NLP CHALLENGE

Tensor Decomposition presents

CARE

Customer Assistance and Response Engine

Meet Our Team

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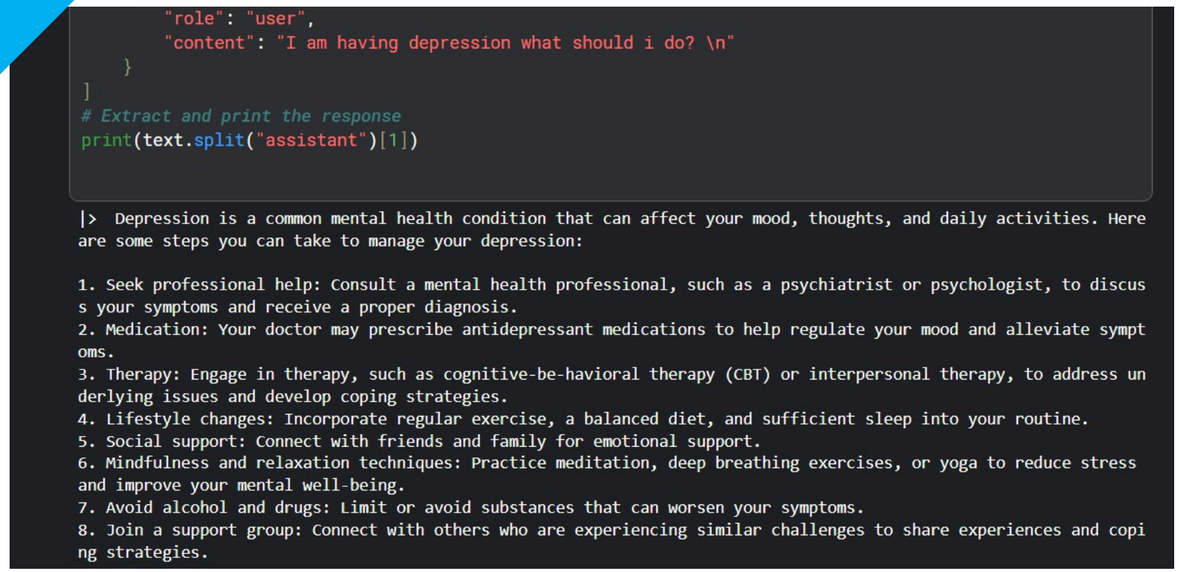
Overview

Problem Statement

To create a **Smart Customer Support Chatbot** powered by **NLP** that can handle diverse customer inquiries, offer **empathetic responses** based on **user sentiment**, and escalate unresolved issues. The chatbot should be versatile enough to serve industries such as **e-commerce**, **banking**, **healthcare**, or **telecommunications**.

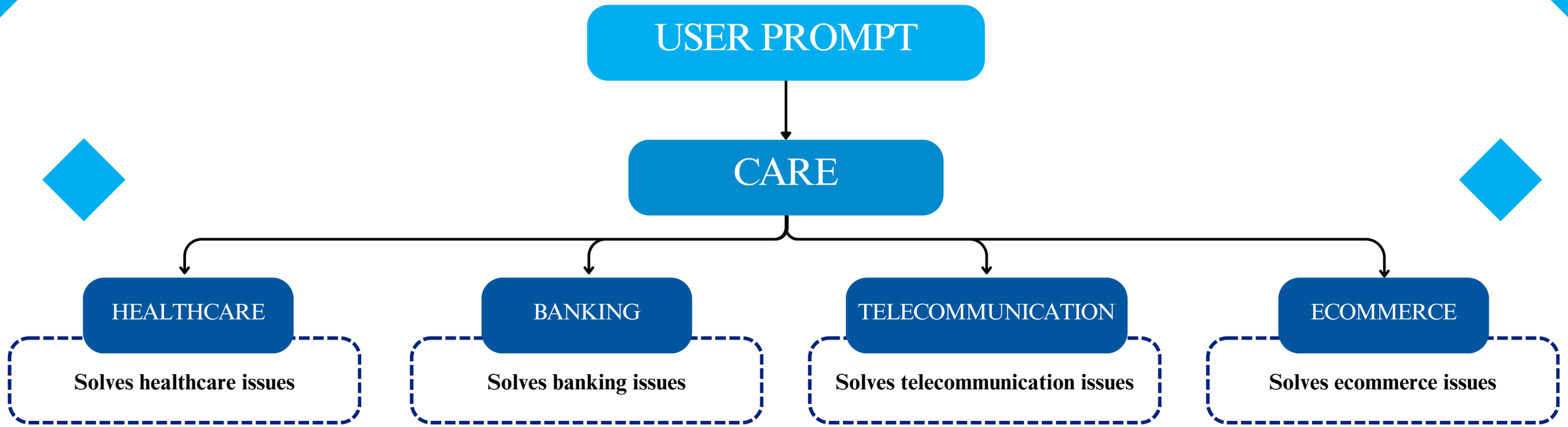
Our Solution: CARE



CARE (Customer Assistance and Response Engine) is an advanced chatbot powered by **Phi 3.5 LLM**, designed to deliver **efficient**, **empathetic**, and **domain-specific** support across medical, telecom, banking, and e-commerce sectors.

It automates customer interactions, analyzes sentiment, and ensures seamless issue resolution.

Execution Framework



Methodology
phi-3.5-mini-instruct

- **Phi 3.5 Mini Instruct:** A compact language model with approximately 3.8 billion parameters.
- Optimized for efficient fine-tuning and deployment.
- Uses **instruction-tuned training** for improved prompt adherence and contextual understanding.
- **Built on transformer architecture,** balancing performance and computational efficiency.
- **Size Benefits:**
  - Enables faster inference.
  - Reduces memory requirements.
- **Ideal Usage:**
  - Suitable for resource-constrained settings.
  - Capable of generating coherent, domain-specific chatbot responses.

Dataset

Banking:
https://www.kaggle.com/datasets/shashwatwork/consume-complaints-dataset-fo-nlp

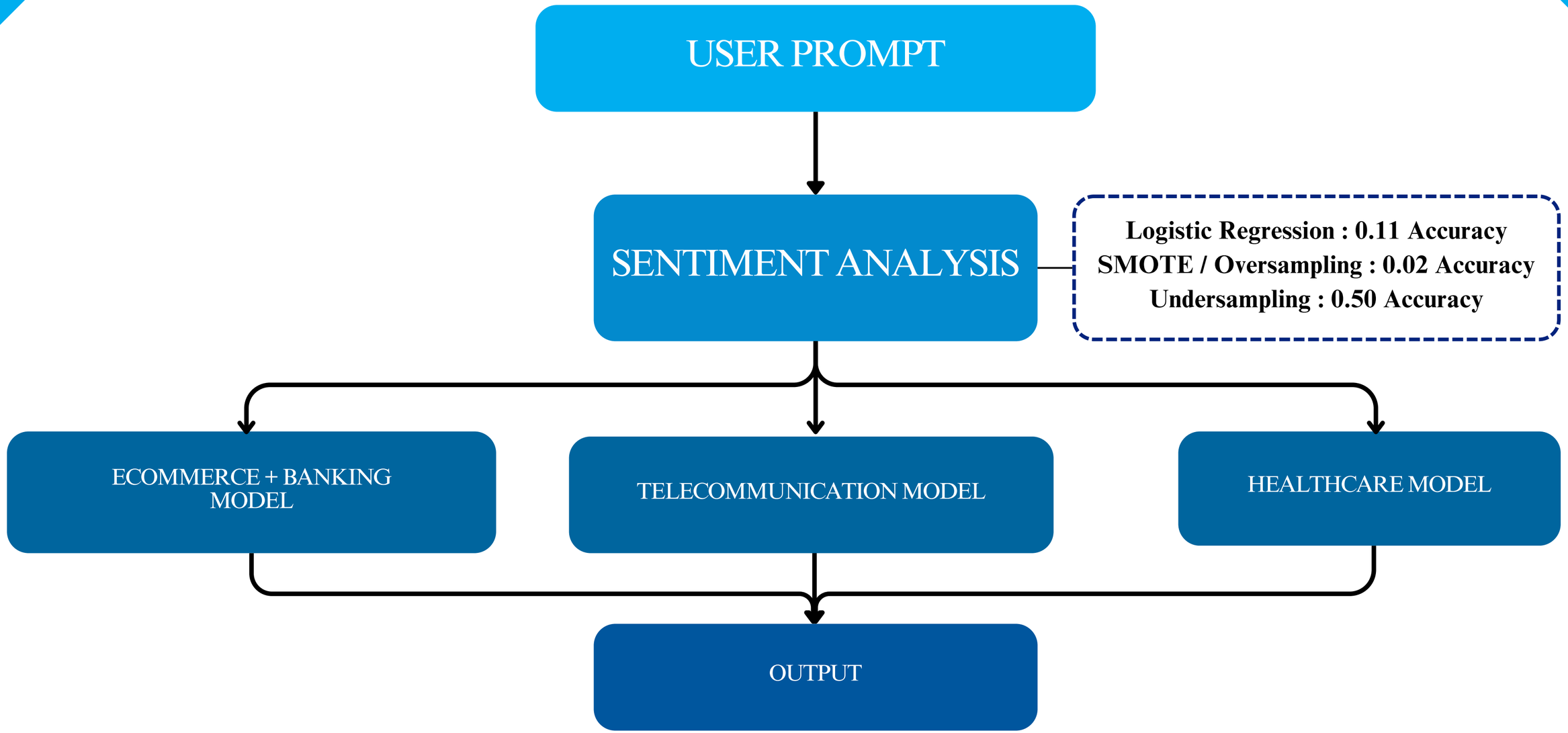
Medical:
https://huggingface.co/datasets/ruslanmv/ai-medical-chatbot?row=0

Telecommunication:
https://huggingface.co/datasets/bitext/Bitext-telco-llm-chatbot-training-dataset

Ecommerce :
https://github.com/imsoumya18/E-commerce_FAQ/blob/main/Ecommerce_FAQs.csv + Custom Made

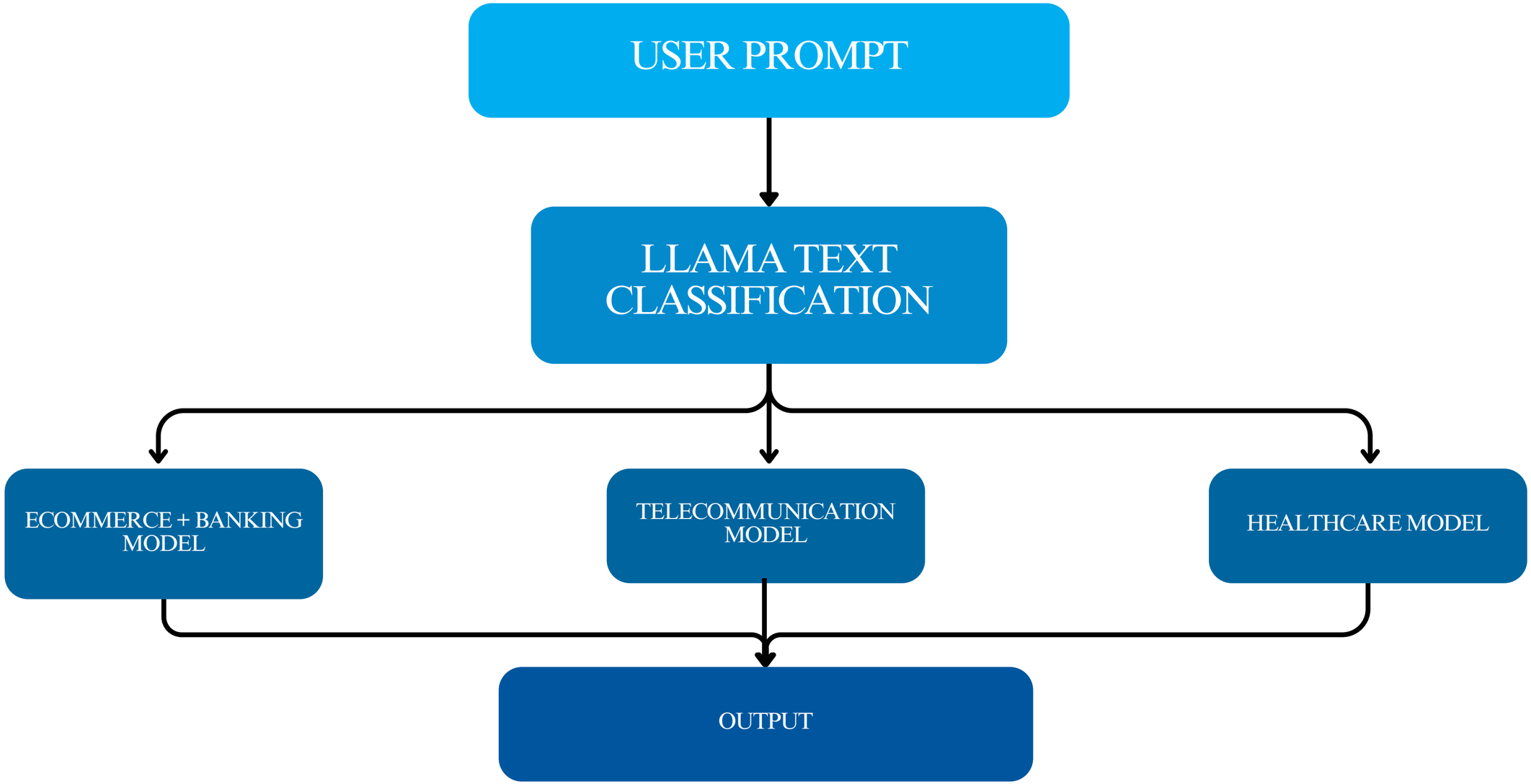
Approach 1

(Not feasible due to **poor classification results**)



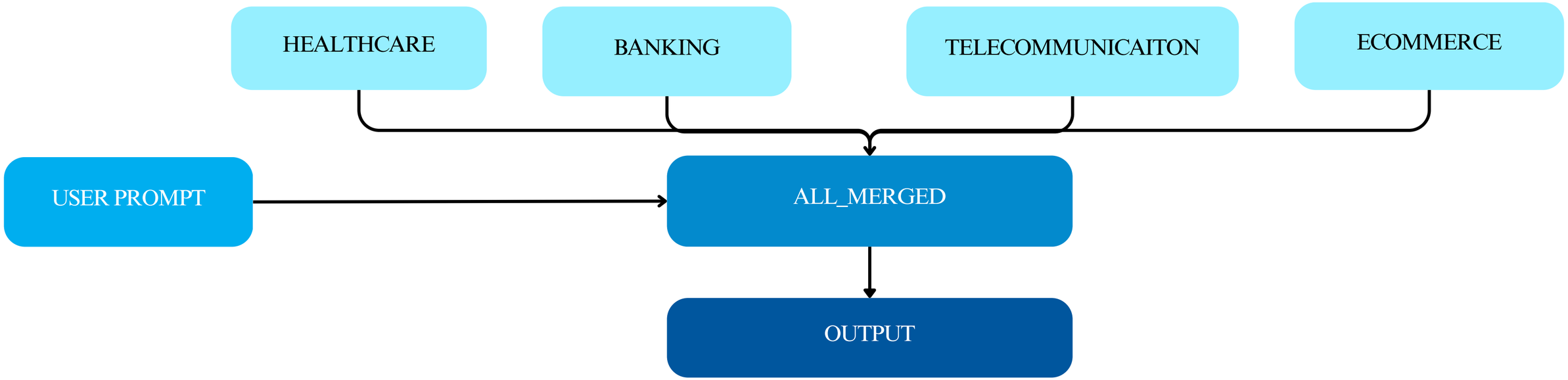
Approach 2

(Not feasible due to **high memory requirement**)

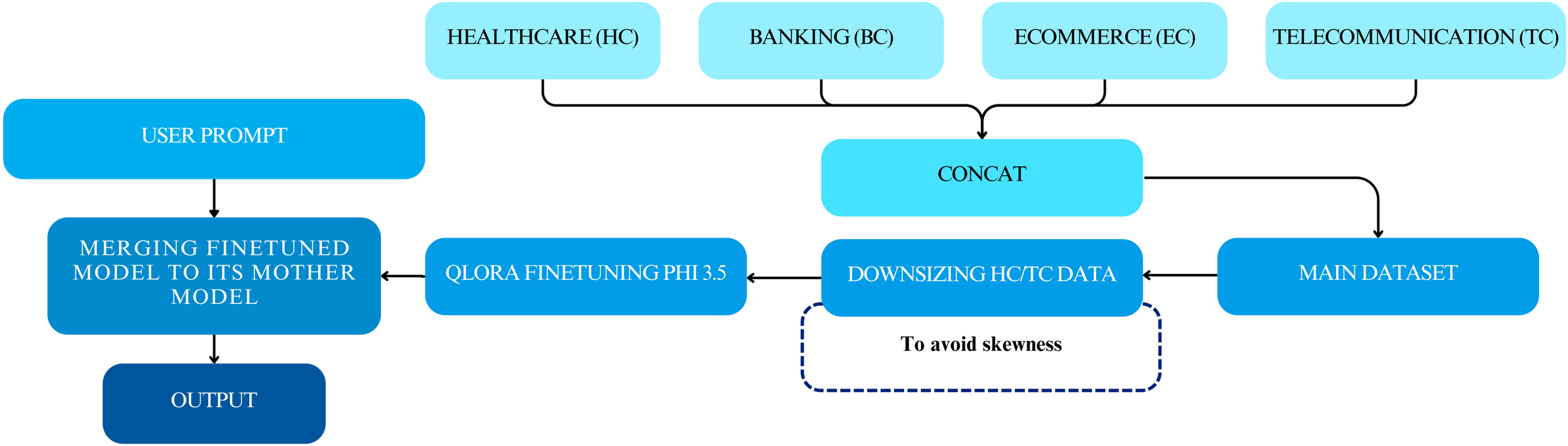


Approach 3

(Not feasible due to **low accuracy**)

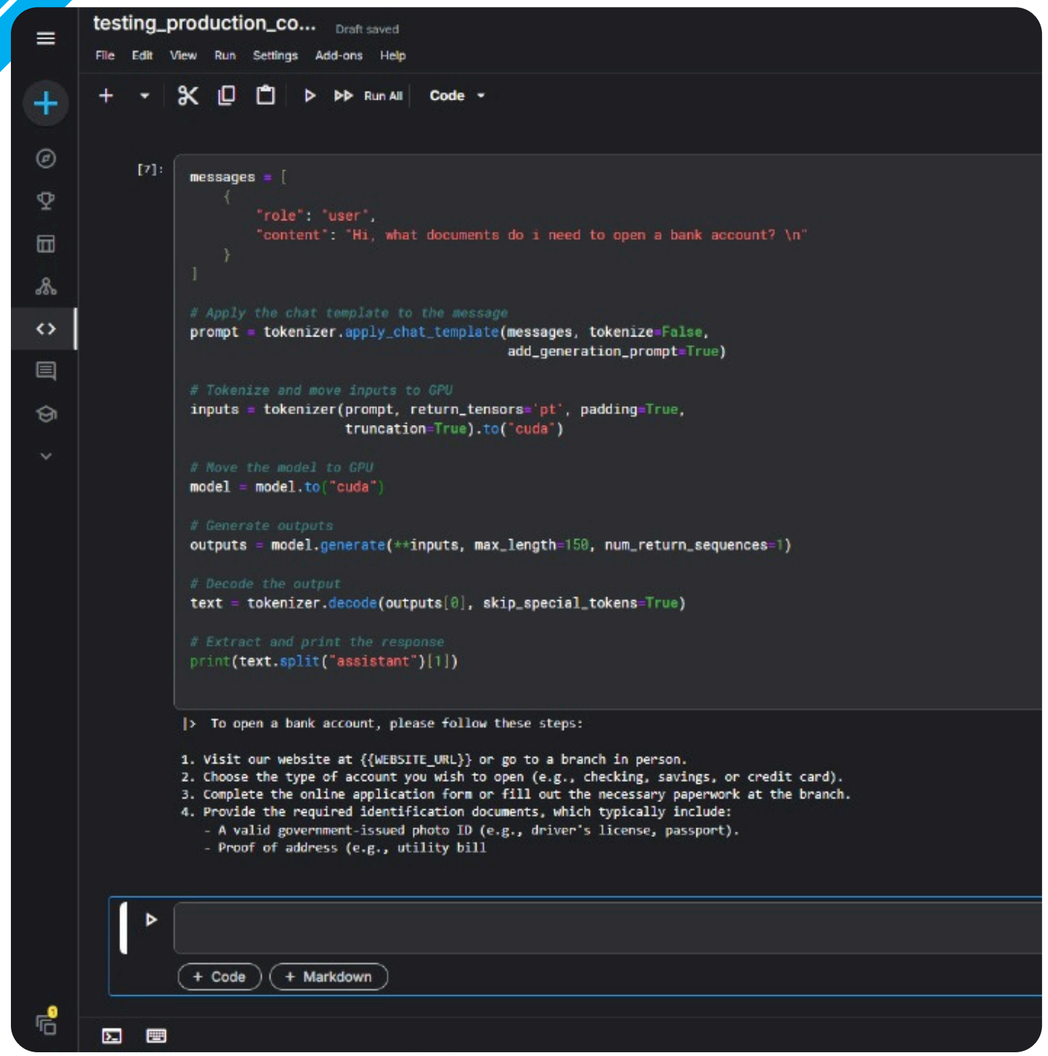


Final Approach

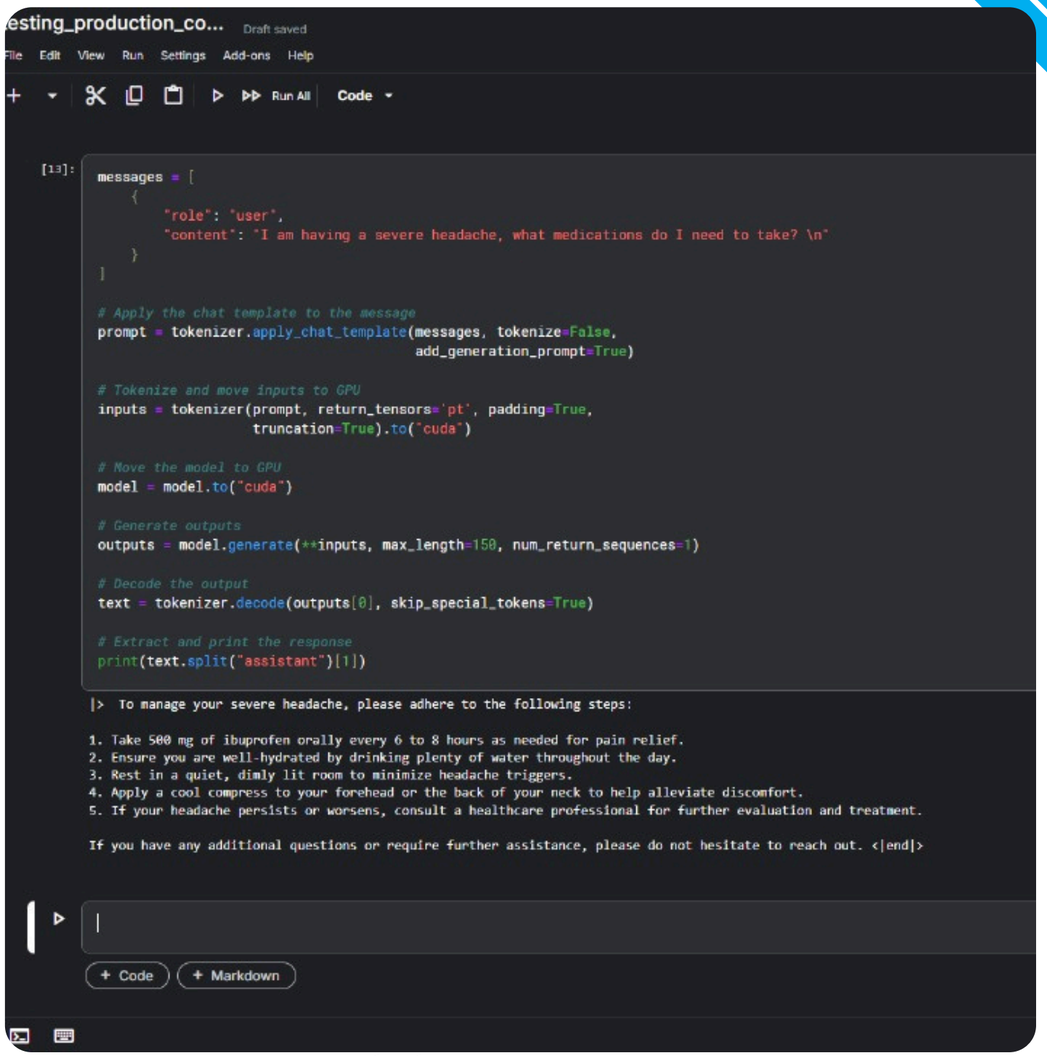


Final Model Made: https://huggingface.co/ankitruler567/Phi-3.5-mini-instruct-Combined-Model
Final Testing Notebook: https://www.kaggle.com/code/ankitd7752/testing-production-code-tensor-decomposition

User Prompts

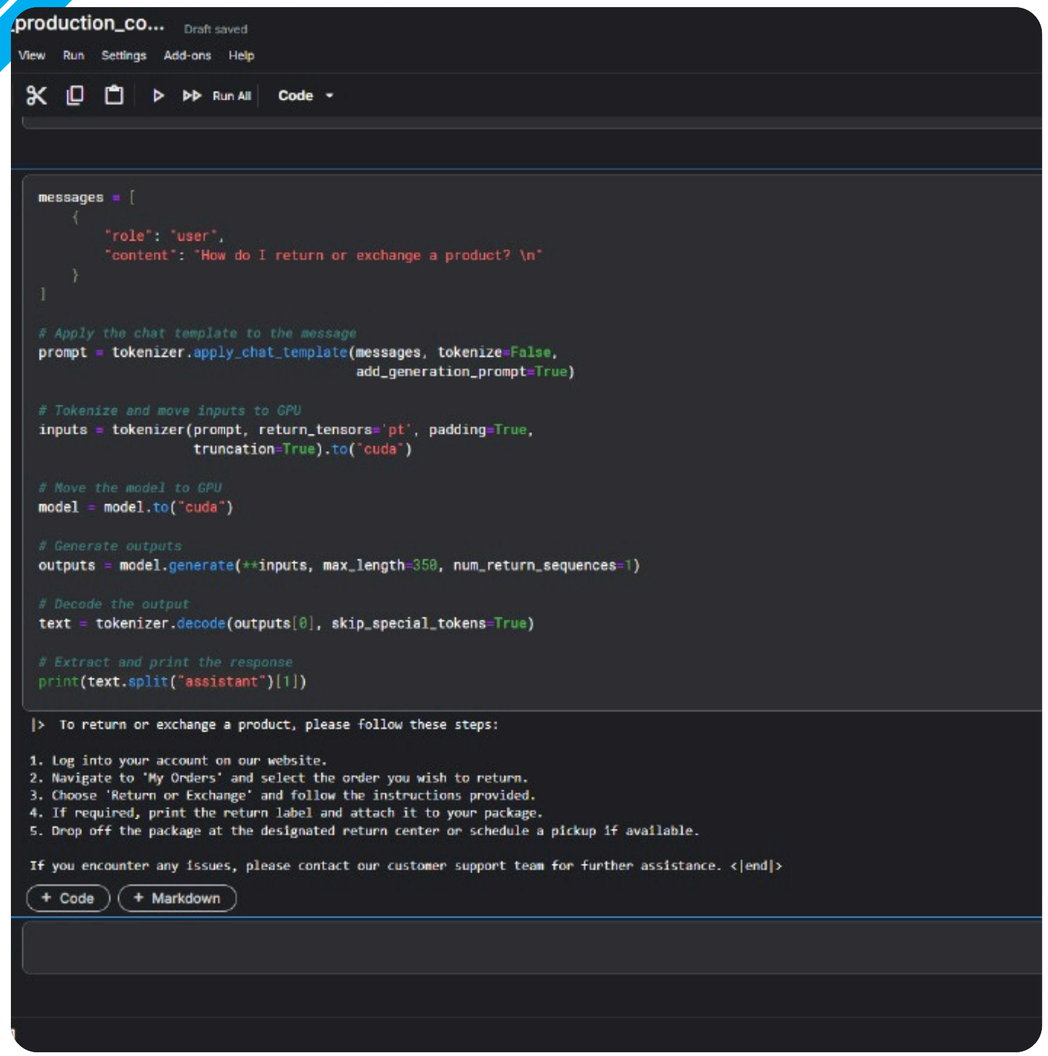


Banking Prompt

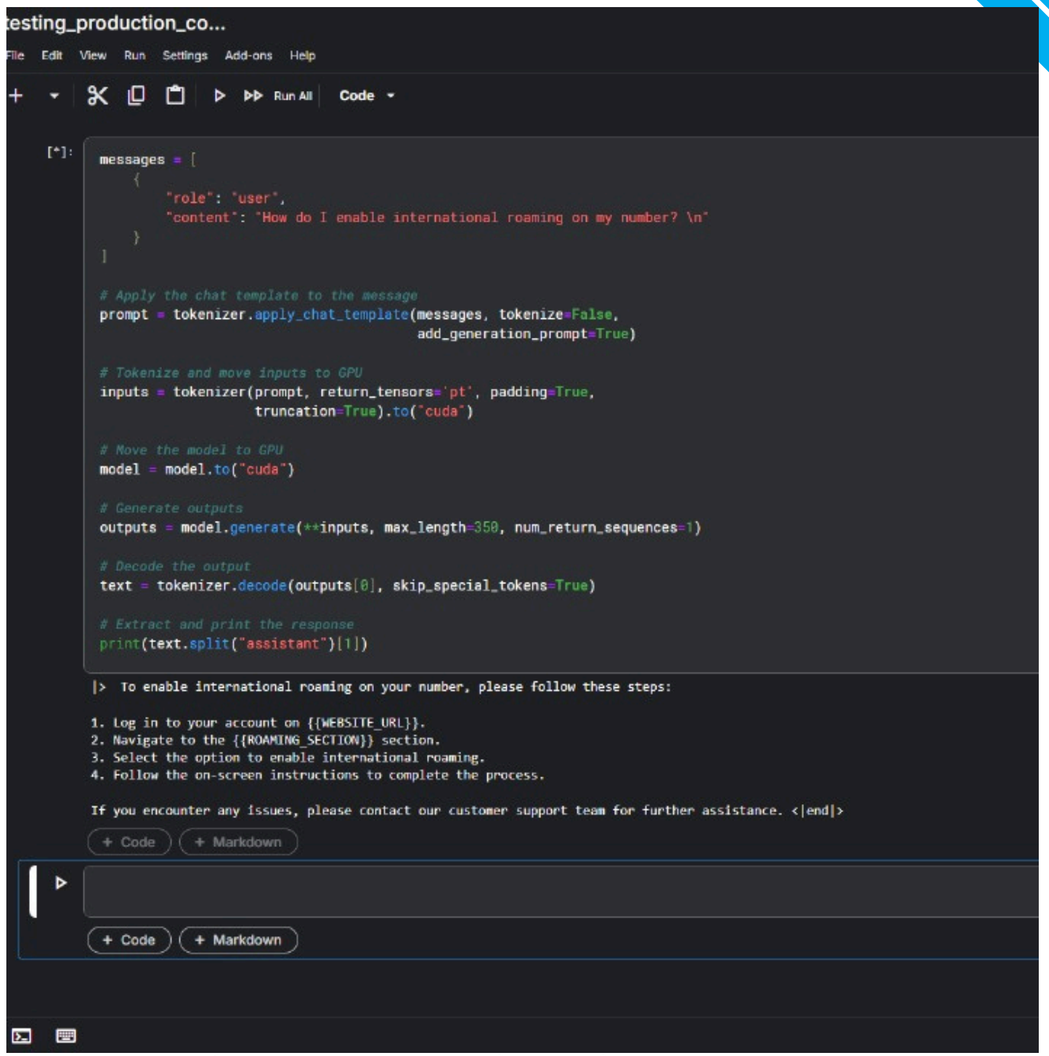


Healthcare Prompt

User Prompts



Ecommerce Prompt



Telecommunication Prompt

Possible Improvements

Some possible improvements that we felt could be made for our chatbot

- **Multi-Language Support**: Expand the chatbot's capability to handle queries in multiple languages for global accessibility.
- **Voice Integration:** Implement real-time voice-to-text and text-to-voice features for better accessibility.
- **Using RLHF and RAG**: We can integrate out chatbot system with RLHF and RAG to continuously making our chatbot more and more accurate.
- **Knowledge Base Expansion**: Continuously update domain-specific databases to improve accuracy and relevance.
- **Deploying the model as an API:** We can deploy the model as an API to serve even a larger base of customers creating a more large impact.

Conclusion

At the end we would like to thank GENPACT and KSHITIJ for giving this amazing project to work upon which can be a really helpful solution for which would impact a lot of people in a positive way.
With this, Team Tensor Decomposition signs off!

Thank you