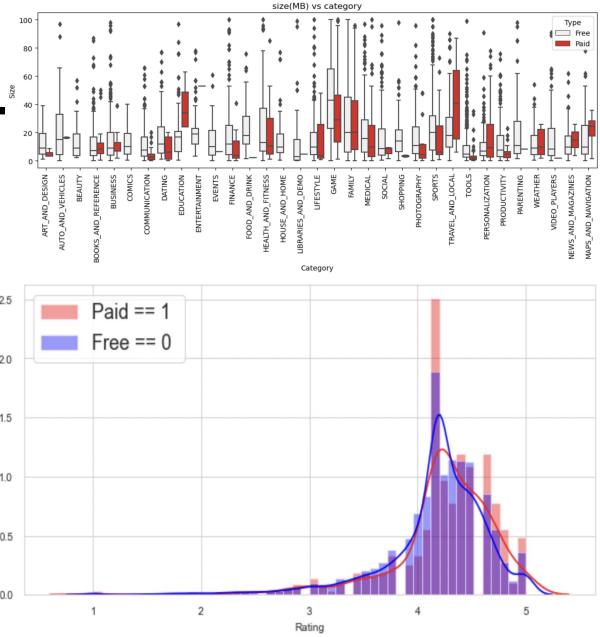
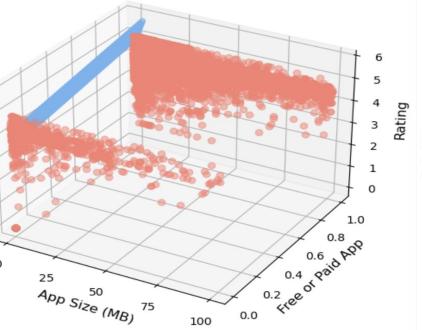
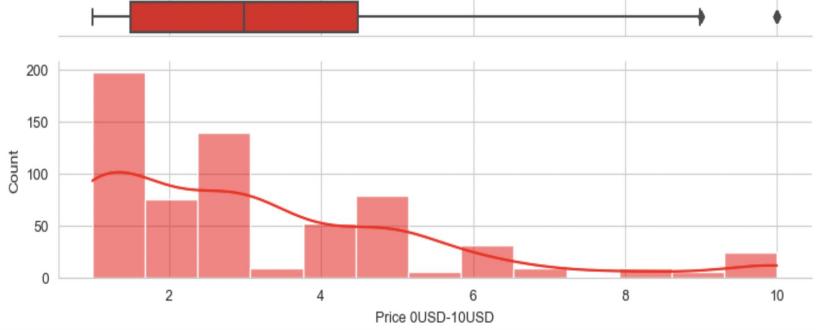
Installs more than 600Million

	Category	App	Installs
4327	GAME	Subway Surfers	8000000000.000000
5744	NEWS_AND_MAGAZINES	Google News	4000000000.000000
4354	GAME	Temple Run 2	3000000000.000000
3773	GAME	Candy Crush Saga	3000000000.000000
1039	COMMUNICATION	imo free video calls and chat	2000000000.000000
6581	PRODUCTIVITY	Dropbox	1500000000.000000
1012	COMMUNICATION	UC Browser - Fast Download Private & Secure	1500000000.000000
4192	GAME	Pou	1500000000.000000
7983	TOOLS	SHAREit - Transfer & Share	1000000000.000000
4023	GAME	Helix Jump	600000000.000000
3592	GAME	8 Ball Pool	600000000.000000



2.5 HOW DOES PAID APP PRICE AND SIZE INFLUENCES RATINGS?

Price distribution of Apps from 0USD-10USD



- Almost 200 apps cost below 2USD.
- App size showed higher ratings in Paid Apps than in Free Apps.
- End users tend to rate if they paid for their App.
- Heavier App size seem to correlate with better Rating.

	Category	App	Price		Category	App	Price		Category	App	Price
3176	FAMILY	go41cx	10.000000		5940	PERSONALIZATION	BL Holo Theme	2.000000			
1797	FAMILY	CHRONO TRIGGER (Upgrade Ver.)	9.990000		1440	FAMILY	AC CE BJT Actorial	2.000000			
5386	MEDICAL	Critical Care Paramedic Review	9.990000		6336	PHOTOGRAPHY	F Length Sim (no Ads)	2.000000			
4672	HEALTH_AND_FITNESS	Vital Tones El Pro	9.990000		4277	GAME	Sic Bo	1.990000			
5228	MAPS_AND_NAVIGATION	Jeppesen CR Flight Computer	9.990000		265	PERSONALIZATION	Dungeons and Dragons DM Tools	1.990000			
1430	FAMILY	500 AP World History Questions	9.990000		6174	TOOLS	Swift Dark CM / CM13 Theme	1.990000			
5937	PERSONALIZATION	BIG Launcher	9.990000		7484	LIFESTYLE	Analog and Digital Clock AW-7PRO	1.990000			
1668	FAMILY	Baldur's Gate: Enhanced Edition	9.990000		5014	HEALTH_AND_FITNESS	H*nest Meditation	1.990000			
1667	FAMILY	Baldur's Gate II	9.990000		4496	TOOLS	Be Stronger	1.990000			
5375	MEDICAL	Chest CT Sectional Walker	9.990000		7784	FINANCE	FVD Ad-Free	1.990000			
94	AUTO_AND_VEHICLES	FORD V SERIES CALC - NO LIMIT	9.990000		3212	PERSONALIZATION	BA Pro Financial Calculator	1.990000			
5296	MEDICAL	Abdominal CT Sectional Walker	9.990000		3189	TOOLS	iAy Caramba!	1.990000			
5469	MEDICAL	InfantRisk Center HCP	9.990000		7944	FAMILY	Power Widget	1.990000			
6430	PHOTOGRAPHY	Pocket AC	9.990000		1544	PERSONALIZATION	Alif Ba Ta Bullseye	1.990000			
4316	GAME	Star Wars™: DIRTY	9.990000		6248	FAMILY	weather HD	1.990000			
6333	PHOTOGRAPHY	EF Lens Simulator	9.990000		2485	GAME	K.MOJI	1.990000			
2008	FAMILY	DRAGON QUEST III	9.990000		4262	TOOLS	Santa's Monster Shootout DX	1.990000			
3134	FAMILY	XCOM®: Enemy Within	9.990000		7482	PERSONALIZATION	Analog Clock AW-7 PRO	1.990000			
722	BUSINESS	Tiny Scanner Pro: PDF Doc Scan	9.980000		6167	TOOLS	Smart Launcher theme b. gold	1.990000			
723	BUSINESS	TurboScan: scan documents and receipts in PDF	9.980000		8007	TOOLS	Servidor Privado CR y CoC - Royale Servers PRO	1.990000			

3.0: MACHINE LEARNING

3.1: SUPERVISING THE MODELS

Model Selection: Linear Regression, Random Forest Regressor, KNN Regressor

Dependent Variable: Rating (1.0 to 5.0)
Independent Variable: The other remaining features

APP_STORE_DF Model Set-up & Selection
(Continuous)

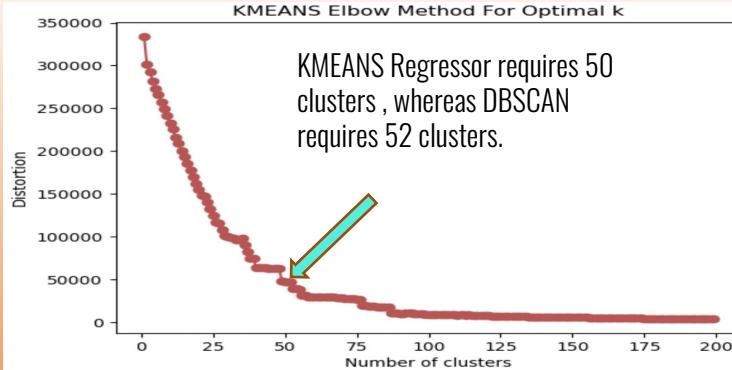
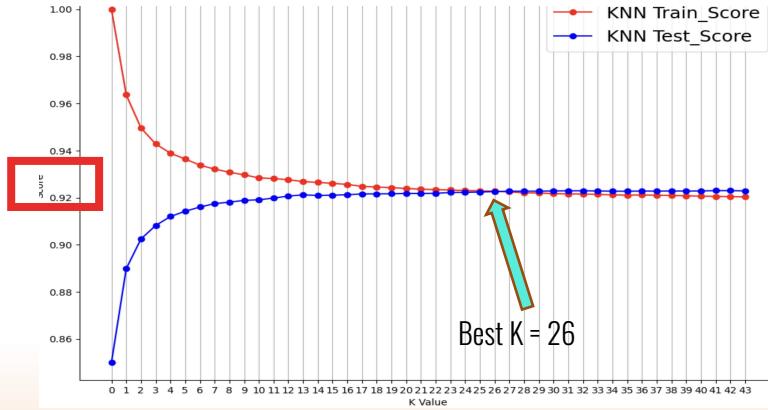
Model Selection: Logistic Regression, Gaussian Naives Bayes , Random Forest Classifier

Dependent Variable: Sentiment Score (Positive 1, Negative -1, Neutral 0)
Independent Variable: The other remaining features

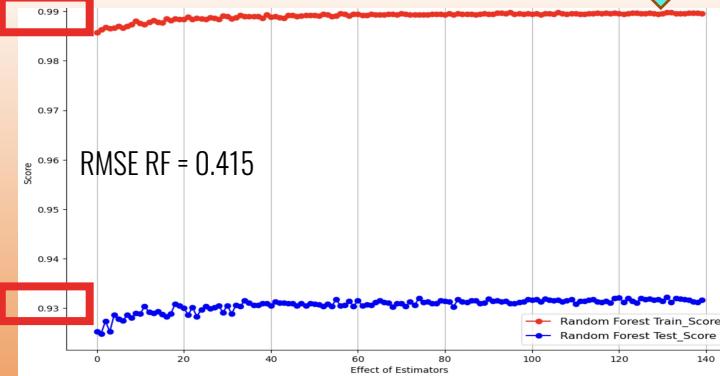
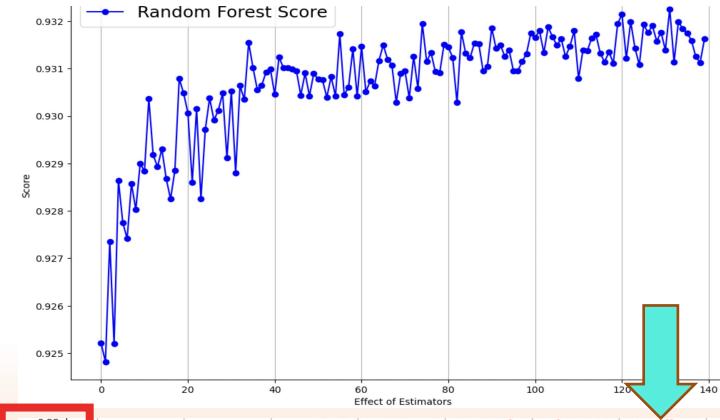
APP_USER_REVIEW_DF Model Set-up & Selection
(NLP)

3.2 APP_STORE_DF MODEL VISUALISATIONS

- KNN Regressor & KMEANS Cluster Regressor

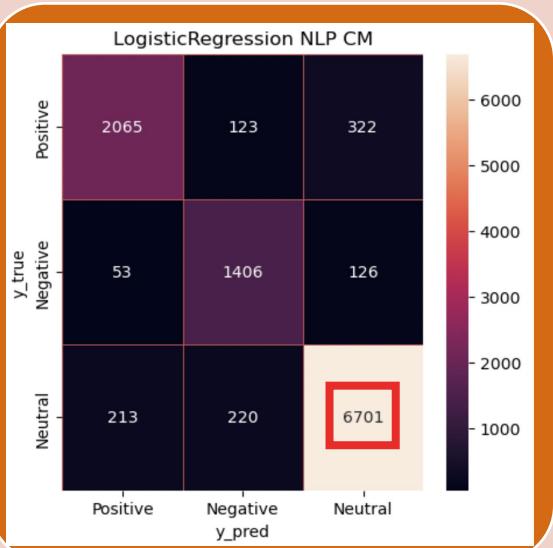


- Random Forest Regressor

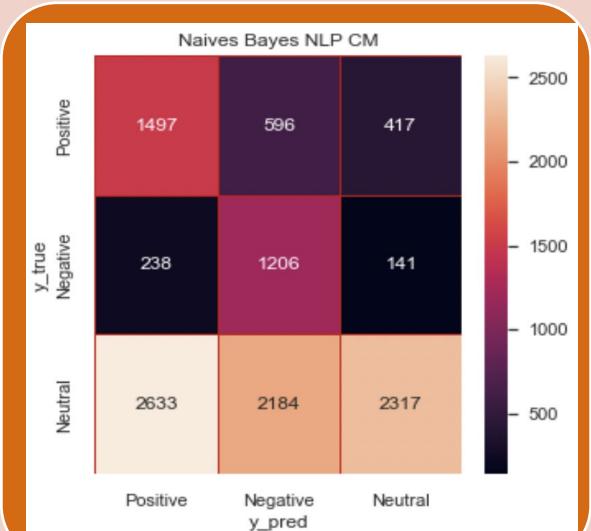


3.3: APP_USER_REVIEWS_DF NLP MODEL VISUALISATIONS ON SENTIMENT APP SCORE

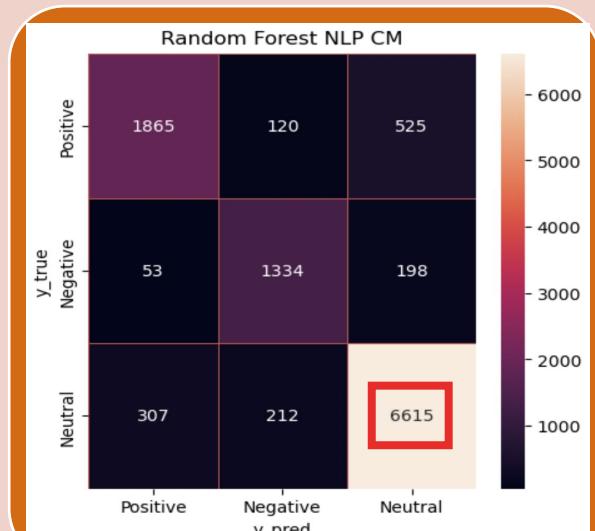
Logistic Regression CM



Naives Bayes Classifier CM



Random Forest Classifier CM



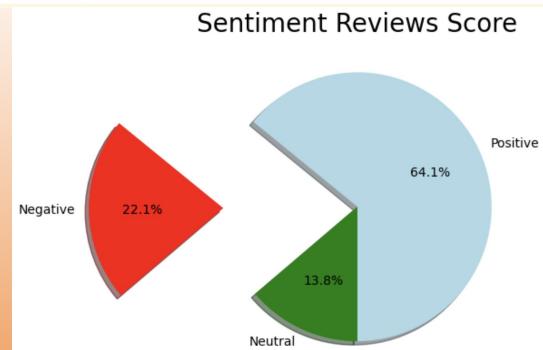
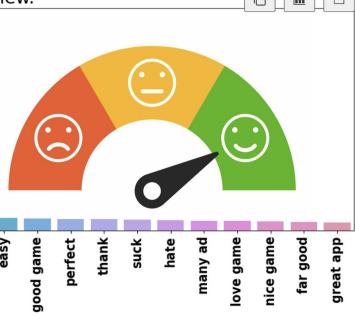
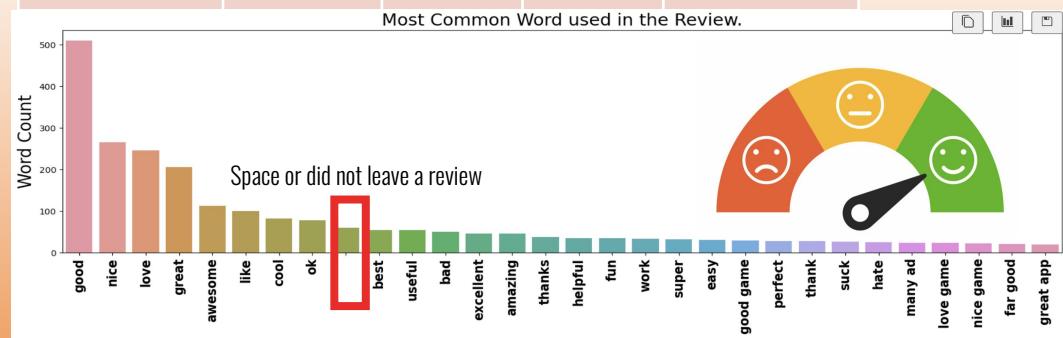
4.0: FINDINGS AND CONCLUSION

4.1: APP_STORE_DF TYPES OF MODELS FINDINGS SCORES

Models	Trained	Tested	Type of Fit
Linear Regression	91.9	92.3	Good Fit
KNN Regressor	92.3	92.2	Good Fit
Decision Tree Regressor (Baseline)	99.9	86.9	Overfit
Decision Tree Regressor (Hyperparameter Tuning)	91.4	92.0	Good Fit
Decision Tree Regressor (GridSearched CV)	92.4	92.5	Good Fit
Random Forest Regressor (GridSearched CV)	98.9	93.2	Good Fit

4.2: APP_USER_REVIEWS_DF TYPES |

NLP Models	Trained	Test	Type of Fit	RMSE
Logistic Regression	96.9	90.6	Good Fit	0.49
Naives Bayes Classifier	57.4	44.7	Overfit	1.17
Random Forest Classifier	99.3	87.4	Good Fit	0.59



5.0: RECOMMENDATIONS

5.1: HOW WOULD THE MODELS BENEFIT COMPANY ?

- The impact of the model will benefit in the following ways:

Revenue:



Business Outlook:

- **Contingent Value Right (CVR):** metric indicates percent users that saw your ad took action as a result. Right often granted to shareholders of a company facing restructuring or a buyout. Rights ensure that the shareholders get certain benefits if a specific event occurs.
- **Consumer Price Index (CPI):** is a metric that tracks a fixed selection of goods and services to determine price fluctuations over time. Companies can use this measure to analyse changes in the overall cost of living and to measure inflation

Case Study 1: Increase Reviews Numbers App: Bingo Blitz

30%
Organic
Conversion
lift

+30%
in organic CvR
→
+1,500
organic installs/day

$1,500 \times \$3.00 = \$135,000$
installs avg CPI
per month

Case Study 2: Increase Reviews Numbers + Replying to Reviews App: Slotomania

15%
Organic
Conversion
lift

+15%
in organic CvR
→
+2,000
organic installs/day

$2,000 \times \$4.00 = \$240,000$
installs avg CPI
per month

30 % increase only

+0.7 points in rating and 15 % increase

5.2: FOCUS END-USER EXPECTATIONS

- Define your proposed app's primary purpose
- Define three to five other business issues it should solve
- Determine the target audience for your app, including their demographics and preferred operating system or platform
- Look for similar apps on the market and determine how closely they align with your idea
- Read reviews of potential competitors to learn what users do and do not like
- Find the number of downloads of your competing app to determine popularity





5.3: SOLUTIONS TO INCREASE REVENUE:

- From above statistics and model ,
- 1. last_update : date as to which App is last updated (last updated number of days ago)
- 2. Free: whether App is available for free
- 3. App Size (MB) : How much space does an App occupy their device



are the top 3 most influential features that can be co-relatable to an App Rating and an App Review.

- Solutions:
- 1. Up to-Date: Keep App updated by providing notifications to end-users
- 2. Customer Service: Provide App Review Plugin , only after end-users accomplished intended task on App.
- 3. Optimise App Size(KB): increase APK efficiency by optimizing file contains all of a program's code resources, assets, certificates, and manifest file(license, versions).

6.0: FURTHER EXPLORATION

6.1: FURTHER EXPLORATION

1. Statistics of Age groups preferences
2. Marketing Price accredited per App annually
3. Sales accredited per App annually
4. Satisfactory on an App update

