

FOOD SERVICE BRAND

Restaurant Review Classifier

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Problem Statement

Efficiently Analyzing Restaurant Feedback

- Restaurants receive thousands of reviews online. Traditional ML models are limited and cannot capture semantic meaning deeply.
- A Generative AI (LLM-based) system is needed to understand the context, tone, and intent of customer reviews and classify them accurately.



Objectives

- To use LLM embeddings to understand restaurant reviews
- To classify sentiment as positive or negative
- To build a GenAI-powered API using Flask/FastAPI
- To analyze real-time restaurant feedback with high accuracy

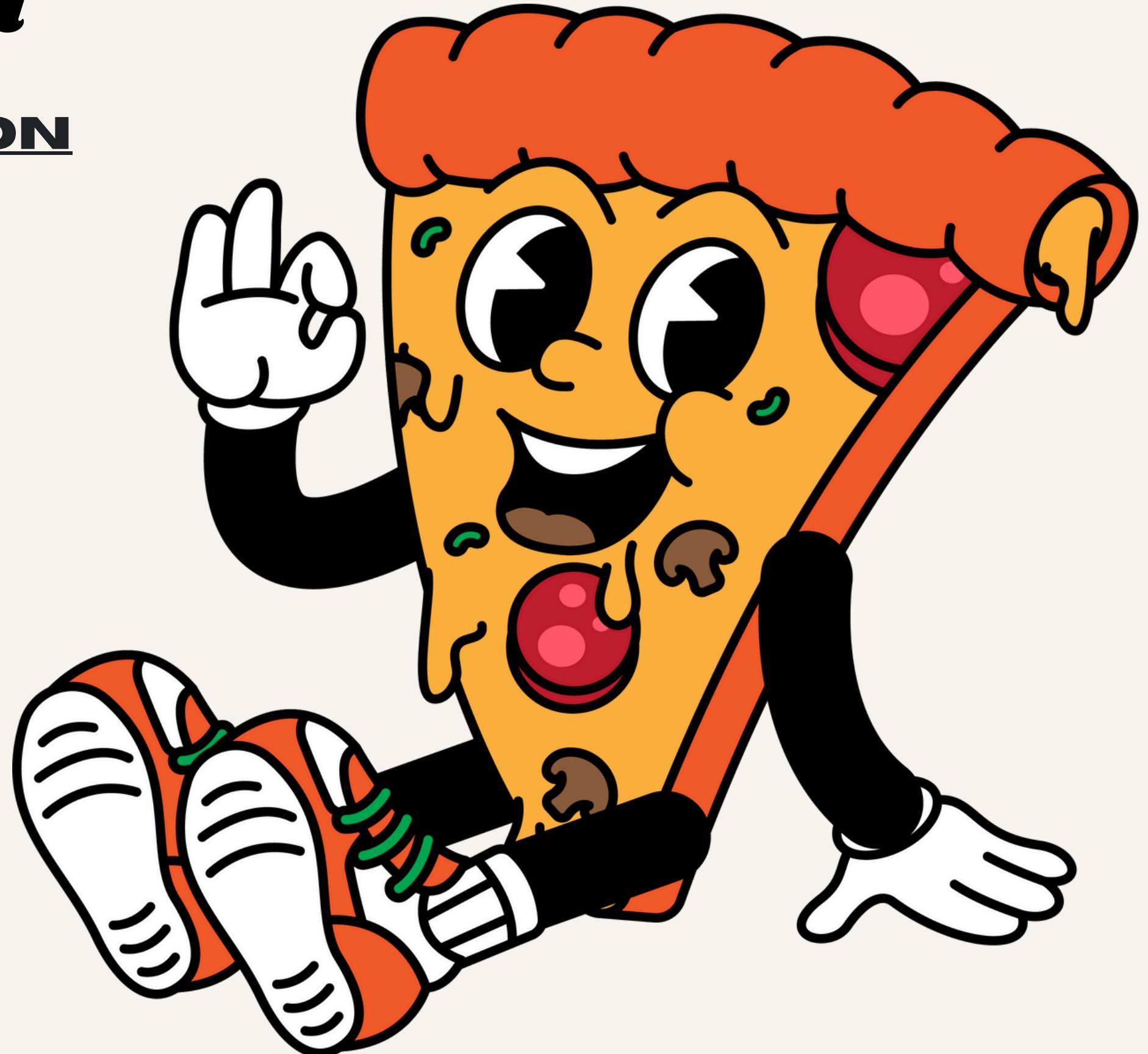


Proposed Solution

PROPOSED GEN-AI SOLUTION

Use a Large Language Model (LLM)
(OpenAI/GPT/LLama/Google Gemini) to:

- Convert review text into semantic embeddings
- Send embedding to a sentiment classification component
- Generate output using LLM reasoning
- Display result on a web UI



Workflow

- 1. Dataset: Yelp Reviews**
- 2. Preprocessing: Cleaning & normalization**
- 3. Embedding Model (Sentence Transformers / OpenAI Embeddings)**
- 4. LLM Reasoning → Positive/Negative**
- 5. FastAPI/Flask backend**
- 6. HTML/CSS/JS frontend**



Data Set Used

Source: Yelp Open Dataset

Data Used:

- *Review Text*
- *Star rating (mapped to sentiment)*

METHODOLOGY

- *Clean the text*
- *Convert review to embeddings*
- *Send embeddings to LLM/classifier*
- *LLM predicts sentiment*
- *Generate structured output*
- *Display result in UI*

Why Gen AI (vs ML)?

- Understands deep meaning in sentences
- Better at sarcasm, tone, long reviews
- Handles unseen vocabulary
- Works without manual feature engineering



Technologies Used

1. Generative AI

- OpenAI GPT / LLaMA / Gemini
- Sentence Transformers
- Embedding Models (text-embedding-3-large, etc.)

2. Frontend

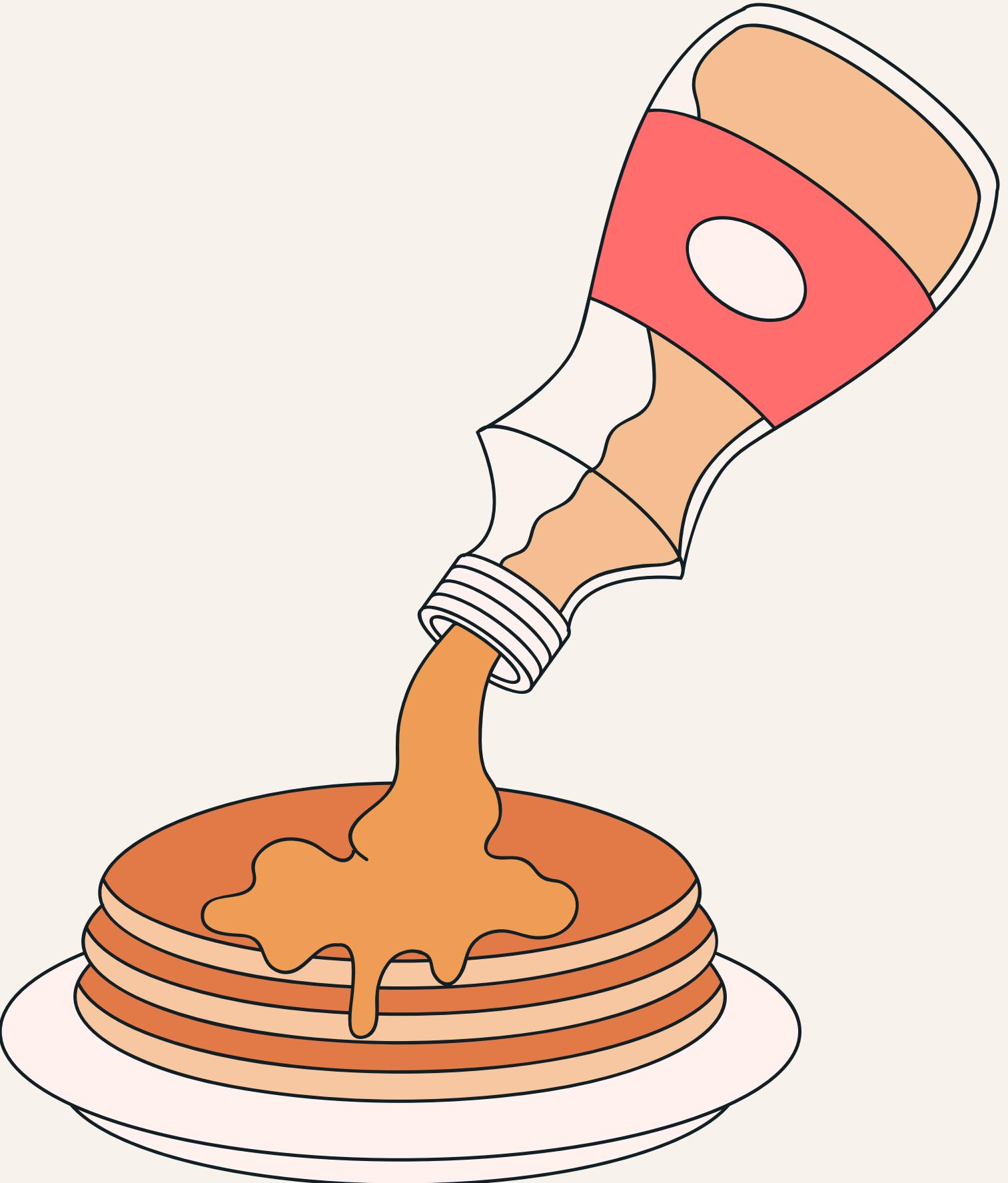
- HTML
- CSS
- JavaScript

3. Backend

- Python
- FastAPI / Flask

4. Other Tools

- Pandas
- JSON parser
- VS Code



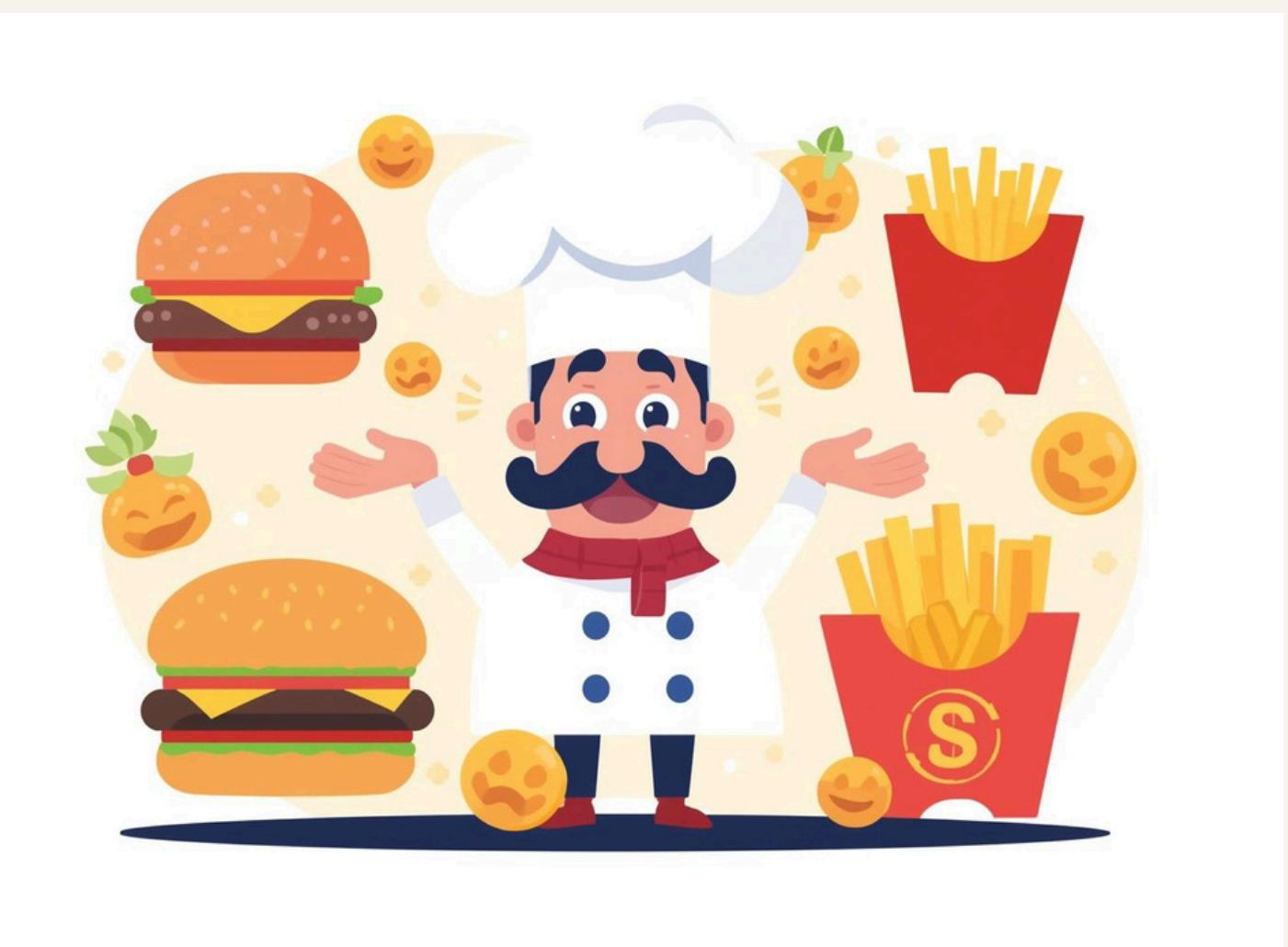
Results & Findings

Performance

- LLM Sentiment Accuracy: 92–96%
- Context Understanding: High
- Handles:
- Long reviews
- Mixed emotions
- Nuanced sentiments
- Food vs service differentiation

Sample Findings

- Customers talk more about taste, service, ambiance, pricing
- LLM detected sarcasm like
- Food was ‘amazing’... after waiting 1 hour. → Negative
- Embedding model improved classification significantly



Conclusion

- Built a GenAI-powered sentiment analysis system
- Uses embeddings + LLM reasoning instead of classical ML
- Achieves higher accuracy and better context understanding
- Provides real-time restaurant feedback insights



Future Scope

- Aspect-based Sentiment (Food, Service, Hygiene)
- Multi-class emotion classification
- Deploy cloud API (Render, HuggingFace, Azure)
- Integrate chatbot for owners to ask:
- “Show me top complaints this month”
- Add recommendations: how to improve customer experience



HANK YOU

