Team : NeverMind

App Name: medHelp.AI

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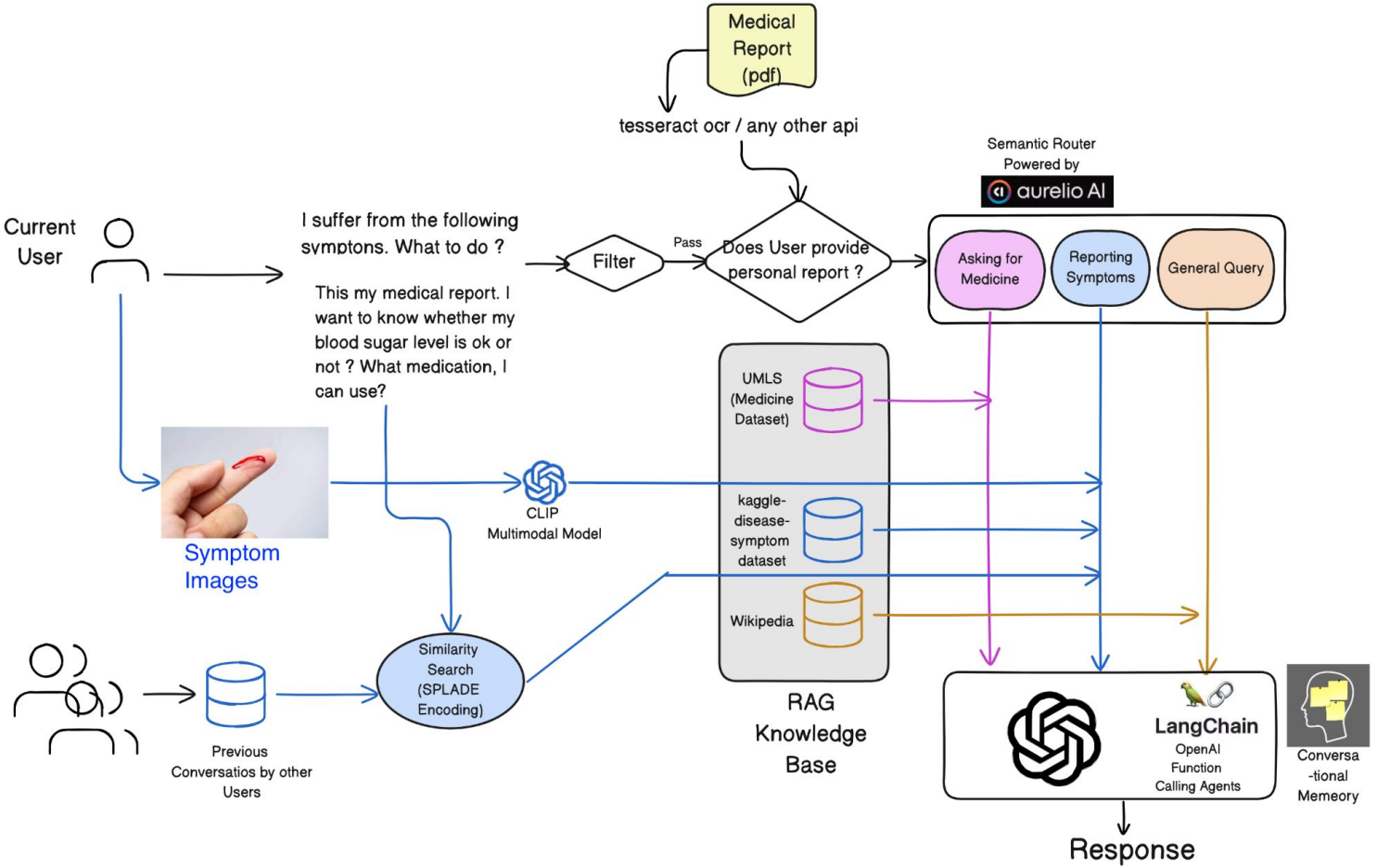
Track : GenAI
Topic: Healthcare and Telemedicine
Developing AI-powered virtual healthcare assistant

Design Flowchart



Description of key stages

Stage 1: Here, user provides information:

a) User's query through text
b) User provides symptoms' images. Ex: images of swelling, bleeding surface, etc. i.e. any visible wounds
c) User's medical records i.e. any past prescriptions, medical reports, etc.
d) Malicious or Spam information is filtered
e) Any query involving usage of highly sensitive information such as high doses of antibiotic is filtered and directed suitably to the concerned doctor.

Stage 2 : Routing of requests

a) Pdf's information are scraped through tesseract.
b) Semantic router routes the queries as per the following categories:
    1. Medicine related
    2. Symptoms reporting
    3. General query

c) Symptoms are also gathered through the knowledge base of different conversations by other users involved with our AI assistant, as influenced through Federated Learning.

We store Splade Sparse Encoding of such conversations.

Multimodal Q/a Incorporation : We use OpenAI's CLIP multimodal model to compare the the user provided symptom pictures and symptom text.

We are also leveraging RAG based strategies to further fine-tune our responses to generate the most accurate results trained on state-of-the-art datasets, respectively for each queries.

Stage 3:

The final report is generated. Previous instances are captured through LangChain conversational memory to provide a better user experience.

Tech Stack Used:

1. PyTorch
2. LangChain
3. OpenAI
4. Semantic Router powered by AurelioAI

Model Used:

1. Multimodal CLIP : openai/clip-vit-base-patch32
2. Dense Embedding Model : text-embedding-ada-002
3. Sparse Embedding Model: naver/splade-cocondenser-selfdistil
4. OpenAI generation Model: gpt-3.5-turbo-0613 (temperature 0.0 and 0.1)

Challenges Faced and Solved

LLM hallucination: It was solved using RAG based answer extraction strategies with incorporation of OpenAI function call and Agents.

Lack of proper responses from user: Multimodal models have been leveraged to cater to this challenge if the user can not express the visual symptom properly.

Learning from experiences: We are using the past medical records and displaying the relevant information to the user as learned previously from those interactions

Future Scope

1. Leveraging a more powerful model generate captions of respective images.
2. Extracting information from pdf files in a more semantically efficient form
3. Incorporation of more layers to maintain a positive and motivating atmosphere in the response section