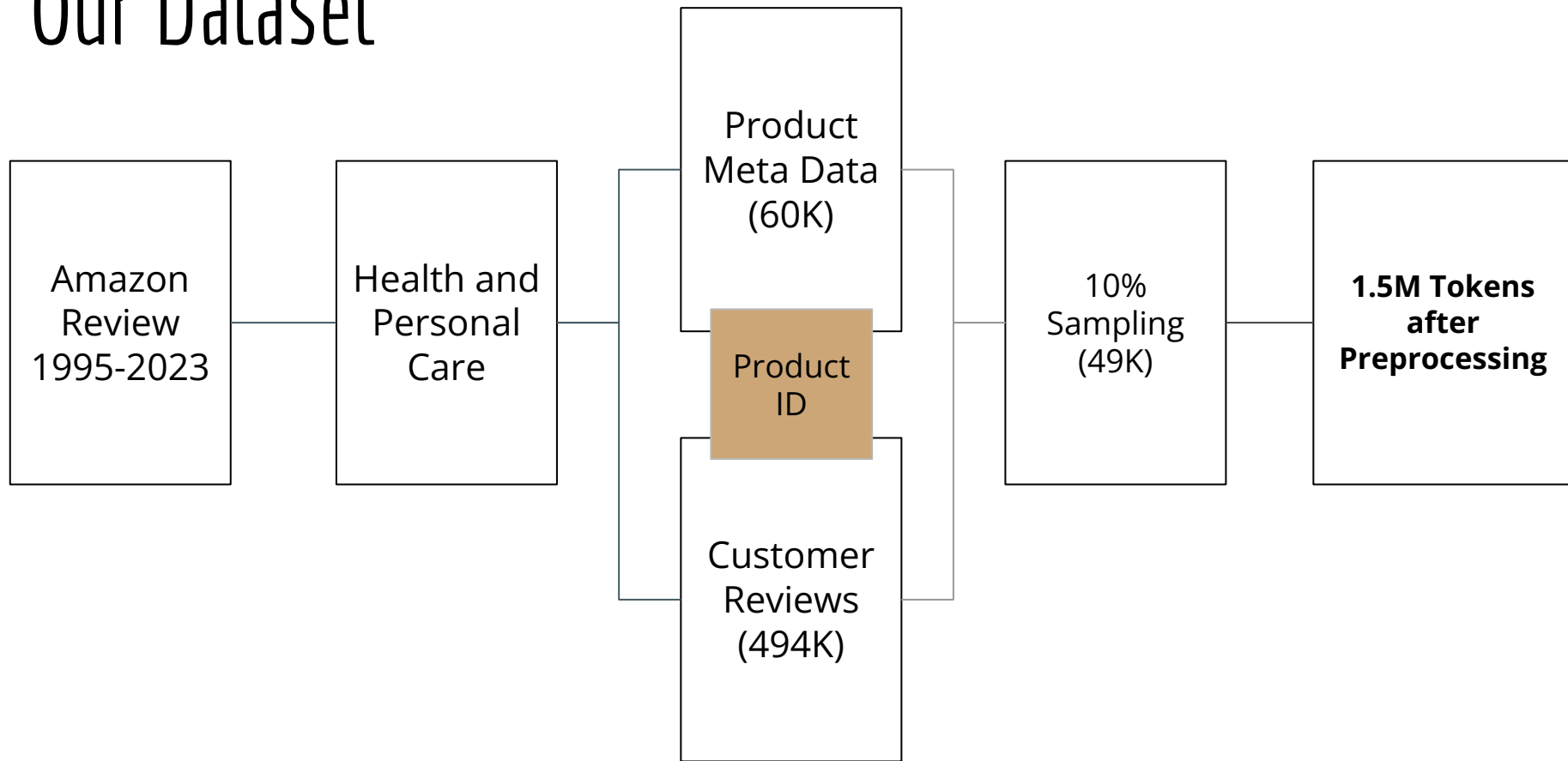


Analysis of Health and Personal Care Product Reviews for Customer Satisfaction Improvement

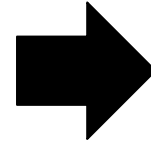
Group 5: Jyun-Ru Huang, Pin-Hao Pan, Ruo-Rong Wang, Zehui Wang

Our Dataset

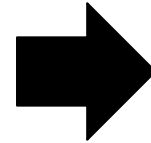


Problems We Want to Solve

1. Where does 3-star review fit? Negative or Positive?
2. What Kind of Products Does This Domain Contain?
3. Top Phrases from User Reviews
4. Sentiment Prediction Model with Labeled Reviews
 - Can be used on unlabeled reviews



Understand
Our Data &
Domain



Improve
Customer
Satisfaction

1. Are 3-Star Reviews Positive or Negative?

Cosine Similarity of Sentiment

73.1% Closer to 5-Star Reviews

26.9% Closer to 1-Star Reviews



**3-Star Reviews Are
Mostly Positive in
Sentiment**

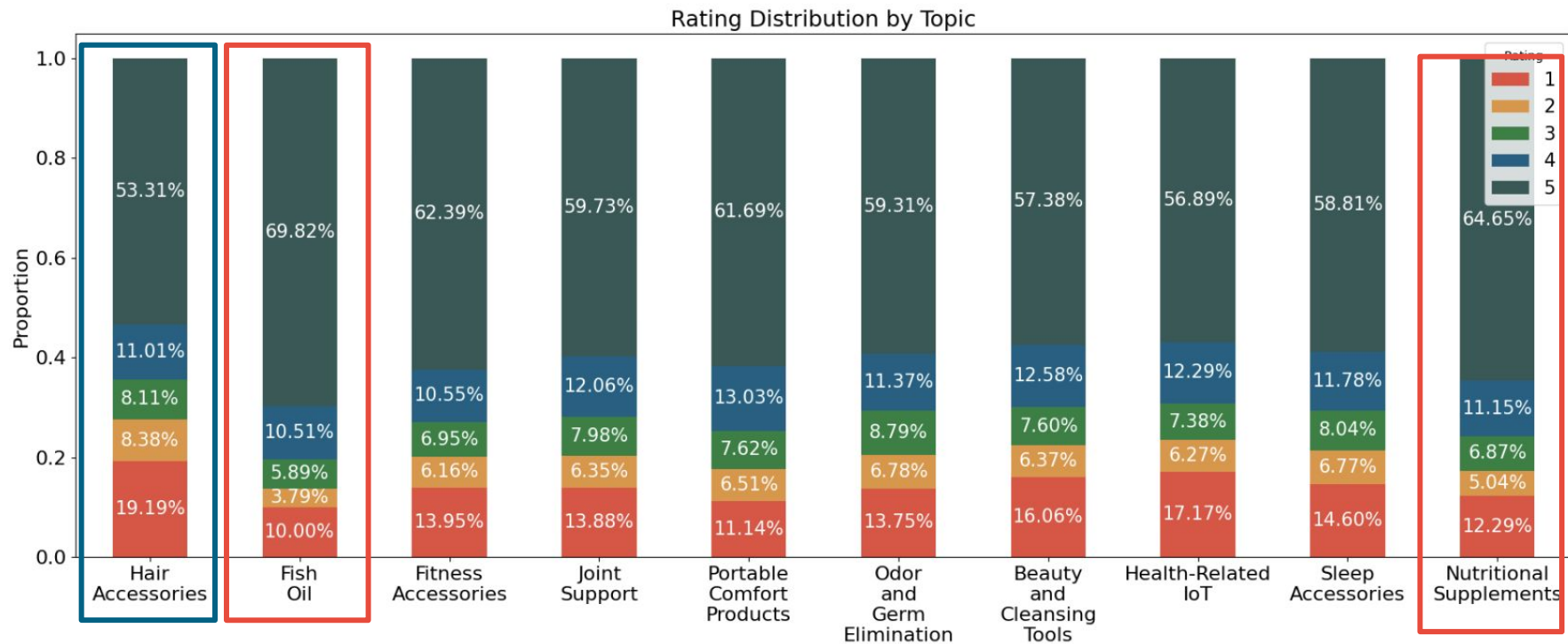
2. 10 Subcategories Classified by Product Titles

Vectorization: TF-IDF (reasonable top words)

Topic Modeling Method: NMF (reliable topic classification result)

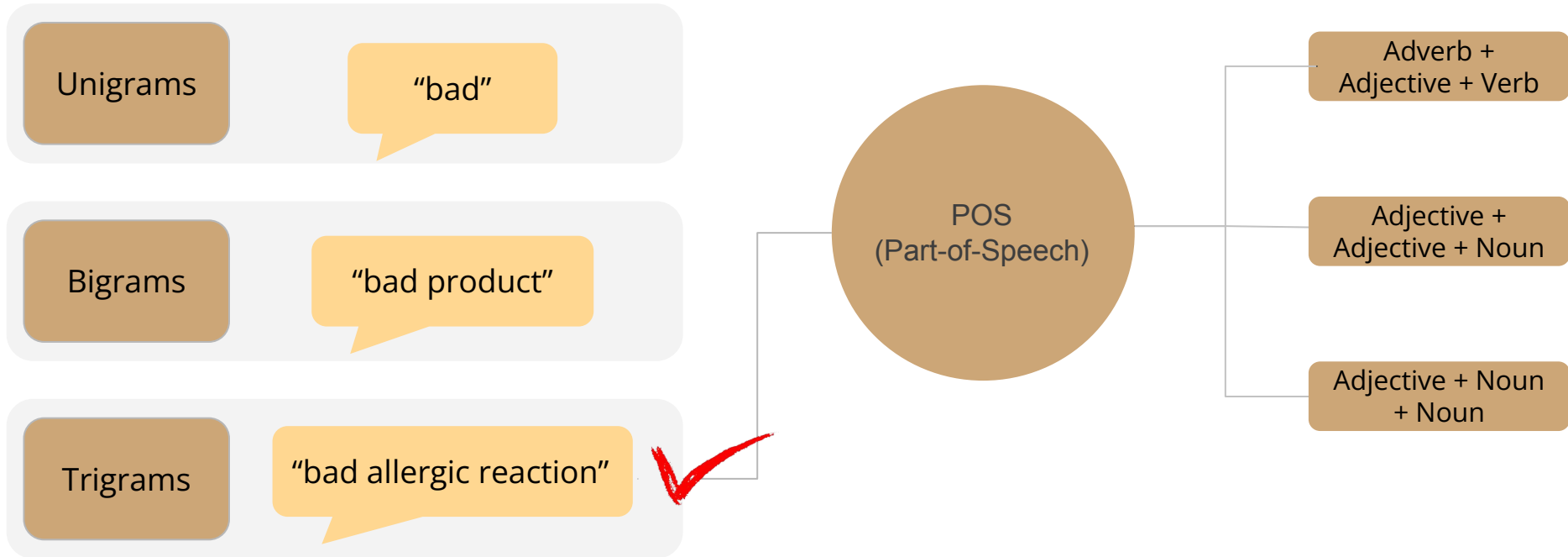
Topic 1	Topic 2	Topic 3	Topic 4	Topic 5
Hair Accessories	Fish Oil	Fitness Accessories	Joint Support	Portable Comfort Products
Topic 6	Topic 7	Topic 8	Topic 9	Topic 10
Odor & Germ Elimination	Beauty & Cleansing Tools	Health-Related IoT	Sleep Accessories	Nutritional Supplements

10 Subcategories: Rating Distribution



Positive (%)	72	86	80	80	82	79	78	77	79	83
Negative (%)	28	14	20	20	18	21	22	23	21	17

3. Extracting Top Phrases from User Reviews



Highest Positive Sentiment From Fish Oil

'Odorless, absorbs well, and greaseless. USDA organic. Appears to be a **good quality oil**. I use it as a carrier oil for essential oils, and it does not interfere with the fragrances I mix with it.'



'**excellent product and excellent customer service**. i take 2 daily, my wife takes two daily and never any fishy aftertaste. really good price. i used to buy omega 3 for my dog but now i also give him two a day and he loves them. you cannot go wrong with this product.'

'**Great quality product** full of herbs that are so good for you. This product is top notch and does what it says it will do.'

'This product I take at night to help me relax and get a **good night sleep**. It has also helped with leg cramps. I love this product.'

Positive Sentiment Ratio: 86.22%

Key Factors: High product quality, effective results, excellent customer service.

Highest Negative Sentiment From Hair Accessories

'Unable to return these glasses well before 30 days. They scratch my nose & don't fit my face at all and now it says it is not an eligible item to return? What's **total waste** of money.'

'I got this to use with a costume and it didn't look anything like the picture. There were only three tiny pieces of very **ineffective sticky stuff** to hold it on and the second I tried to pick it up tufts of the "hair" came flying off. Horrible quality. I wouldn't spend even a dollar on this because it was useless. Very sad about that.'



"Horrible quality product. The battery motor broke after one week. Wish I could get a full refund. Don't waste your money."

'The company doesn't even have a photo of the back of the can because they KNOW how dangerous this stuff is. On the back label there are warnings saying not to let this come in contact with your skin or breath it or your eyes. They are intentionally hiding the highly **toxic** nature of this product. It contains o-Phenylphenol which is **pretty darn toxic** and is absorbed into the skin or inhaled. It literally says in the can "Do not get in eyes or on skin or clothing." So....how could you safely use this on shoes or other sports equipment.'

Negative Sentiment Ratio: 27.57%

Key Issues: Poor product effectiveness, low quality, potential safety concerns.

4. Logistic Regression of Sentiment Prediction - Our Next Step

(1) Experiment with Different Embedding Methods

(2) Expand or Balance the Dataset

		Text Vectorization Method		
		M2 TF-IDF + N-gram Random Forest	M2 TF-IDF + N-gram Logistic Regression	M1 Best Result Embedding + Word2vec Logistic Regression
Accuracy		0.81	0.82	0.87
Positive	Precision	0.83	0.82	0.89
	Recall	0.98	0.99	0.95
	F1 Score	0.89	0.90	0.92
Negative	Precision	0.64	0.74	0.73
	Recall	0.17	0.16	0.51
	F1 Score	0.27	0.27	0.60

Business Implications & Recommendations



Brand & Seller

Product Improvement:

- Address critical issues such as comfort, functionality, quality, and safety
- Use positive feedback to drive marketing strategies

Leverage Contextual Feedback:

- Refine product features and innovate in line with consumer expectations based on context-rich phrases

Amazon Platform

Proactive Monitoring:

- Continuous review tracking to identify recurring negative feedback (e.g., "unsafe", "expired")
- Enables timely refinements of product listings and removal of problematic items

Maintaining Shopper Trust:

- Ensure a smooth buying experience and uphold platform reputation

Thank You!