

Image Generation from Reviews

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Products Selected

01 Cat Tree Tower

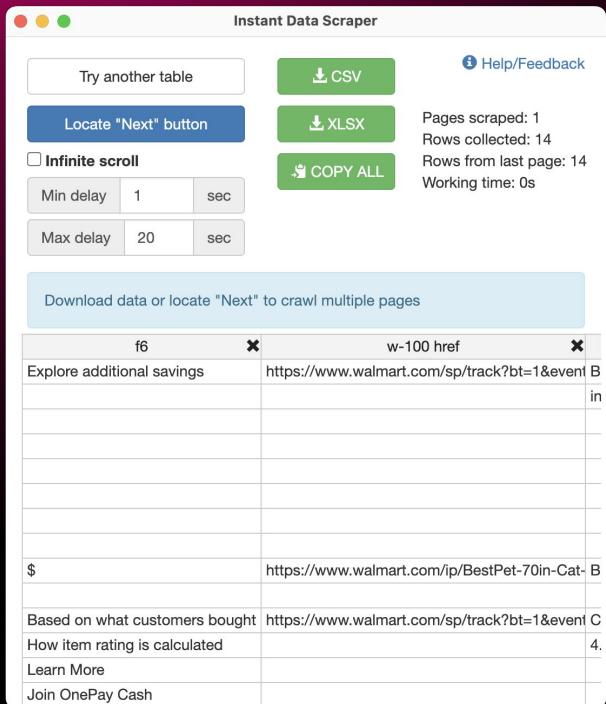
02 Egg Cooker

03 VICTGOAL Bike Helmet

Product: BestPet 70in Cat Tree Tower (Walmart)



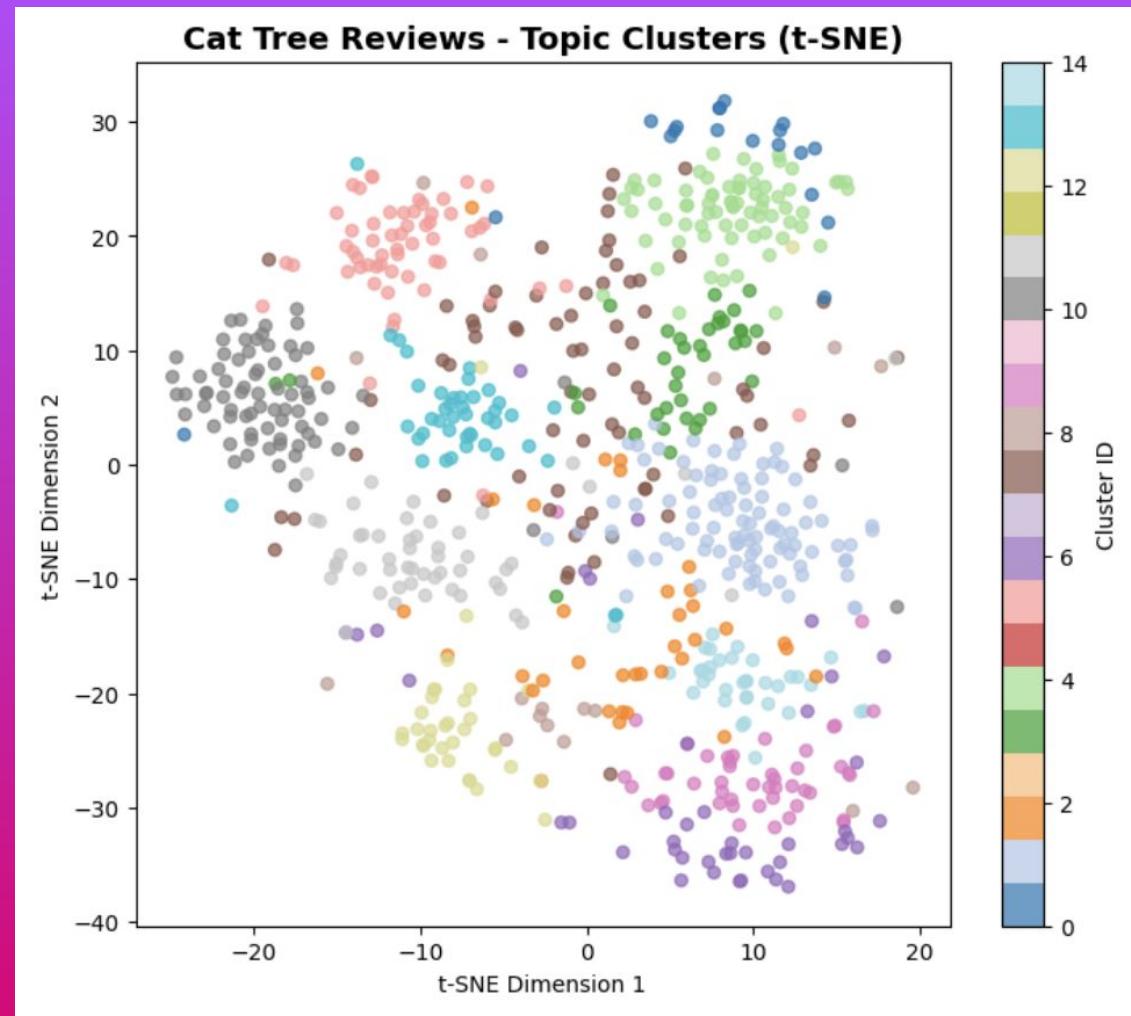
Data Collection



- **Source:** Walmart product page
- **Tool:** Instant Data Scraper (Chrome Extension)
- **Volume:** 106 pages → 730 valid reviews
- **Processing:** Extracted review text only (removed ratings, dates, usernames)

Embedding & Clustering

- **Model:**
sentence-transformers
(all-MiniLM-L6-v2)
- **Method:** KMeans (15 clusters) + t-SNE visualization
- **Purpose:** Understand review topic distribution
- **Token count:** ~28k tokens
 - within GPT-4 context window, so used ALL reviews



LLM Feature Extraction

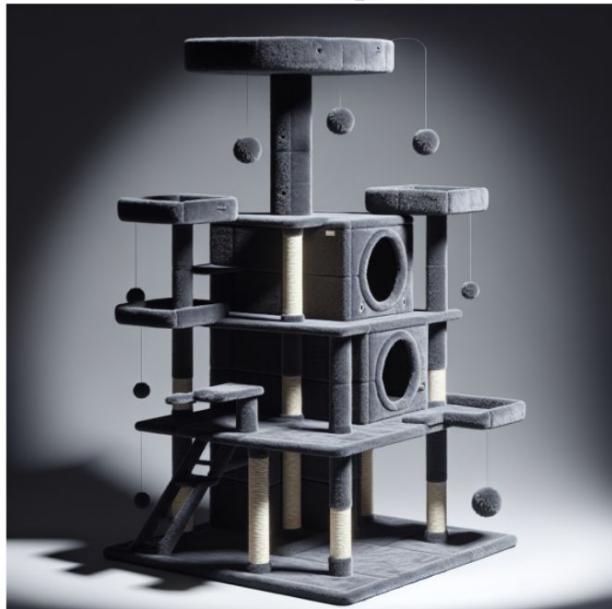
- **Model:** GPT-4o
- **Input:** All 730 reviews combined
- **Output:** Structured JSON with:
 - Structure & dimensions
 - Materials & textures
 - Components
 - Color scheme
 - Image generation prompt

Prompt	Approach	Result
 review_based	Raw LLM output	Contains "not very stable"
 positive_extracted	Prompted for positive only	Still had "wobbly"
 ideal_manual	Manual curation	Clean, product-photo style

DALL-E

--- DALL-E 3 Results ---

DALL-E 3: review_based



DALL-E 3: positive_extracted



DALL-E 3: ideal_manual



Stable Diffusion

--- Stable Diffusion Results ---

Stable Diffusion: review_based



Stable Diffusion: positive_extracted



Stable Diffusion: ideal_manual



Comparison

Stable Diffusion > DALL-E 3 for product images

- SD: More realistic, closer to actual product photos
- DALL-E: More stylized/artistic

Negative words don't visually manifest

- "Wobbly" in prompt ≠ wobbly-looking image
- Models can't interpret abstract quality descriptors

Manual prompt curation matters

- Specific visual details beat LLM-generated prompts
- Style keywords crucial ("product photography," "white background")

LLM is too "honest"

- Faithfully extracts all sentiment from reviews
- Need explicit filtering for marketing use cases

Product: MyMini Premium 7-Egg Cooker(Walmart)



The main image shows the teal-colored MyMini Premium 7-Egg Cooker with its lid open, revealing seven brown eggs inside. The brand name 'MyMini' is printed on the front of the base. To the left of the main image is a vertical sidebar with several smaller thumbnail images: a close-up of the eggs, the cooker with a single egg, a video play button, a 'FAST & EASY PREPARATION' guide, a meal idea, another meal idea, and a 'View all' button.

[View in 3D](#)

100+ bought since yesterday Best seller

Visit the MyMini Store

MyMini Premium 7-Egg Cooker

★★★★★ (4.6) | 6,183 ratings

Actual Color: Teal

\$12.97 \$11.70

About this item

Smart summary Generated by AI

- **One-Touch Operation:** Simply fill up the measuring cup to your desired water level, choose between soft, medium, or hard boiled, turn it on, and within minutes the alarm will notify you that your eggs are ready.
- **7-Egg Capacity:** The egg tray allows you to cook up to 7 large eggs at a time, providing healthy and consistent results.
- **Versatile Cooking:** This 350-watt egg cooker can prepare soft, medium, or hard-boiled eggs, egg whites, poached eggs, scrambled eggs, omelets, and even steam vegetables and dumplings.
- **Cool-Touch Handles:** Equipped with cool-touch handles to keep your hands safe, allowing you to open and close the lid without the risk of burns.
- **Included Accessories:** Comes with a measuring cup with egg piercing tip, 7-egg tray, egg poacher/scrambled egg bowl, and egg white separator.
- **Easy to Clean:** The egg tray and stainless-steel steam cooking plate are detachable, making clean-up quick and easy.
- **Compact Design:** Fits on countertops without taking up too much space, ideal for dorm rooms, offices, and small kitchens.

[View full item details](#)

Total 2773

Got 2105 raw reviews

All filters ▾ Star rating ▾ Verified purchases only Sort by | Most relevant ▾

Ease Of Use (388) Boil (347) Peel (244) Price (202) Cleaning Up (118) Convenience (85) Alarm (72) Shells (67) Instructions (62) Sound (54) View r

Showing 1-10 of 2,773 reviews

Mar 12, 2025  Verified Purchase ⓘ

Debra  Item great, Delivery a nightmare

Item details Color: Teal

Item is great. But, it was delivered to the wrong address. The delivery man said he delivered it to another door. Hard to find the door. My last name on the mail box.

Helpful?  (0)  (0) | Report

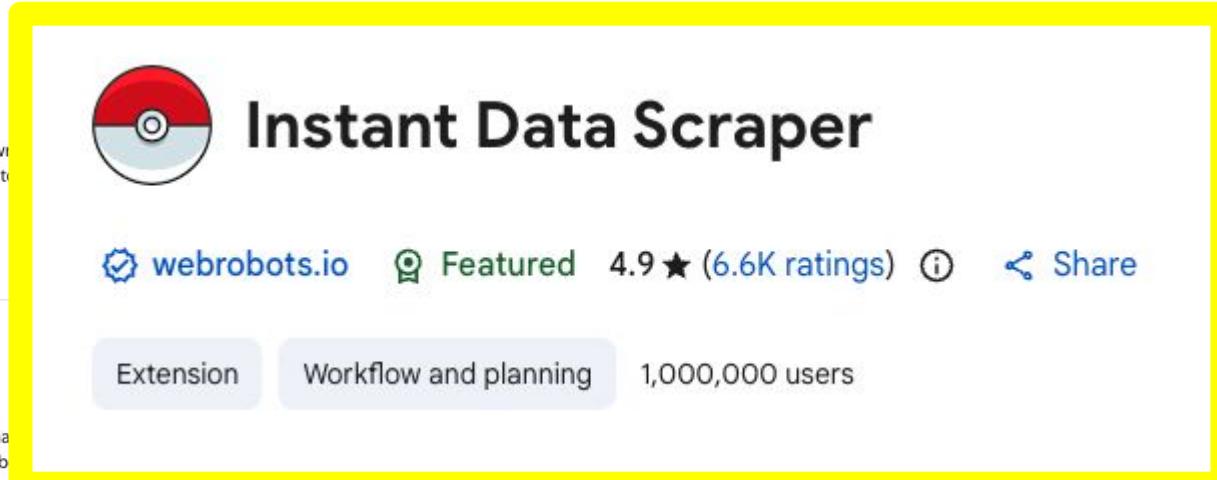
Jun 8, 2025  Verified Purchase ⓘ

Julie  Great little egg cooker

Item details Color: Teal

Cute and easy to use little egg cooker. It has you like your eggs cooked. Not only hard boiled and it has a little alarm that goes off when t

Helpful?  (0)  (0) | Report



 Instant Data Scraper

 webrobots.io  Featured 4.9 ★ (6.6K ratings) ⓘ  Share

Extension Workflow and planning 1,000,000 users

Data loading and preprocessing

retained only review column

Removed NaN values → 2102 clean reviews

Because gpt-4o's max input tokens is 30k,
we have to sample the original dataset

Total reviews: 2102

Combined text length: 319149 characters

Estimated tokens: ~79787

	review
0	I recently got my hands on the MyMini 7-Egg Co...
1	Wish I had found this years ago. No boiling wa...
2	Cute and easy to use little egg cooker. \nlt h...
3	this egg cooker is awesome! its super easy to ...
4	The product is great but charging me more for ...
...	...
2097	1 article was missing. Old fashioned oatmeal
2098	it's a great having a granddaughter loves it g...
2099	Easy To Use Good Quality !
2100	Pretty cool gadget..quickly hard boils eggs.....
2101	worst pickup experience. took almost an hour t...
2102 rows × 1 columns	

How to sampling ?

1) Base line:

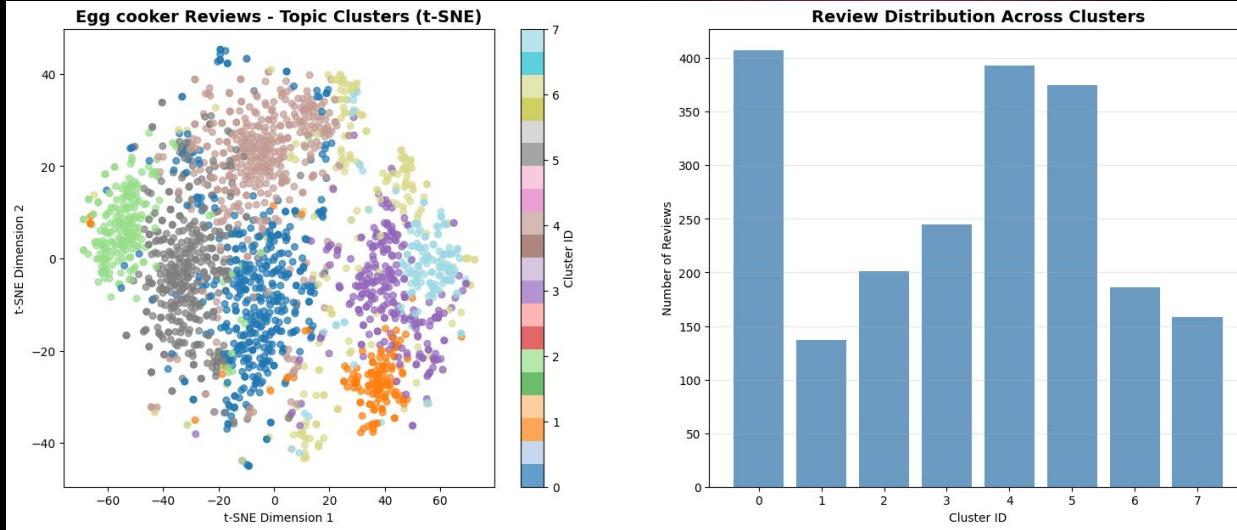
Randomly select 800 reviews from 2102 clean reviews

How to sampling ?

2) **Cluster-based:**

- Use SentenceTransformer all-MiniLM-L6-v2 for embedding
- Use KMeans to cluster all the 2102 clean reviews into 8 different clusters
- Visualized cluster distribution and cluster size distribution
- Use Silhouette Score, CH Score, DB Score to evaluate clustering quality

Cluster-based sampling



Silhouette Score: 0.04490712285041809
CH Score: 95.15264892578125
DB Score: 3.682014979654795

**The result is not ideal.
But still go for it**

How to sampling ?

3) RAG-based

- Use SentenceTransformer all-MiniLM-L6-v2 for embedding
- Use FAISS vector base to storage embedding, transform to float21, normalize to L2, build index
- Write **5** different queries to retrieve the vector base
 - visual-related,
 - functional-related,
 - materials-related,
 - positive design reviews,
 - negative design reviews

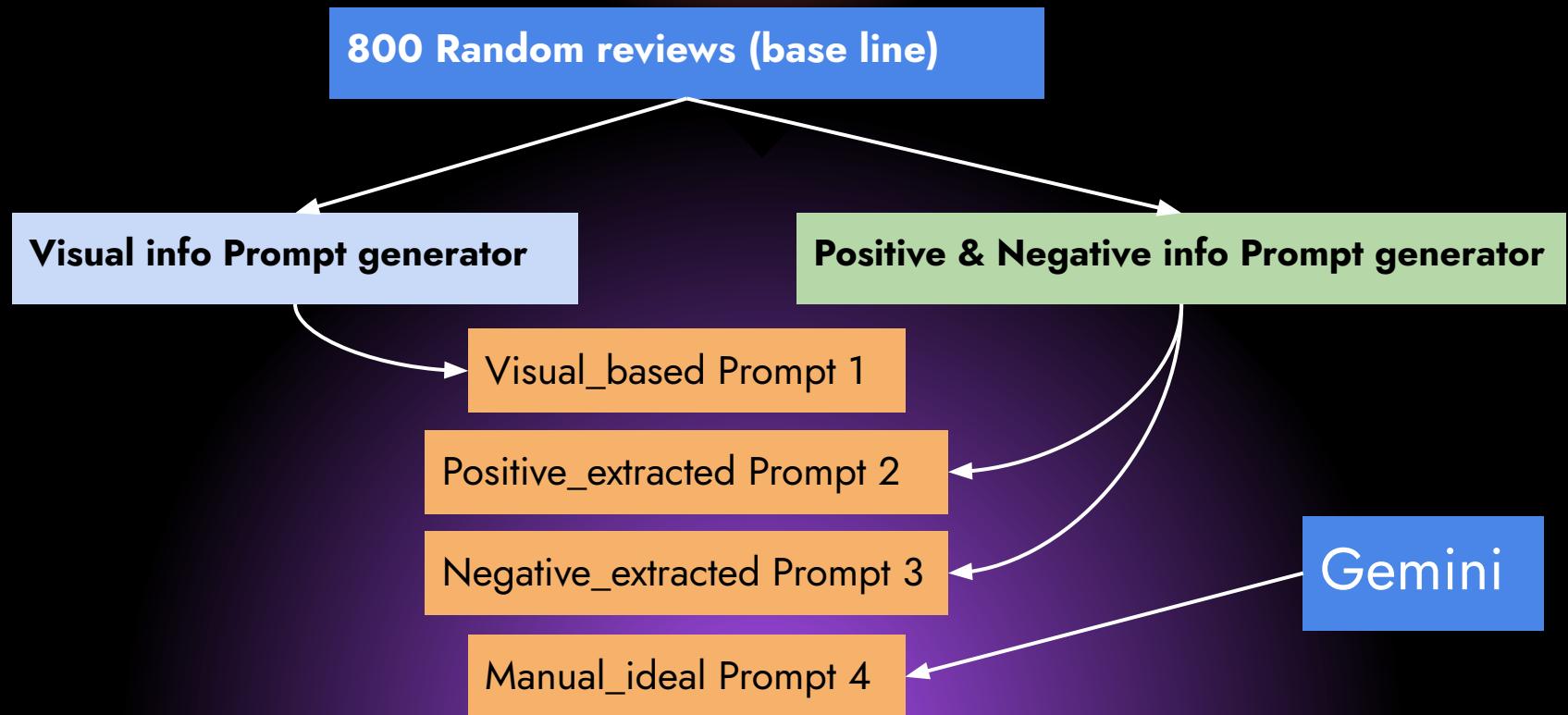
Retrieved visual-related reviews: 400
Retrieved functional-related reviews: 400
Retrieved materials-related reviews: 400
Retrieved positive design reviews: 400
Retrieved negative design reviews: 400

positive reviews 376
positive reviews: 250
negative reviews number 376
negtive reviews: 250

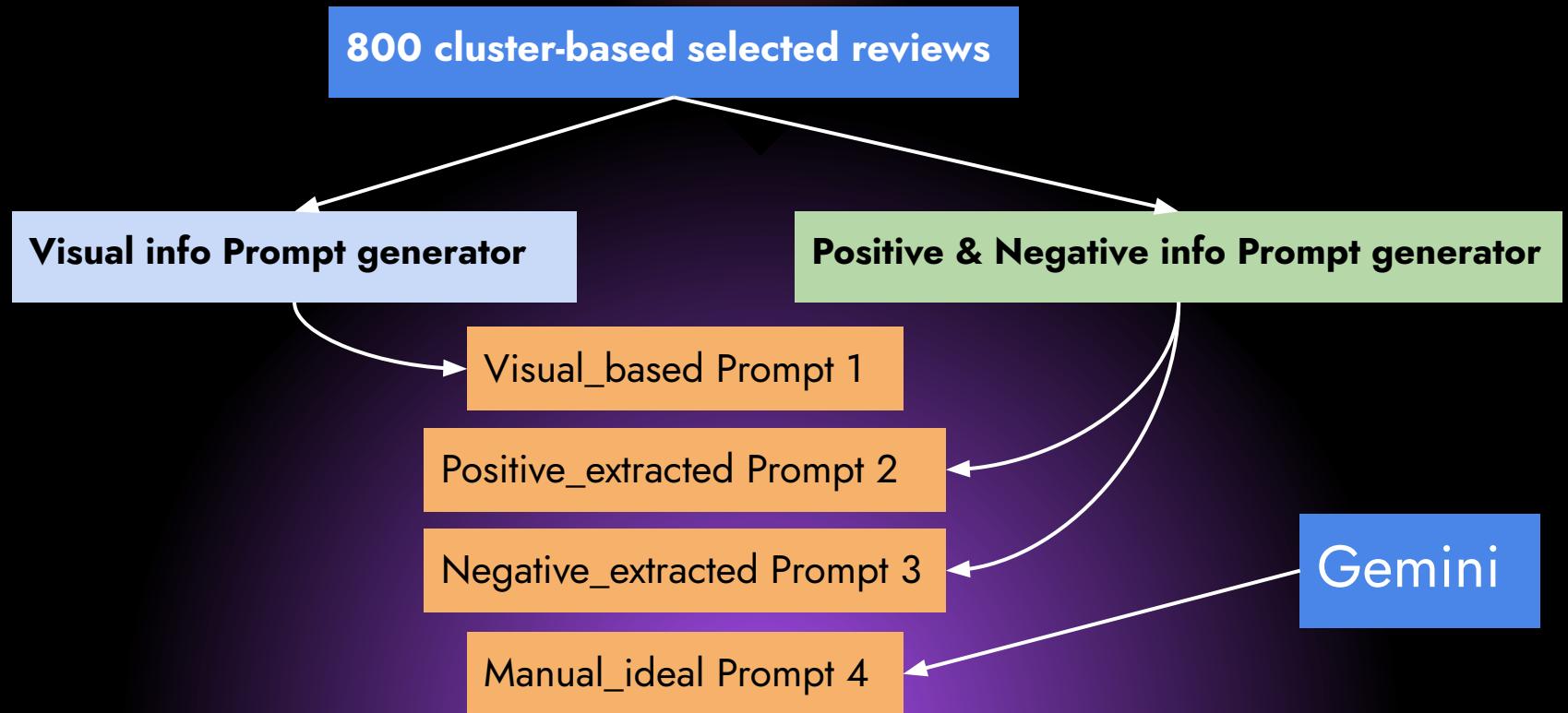
Remove duplicate

reviews number 1200
reviews number after duplicate removal: 577
Random sample : 500

Prompt generating



Prompt generating



Prompt generating

250 retrieved negative reviews (RAG)

500 retrieved visual reviews (RAG)

250 retrieved positive reviews (RAG)

Visual info Prompt generator

Positive & Negative info Prompt generator

Visual_based Prompt 1

Positive_extracted Prompt 2

Negative_extracted Prompt 3

Manual_ideal Prompt 4

Gemini

Result



Base line



RAG-based

Cluster-based

Best Three

RAG-based Nano Banana

Imagen: review_based



Imagen: positive_extracted

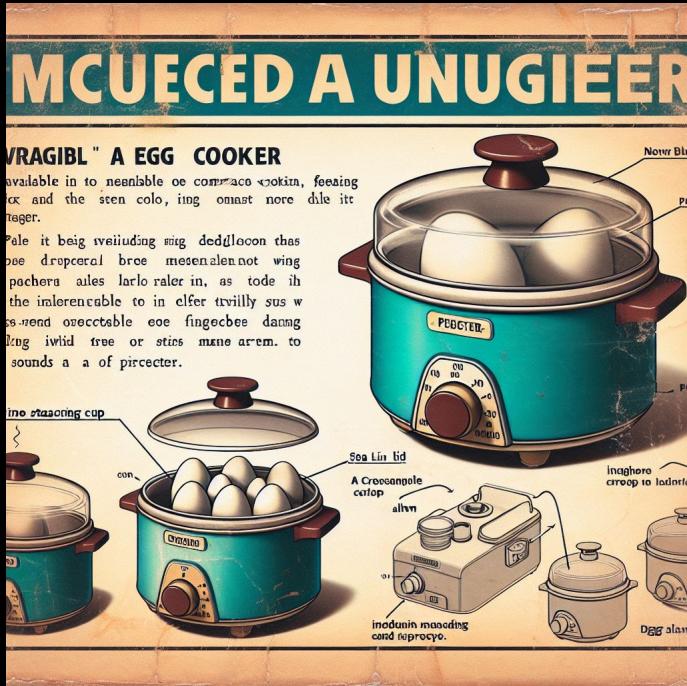


Imagen: realistic_manual



Worst Two

DALL-E Baseline negative prompt



Nano banana Baseline visual prompt



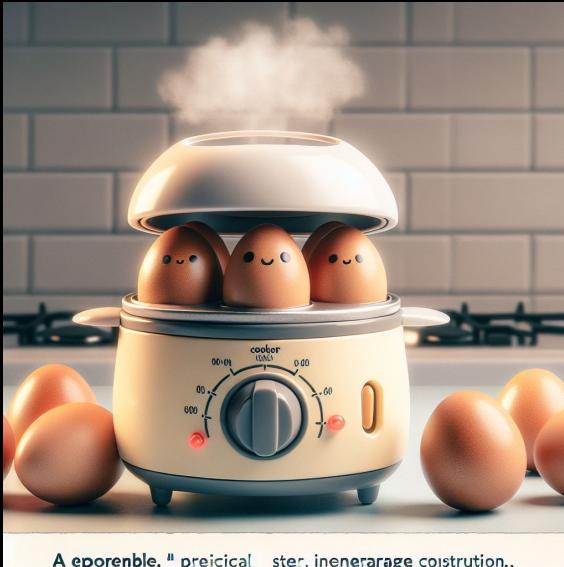
Comparison

RAG-based prompts produced noticeably more stable outputs, suggesting that semantic filtering and relevance-based retrieval significantly improve consistency and shape accuracy.

Cluster-based prompts also improved product geometry and cleanliness of the image, compared with raw review-based prompts.

Comparison

Misinterpretation & Overinterpretation



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VICTGOAL Bike Helmet

GenAI Product Analysis | 2019-2025



Product Overview

Smart Safety Innovation

Adult cycling helmet combining protective design with modern features:
magnetic visor system, detachable goggles, USB-rechargeable rear LED light

Target Users

- Road cyclists
- Mountain bikers
- Daily commuters

Prioritizing safety, comfort, visibility, value

Technical Specifications

Weight: 310g

Materials: PC shell + EPS foam

Size range: 57–61 cm

Warranty: 90 days

Analysis Scope

582 reviews (2019–2025) from Walmart +
victgoal.com

Review Dataset & Customer Sentiment

582

Total Reviews

Spanning 6 years (2019–2025)

91%

Positive Ratings

4-star and 5-star reviews

36

Avg Words

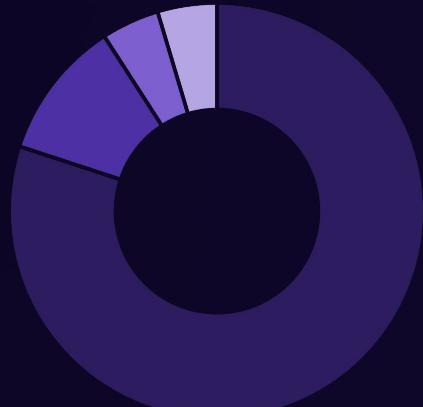
Review length (median: 20)

97

Annual Volume

Reviews per year average

Rating Distribution



5 Stars

4 Stars

3 Stars

1-2 Stars

Key Patterns

Strong positive sentiment: 91% rated 4+ stars, indicating high customer satisfaction

Minimal negative feedback: Only 4.4% critical reviews suggest consistent quality

Reliable performance: Positive ratings maintained across all years analyzed

LLM Analysis



8 Extracted Clusters

Style & Versatility

Focuses on the helmet's aesthetic appeal and adaptability

Fit & Comfort

Focuses on how well the helmet fits and feels

Visor Assembly Complaints

Addresses issues related to the visor's assembly



Magnetic Visor & Goggles

Highlights the convenience and functionality of magnetic attachments

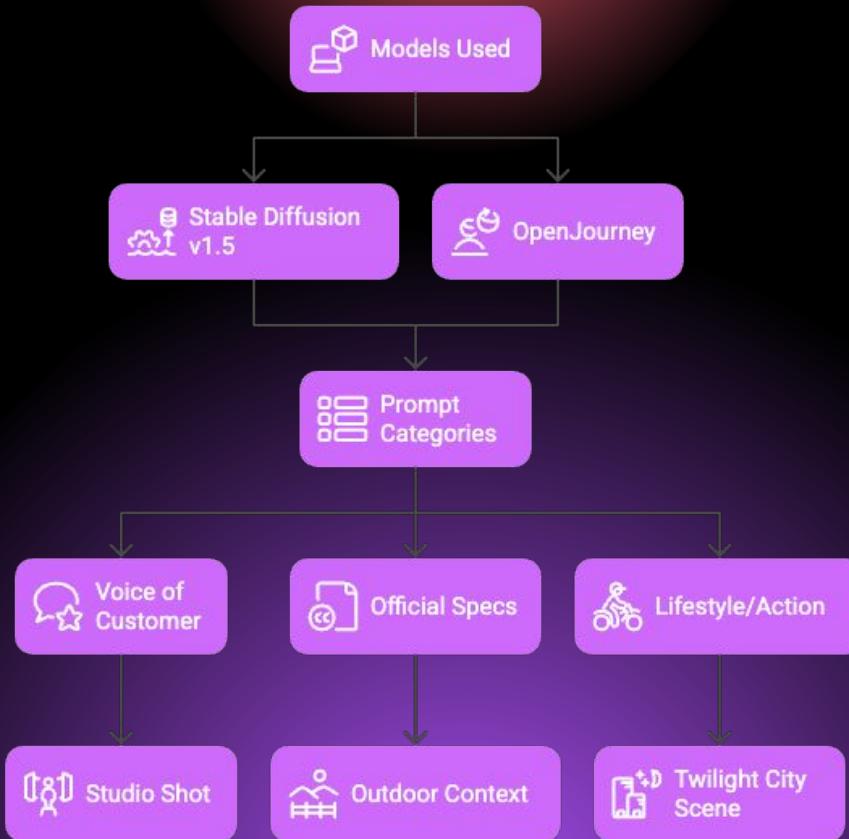
Value for Money

Assesses the helmet's cost-effectiveness

Rear LED Light & Safety

Emphasizes the safety aspects of the helmet with LED lights

MODELS & PROMPT CATEGORIES



Results

Stable Diffusion v1.5



Results

OpenJourney (Model 2)



Voice of
Customer



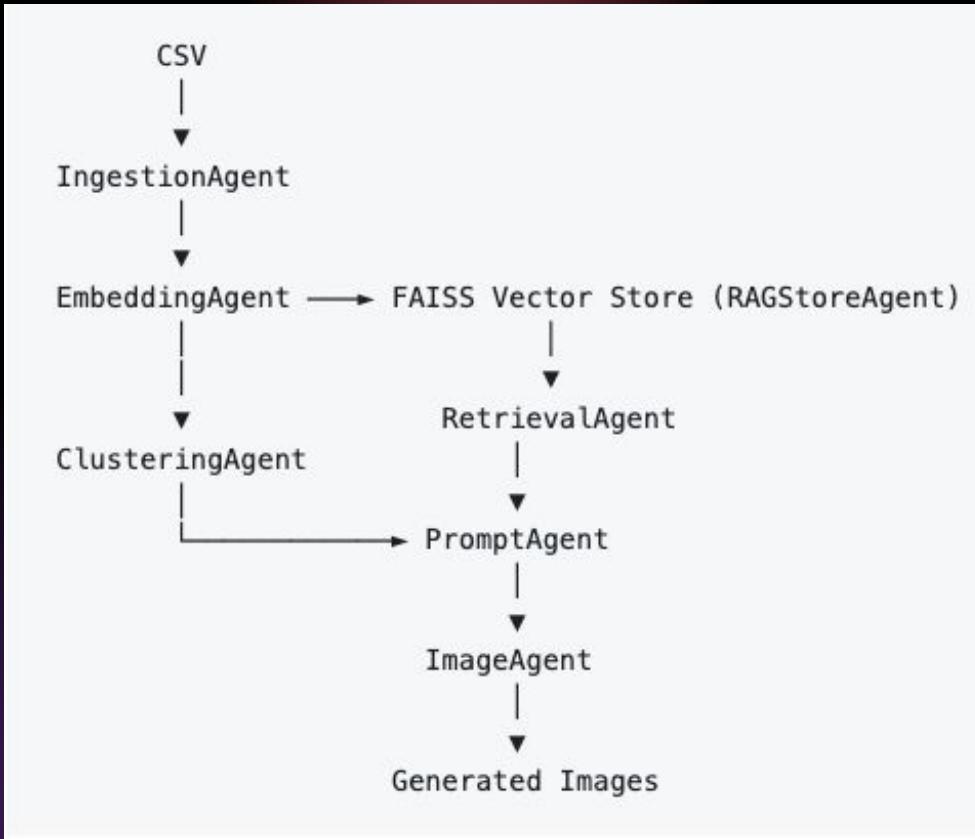
Official Specs



Lifestyle/Action



Agentic Workflow



THANK YOU

Any questions?