



ReviewHive

-Buzzing with customer feedback

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Overview

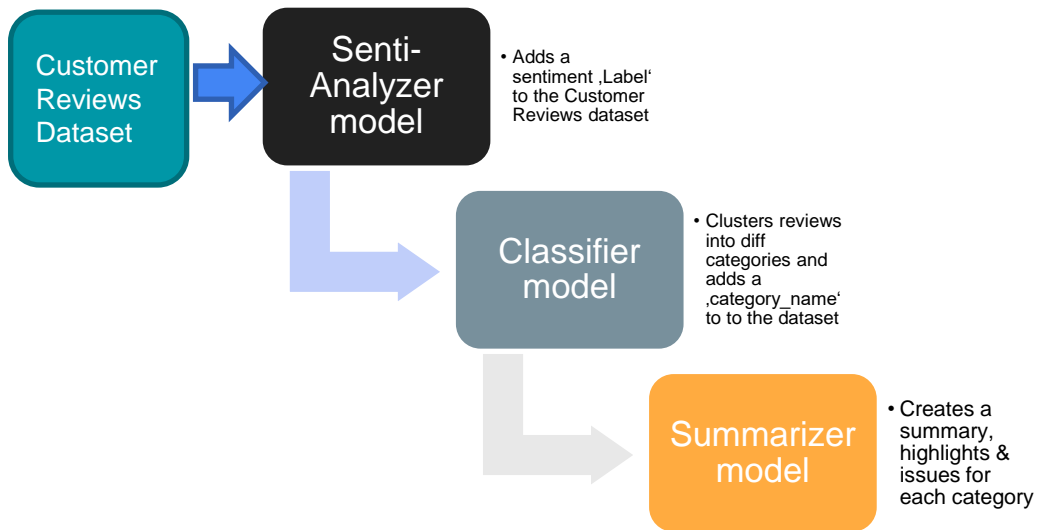
To see the Final product **Click Here** ==>



**ReviewHive -
Product Reviews**



<https://4f4bc6dae411b41461.gradio.live>



Approach and Considerations

- Approach this project as 4 Sprints of one day each.
 - Sentiment Analyzer
 - Classifier
 - Summarizer
 - Final outcome (thru Gradio, HTML, HuggingFace hosting)
- Create MVP(Minimum Viable Product) every sprint and build on top of this.
- Try different models and techniques.
 - Used Transformers for each of the sprint and use Classical model, where applicable
 - Tried various models – RoBERTa, DistillBERT, T5, BART

SPRINT	Final Model
Sentiment Analyzer	RoBERTa
Clustering/Classifier	K-means (K=5)
Summarizer	T5-Base

Sprint 1 – Sentiment Analyzer

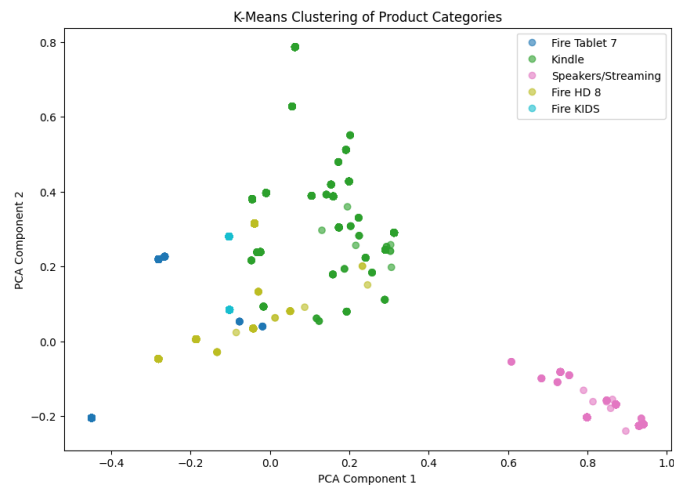
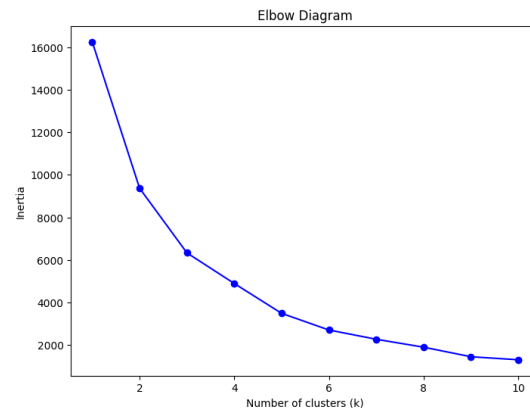
- Based on the rating converted to sentiment
(1&2–Negative,3-Neutral,4&5-Positive)
- Trained and tested model RoBERTa..
- Two Challenges:
 - Dataset skewed towards 4 & 5.
 - Mis-alignment of Review text & Ratings.
- Optimizatation technique used:
 - considered SMOT, oversampling, undersampling
 - implemented class_weights in the model's Entrophy loss.
No changes to the dataset!

Metrics	Score
F1 Score	0.9135
Accuracy	0.9244
Precision	0.9051
Recall	0.9244

Sprint 2 - Classifier

- Transformer method
 - DistillBERT & RoBERTa models used
 - Challenge faced : indexing errors
 - Reset index, cleaned up data cleared cache
 - Change course to classical method after 3 hours
- K-means Clustering (name & categories)
 - Initially k=6, then switched to 5 for better classification
- 5 classes.

○ Fire Tablet	11042
○ Speakers/streaming	5946
○ Kindle	5238
○ Fire HD 8	3958
○ Fire KIDS	1679
- Plotted it using PCA reduction technique.



Sprint 3 - Summarizer

- The most difficult sprint.
- Tried and tested lot of models
 - T5-Small, T5-Base, T5-3B, T5-11B
 - BART
- Challenges faced:
 - Appended-text/Nonsensical-text
 - Repeated-text
 - Kernel Crash (while using bigger models)
 - Batches, Exclusions
 - runtime of over 40mins
 - Software incompatibilities
- Different approaches to generate better output
 - Cascading different ML models for better outputs
 - Train the summarizer with GPT 3.5/Davinci and fine-tune the T5 model
- Techniques used to address:
 - Picking the Right model for the task – went with T5-Base (with 220M parameters)
 - Optimizing input – created consolidation/category/sentiment, Removal of pronouns
 - Prompting – „summarize: {text}“
 - Separating outputs – General summary & Highlights/Issues
 - Reduced the Runtime to less than 10 mins.
- *Combining all the outputs to create the Final Product Review*



**ReviewHive -
Product Reviews**

Ideas for next sprints:

- Sentiment analyzer
 - Base it on reviews_text and reviews_title and supplement it with Rating weights.
- Classifier
 - reevaluate the model and input dataset to improve classification.
- Summarizer
 - more preprocessing of data & improving prompts.
- Ranking of the products and including recommendations
 - For e.g. use of recommend(Y/N) field and Find it helpful field.

Takeaway

- Working alone is added responsibility
- Robbs off – team interaction and fun.

Appendix : Classifier- split up

category_name	Fire HD 8
Row Labels	Count of brand
All-New Fire HD 8 Tablet, 8 HD Display, Wi-Fi, 16 GB - Inc	2814
All-New Fire HD 8 Tablet, 8 HD Display, Wi-Fi, 32 GB - Inc	146
Amazon - Kindle Voyage - 4GB - Wi-Fi + 3G - Black,,,Fire t	1
Amazon Standing Protective Case for Fire HD 6 (4th Gen)	1
Brand New Amazon Kindle Fire 16gb 7 Ips Display Tablet	976
Fire HD 8 Tablet with Alexa, 8 HD Display, 16 GB, Tangeri	6
Fire HD 8 Tablet with Alexa, 8 HD Display, 32 GB, Tangeri	14
Grand Total	3958

category_name	Fire KIDS
Row Labels	Count of brand
Fire Kids Edition Tablet, 7 Display, Wi-Fi, 16 GB, Green Kid-Proof Case	1679
Grand Total	1679

category_name	Fire Tablet 7
Row Labels	Count of brand
Fire Tablet, 7 Display, Wi-Fi, 8 GB - Includes Special Offers, Black	285
Fire Tablet, 7 Display, Wi-Fi, 8 GB - Includes Special Offers, Magenta	10751
Kindle Oasis E-reader with Leather Charging Cover - Black, 6 High-Res	6
Grand Total	11042

category_name	Kindle
Row Labels	Count of brand
All-New Kindle E-reader - Black, 6 Glare-Free Touchscreen Display, Wi-Fi - Includes Special	212
Amazon - Fire 16GB (5th Gen, 2015 Release) - Black,,,Amazon - Fire 16GB (5th Gen, 2015 Rele	5
Amazon - Kindle Voyage - 4GB - Wi-Fi + 3G - Black,,,Amazon - Kindle Voyage - 4GB - Wi-Fi + 3G	25
Amazon 5W USB Official OEM Charger and Power Adapter for Fire Tablets and Kindle eReaders	199
Amazon Echo and Fire TV Power Adapter,,,Amazon Echo and Fire TV Power Adapter,,,	8
Amazon Fire Hd 8 8in Tablet 16gb Black 8018s3t3bk 6th Gen (2016) Android,,,Amazon Fire Hd	135
Amazon Fire Kids Edition Tablet, 7 Display, Wi-Fi, 16 GB, Blue Kid-Proof Case - Blue	6
Amazon Kindle Fire Hd (3rd Generation) 8gb,,,Amazon Kindle Fire Hd (3rd Generation) 8gb,,,	2
Amazon Kindle Lighted Leather Cover,,,Amazon Kindle Lighted Leather Cover,,,	2
Amazon Kindle Lighted Leather Cover,,,Kindle Keyboard,,,	1
Amazon Kindle Paperwhite - eBook reader - 4 GB - 6 monochrome Paperwhite - touchscreen	3176
Amazon Kindle Touch Leather Case (4th Generation - 2011 Release), Olive Green,,,Amazon K	3
Brand New Amazon Kindle Fire 16gb 7 Ips Display Tablet Wifi 16 Gb Blue,,,	57
Certified Refurbished Amazon Fire TV (Previous Generation - 1st),,,Certified Refurbished An	3
Certified Refurbished Amazon Fire TV Stick (Previous Generation - 1st),,,Certified Refurbishe	1
Certified Refurbished Amazon Fire TV Stick (Previous Generation - 1st),,,Kindle Paperwhite,,	1
Certified Refurbished Amazon Fire TV with Alexa Voice Remote,,,Certified Refurbished Ama	4
Echo (White),,,Echo (White),,,	410
Fire Kids Edition Tablet, 7 Display, Wi-Fi, 16 GB, Green Kid-Proof Case	6
Fire Tablet, 7 Display, Wi-Fi, 8 GB - Includes Special Offers, Black	83
Fire Tablet, 7 Display, Wi-Fi, 8 GB - Includes Special Offers, Magenta	211
Kindle Keyboard,,,Kindle Keyboard,,,	2
Kindle Oasis E-reader with Leather Charging Cover - Merlot, 6 High-Resolution Display (300 p	67
Kindle Paperwhite E-reader - White, 6 High-Resolution Display (300 ppi) with Built-in Light, '	30
Kindle Paperwhite,,,Kindle Paperwhite,,,	9
Kindle Voyage E-reader, 6 High-Resolution Display (300 ppi) with Adaptive Built-in Light, Pa	580
Grand Total	5238

category_name	Speakers/Streaming
Row Labels	Count of brand
Amazon - Amazon Tap Portable Bluetooth and Wi	318
Amazon 5W USB Official OEM Charger and Power	7
Amazon 9W PowerFast Official OEM USB Charger	36
Amazon Fire Hd 10 Tablet, Wi-Fi, 16 Gb, Special O	128
Amazon Fire Hd 6 Standing Protective Case(4th G	1
Amazon Fire Hd 6 Standing Protective Case(4th G	6
Amazon Fire Tv,,,Amazon Fire Tv,,,	2526
Amazon Fire Tv,,,Kindle Dx Leather Cover, Black (f	1
Amazon Kindle Fire 5ft USB to Micro-USB Cable (v	4
Coconut Water Red Tea 16.5 Oz (pack of 12),,,Ama	1
Echo (Black),,,Amazon 9W PowerFast Official OEN	1
Echo (Black),,,Echo (Black),,,	3
Echo (White),,,Echo (White),,,	2897
Echo (White),,,Fire Tablet, 7 Display, Wi-Fi, 8 GB -	1
Kindle Dx Leather Cover, Black (fits 9.7 Display, La	9
New Amazon Kindle Fire Hd 9w Powerfast Adapt	1
New Amazon Kindle Fire Hd 9w Powerfast Adapt	6
Grand Total	5946