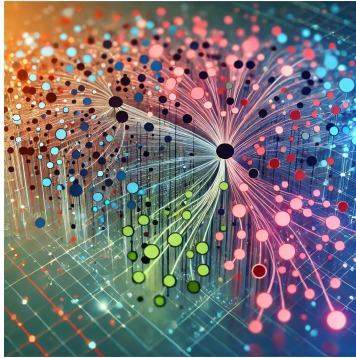


Robo Reviews

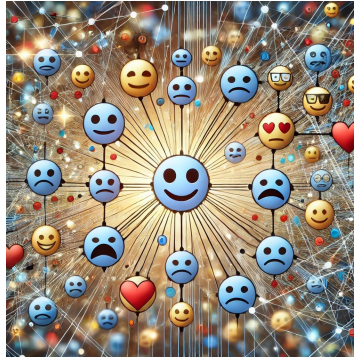
Alexandre Donciu-Julin



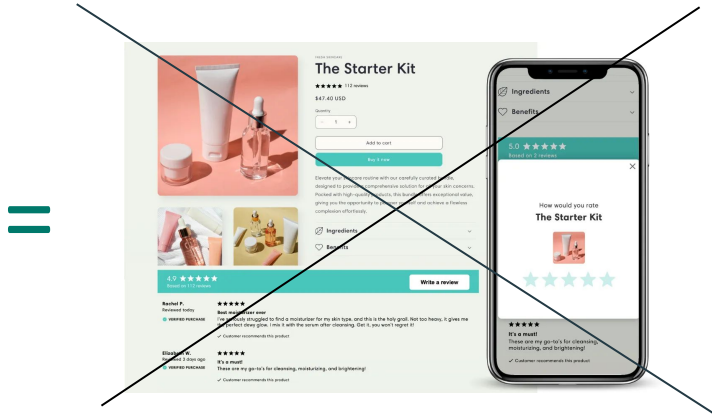
Hook & Overview



+



+



=



Affordable AAA batteries with mixed durability, comfortable to wear, with a snug fit and soft material ♥

What is your story?

- Create 3 models that can interact smoothly with each other
- Try a Transformer approach first
- Start and try to go as far as possible using lightweight and base models

Demo

Review Categorization and Sentiment Analysis

Enter a product review to get the predicted category and sentiment analysis with probabilities.

Enter a Review

Great tablet for everyday use!

Clear

Submit

Predicted Category

Home & Smart Devices

Sentiment Probabilities

Positive

Positive	100%
Neutral	0%
Negative	0%

Flag

AmazonBasics AAA Performance Alkaline Batteries (36 Count)

Accessories & Adapters

Amazonbasics | AmazonBasics

The AmazonBasics AAA Performance Alkaline Batteries are a great choice for anyone looking for a reliable and affordable battery option

The AmazonBasics AAA Performance Alkaline Batteries are a great choice for anyone looking for a reliable and affordable battery option. With a 36-count pack, you'll have plenty of batteries on hand for all your devices. The batteries' longevity is impressive, with users reporting that they last longer than other brands. This makes them a convenient choice for devices that require frequent battery changes, such as remote controls or flashlights. The price is also a positive aspect, with users finding the cost justifiable when buying in bulk. This makes them an economical choice for households or businesses that use a lot of batteries.



Introduction

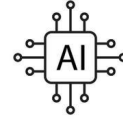
Like :)



Don't
like :(



Solution:



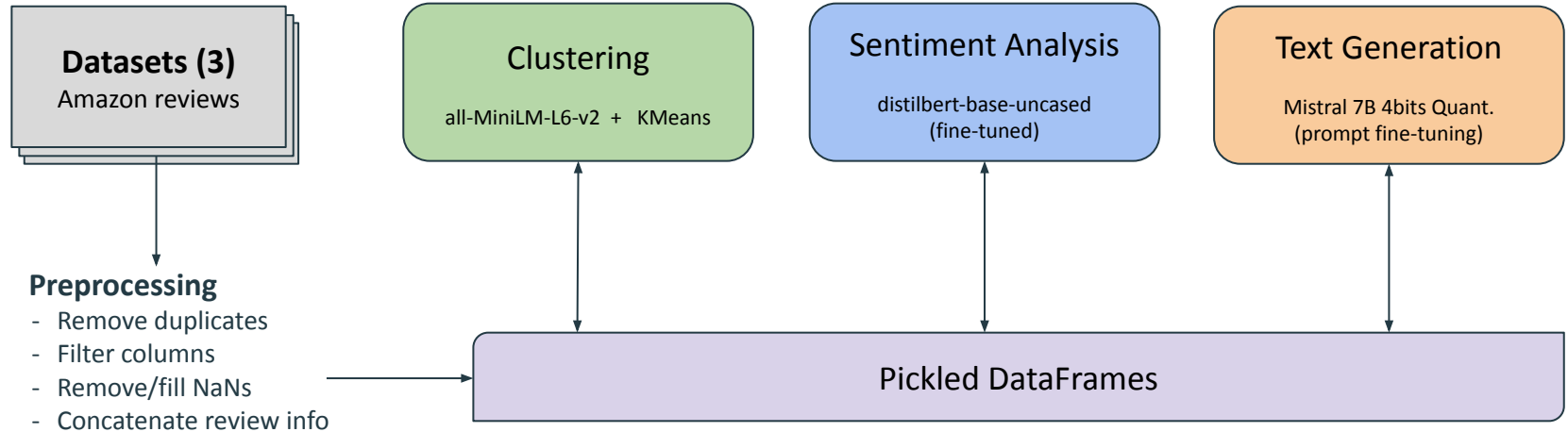
Premium vs 2 Standard Products Comparison Table

3 column layout, tick mark icons, summary text box

	Standard 1	Premium	Standard 2
Feature 1	✓	✓	✓
Feature 2	✓	✓	✓
Feature 3	✓	✓	✓
Feature 4	✗	✓	✓
Feature 5	✗	✓	✓
Feature 6	✗	✓	✗

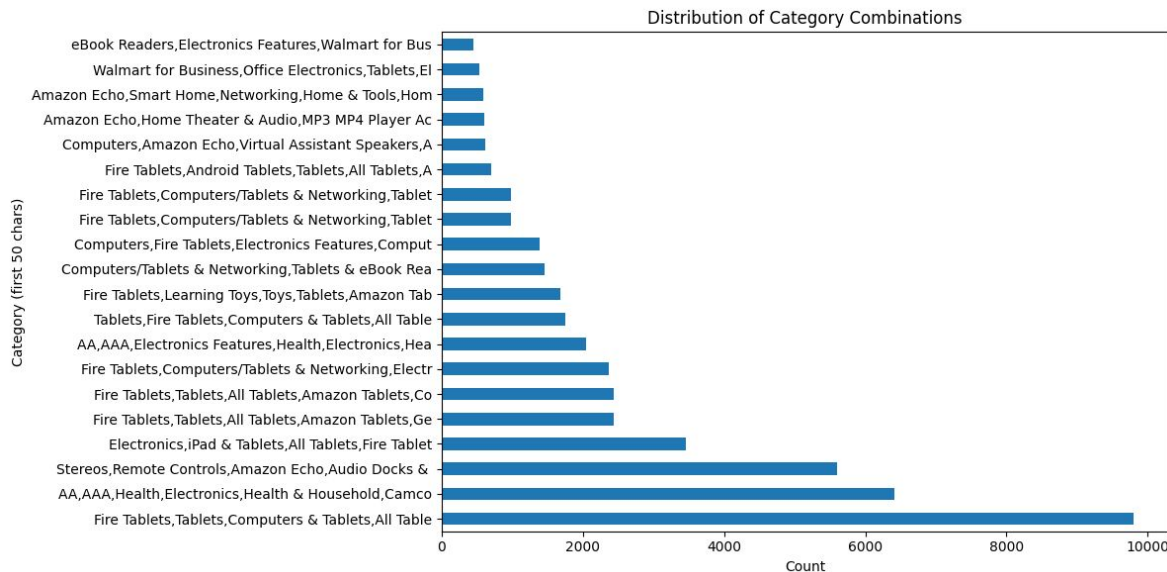
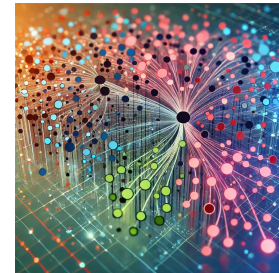
Get these slides & Icons at www.infoDiagram.com

Methods



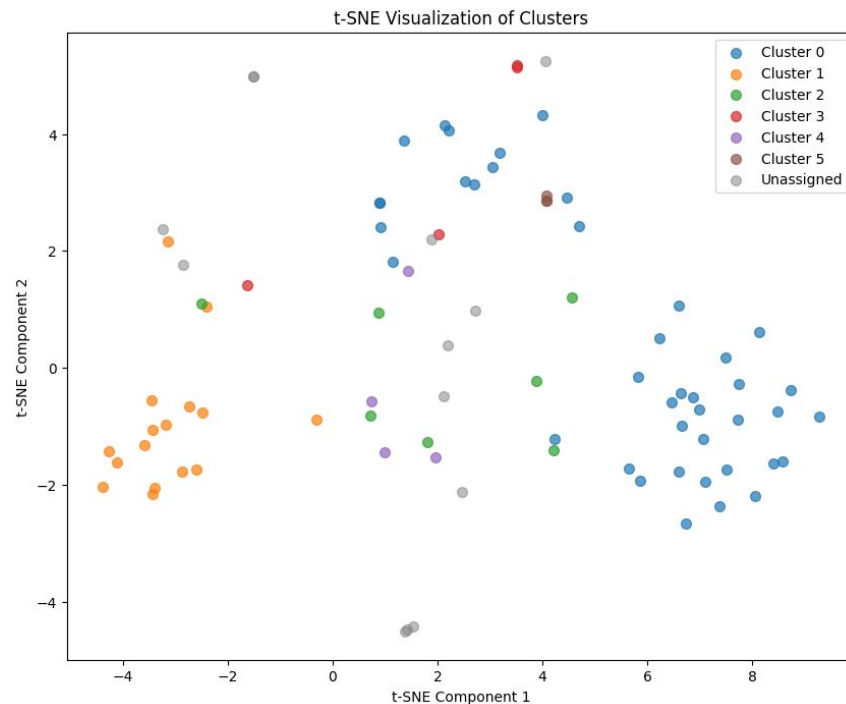
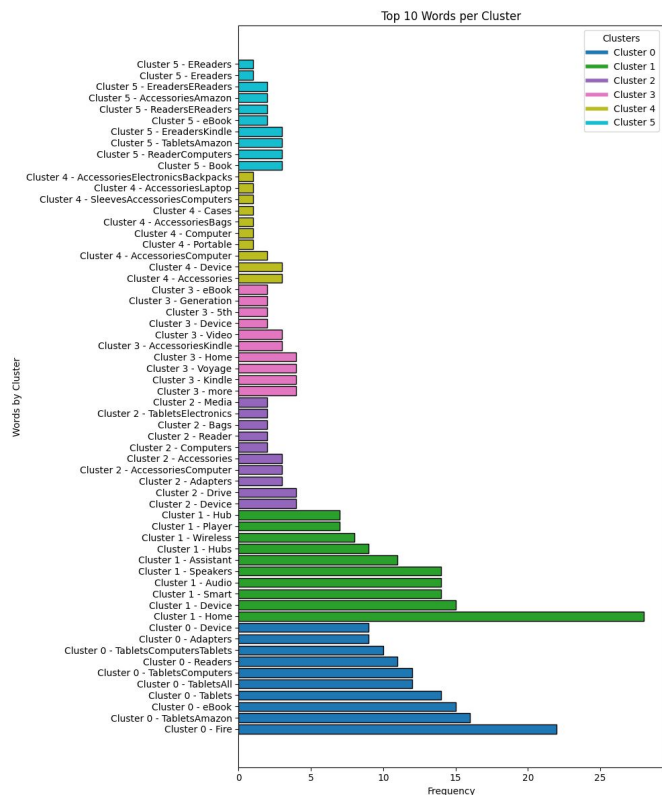
Model 1 - Clustering

Goal: 88 unique categories -> 4-6 clusters



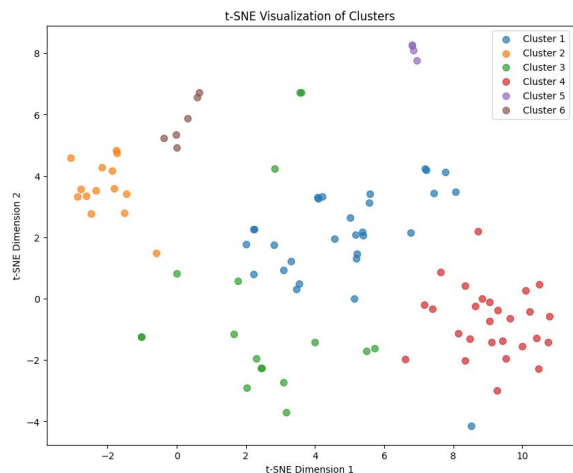
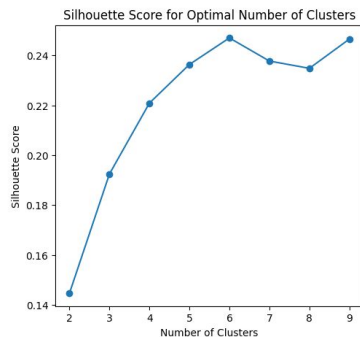
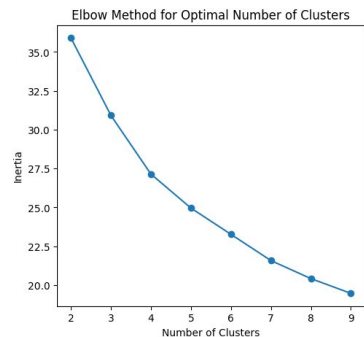
- Highly unbalanced
- Most categories with less than 6 products
- Similar and overlapping categories

Model 1/1 - Similarity Clustering Evaluation



Model: **all-MiniLM-L12-v2** (embedding + clustering)

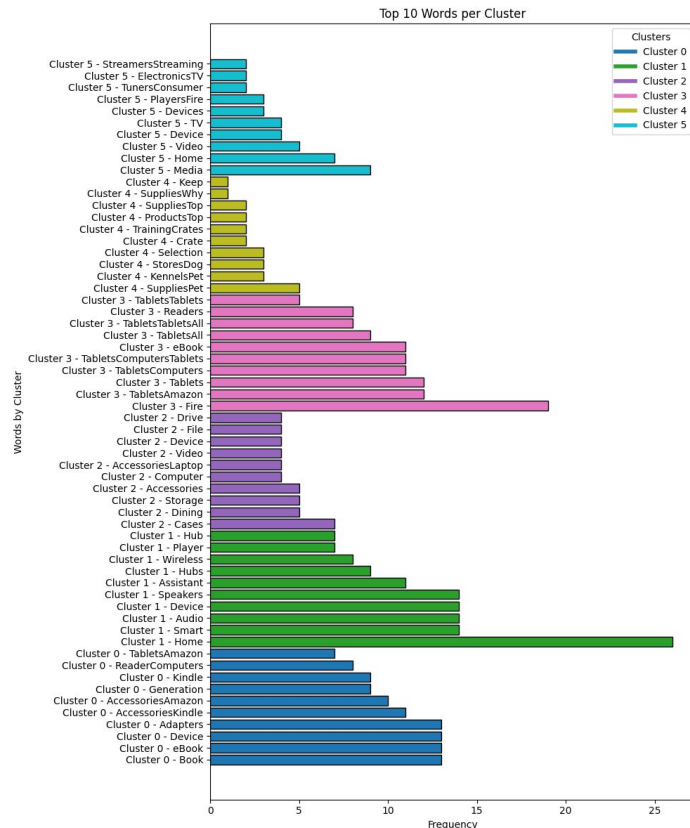
Model 1/2 - Centroid-based clustering Evaluation



Models:

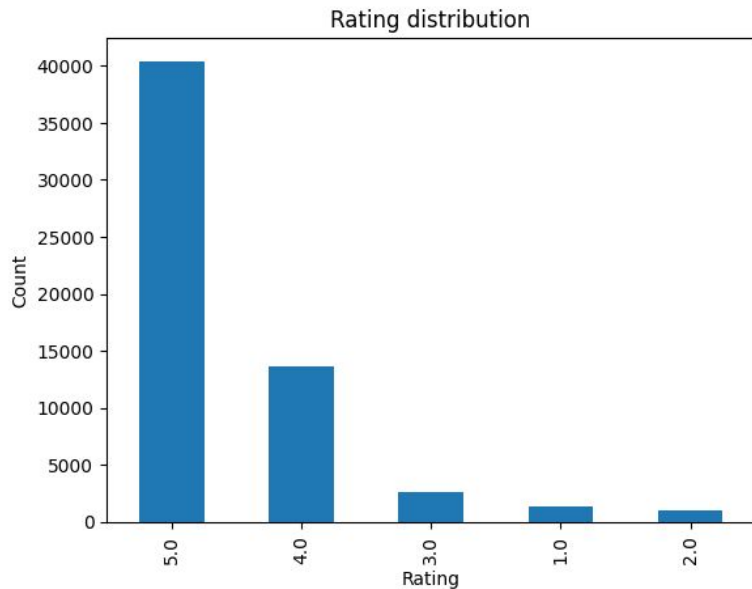
all-MiniLM-L12-v2
(embedding)

KMeans
(clustering)

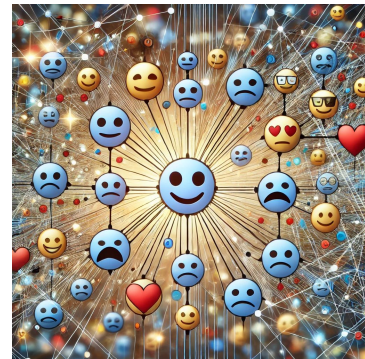


Model 2 - Sentiment Analysis

Goal: ★★★★★ -> positive, neutral, negative



- Highly unbalanced
- Multiple contradictions
- Difficult to convert stars into sentiments



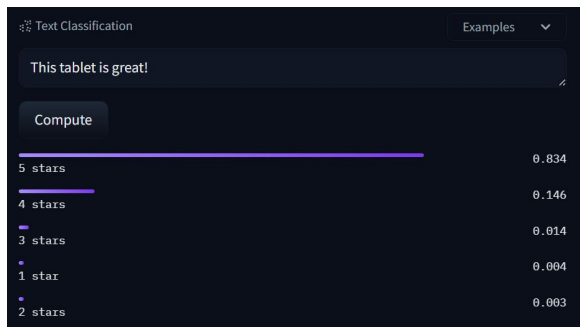
Model 2 - Evaluation

Mapping: ★ & ★★ negative | ★★★ neutral | ★★★★ & ★★★★★ positive

Method 1: Use a fine-tuned HF model

bert-base-multilingual-uncased-sentiment

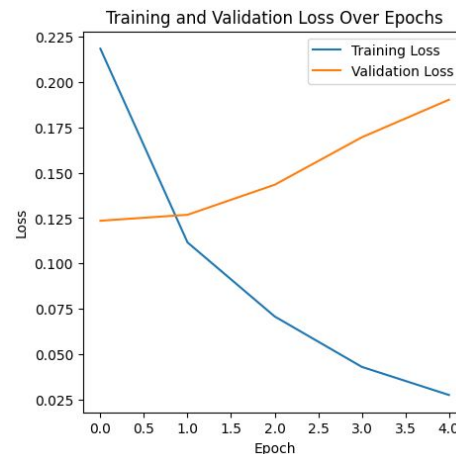
- Fine-tuned on product reviews
- Multilingual
- Difficult to convert stars into sentiments
- Accuracy: 76%



Method 2: Fine-tune

distilbert-base-uncased

- Fine-tuned on my dataset
- Train/Val/Test split [0.6, 0.2, 0.2]
- Test accuracy: 0.975
- Test precision: 0.974
- Test recall: 0.975
- Test F1 score: 0.975



Epoch	Training Loss	Validation Loss	Accuracy	Precision	Recall	F1
1	0.116000	0.123554	0.963193	0.958464	0.963193	0.958689
2	0.098300	0.126838	0.971322	0.968978	0.971322	0.969247
3	0.051800	0.143393	0.970758	0.968768	0.970758	0.969436
4	0.040400	0.169555	0.971096	0.969134	0.971096	0.969701
5	0.020100	0.190264	0.969854	0.968276	0.969854	0.968895

Model 3 - Text Generation

Goal: “Gr8 awesom supr-dupr cool phone” -> “An exceptional, remarkably impressive phone that delivers an extraordinary experience with its sleek design and cutting-edge features”



Mistral 7B 4bitsQ
Llama Tokenizer

Prompt Fine-Tuning

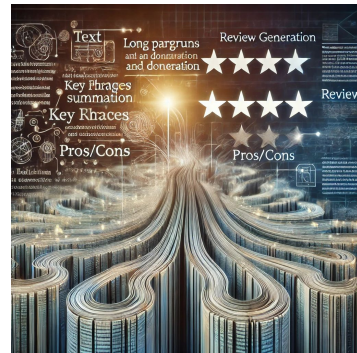
- + Very flexible, multiple prompts
- + Zero / Few-shot prompting
- + Output reliable, reproducible
- Limited short-term memory
- Needs to be helped, break down tasks
- Some hallucinations
- Hard to limit output

REVIEW:

- Great tablet. I like how cheap this is. It's great for browsing the Internet.

SUMMARY:

- Great for browsing the Internet, but cheap and not suitable for other tasks.



Model 3 - Evaluation

3 prompts: Summarize a review -> Extract recurring ideas from multiple review -> Write final product review from recurring ideas

Prompt 1: Summarize a review

Input:

"This product offers outstanding quality and durability, making it a reliable choice for long-term use. The materials feel premium, and the overall performance has been excellent throughout continued use. It's incredibly convenient for daily needs, and I haven't encountered any issues so far. However, the price can feel a bit steep if you're only purchasing a small quantity. To really get the best value, buying in bulk is the way to go, as it offsets the cost and makes the purchase feel much more worthwhile. Overall, a fantastic option if you need something that lasts."

Output:

Great quality, long-lasting, and convenient, but buying in bulk is necessary to justify the price.

Prompt 2: Extract recurring ideas from multiple reviews

Input:

[Review 1]: Great price and battery performance.

[Review 2]: Great quality, long-lasting, and convenient, but buying in bulk is necessary to justify the price.

[Review 3]: Good but expensive batteries. Cheaper, high-quality batteries available.

[Review 4]: Grade A batteries with no worries, good performance, and a good look.

[Review 5]: Off-brand batteries that work as well as name-brand batteries, but at a lower cost.

Output:

Battery performance is a common theme, with users praising the longevity and convenience of the batteries.

Price is mentioned as a factor, with some users finding the cost justifiable when buying in bulk.

Quality is also a recurring idea, with users appreciating the performance and appearance of the batteries.

Prompt 3: Write final product review from recurring ideas

Input:

Battery performance is a common theme, with users praising the longevity and convenience of the batteries.

Price is mentioned as a factor, with some users finding the cost justifiable when buying in bulk.

Quality is also a recurring idea, with users appreciating the performance and appearance of the batteries.

Output:

The AmazonBasics AAA Performance Alkaline Batteries are a great choice for anyone looking for a reliable and affordable battery option. With a 36-count pack, you'll have plenty of batteries on hand for all your devices. The batteries' longevity is impressive, with users reporting that they last longer than other brands. This makes them a convenient choice for devices that require frequent battery changes, such as remote controls or flashlights. The price is also a positive aspect, with users finding the cost justifiable when buying in bulk. This makes them an economical choice for households or businesses that use a lot of batteries.

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Conclusion and Takeway

- Clustering: Transformer + Centroid-based approach (KMeans) showed better clustering results
- Sentiment Analysis works best when fine-tuning the model on our dataset or similar
- Prompt fine-tuning is a great approach but highly correlated to the model in use
- Next Steps: Test Instruct versions of Mistral | Fine-tune it using a LORA method

Thank you! Questions?

[GitHub repo](#)