

# AI Powered Health Assistant for a Healthcare Agency

- A Case Study

## Client

A Healthcare Agency in the US, founded by members of the nation's leading life insurance aggregations and analytics platform provider. For over 30 years, the agency has specialized in retrieving, normalizing and consolidating medical records, and providing associated underwriting analysis functions to insurers.

## Scope of Work

To create robust, reliable, and smart AI-powered chatbot that would enable the user to engage with a care provider 24/7, whenever they want. The chatbot will act as an intermediary for health maintenance requests, answer common health-related questions, and offer guidance and recommendations for identifying suitable healthcare professionals for follow-up.

## Challenges

There were many challenges that needed to be addressed, such as generating multiple intelligent follow-up questions that can handle the wide range of data variability in natural language input by users. Another significant challenge was the preparation of domain-specific datasets by medical experts, which involved gathering data from both open and closed domains.

- **Data Availability:** Building an AI-powered chatbot that can ask follow-up questions based on symptoms and historical data requires a large and diverse dataset of medical records, symptoms, and their corresponding diagnoses. Access to such data can be a significant challenge, especially if the data is fragmented across multiple sources.

- **Natural Language Understanding:** A chatbot's effectiveness depends on its ability to understand and interpret natural language. Developing an AI chatbot that can accurately interpret a wide range of inputs and recognize various phrasings of symptoms can be challenging. Moreover, understanding the context of the conversation can also be a hurdle.
- **Domain Expertise:** Building a chatbot that can ask intelligent follow-up questions requires deep domain knowledge of the medical field. Developers need to understand the relationships between symptoms, diagnoses, and treatments to create relevant and helpful follow-up questions.

## Solution

### Understanding the Data:

The first step involved was to understand the data by analyzing the comprehensive dataset of medical records, symptoms, and corresponding diagnoses. Additionally, we required a dataset of non-medical messages that the chatbot might receive. The dataset was ensured to be diverse and representative of different age groups, genders, and health conditions. The data was preprocessed to remove any irrelevant information and to standardize the format.

### Research and Development:

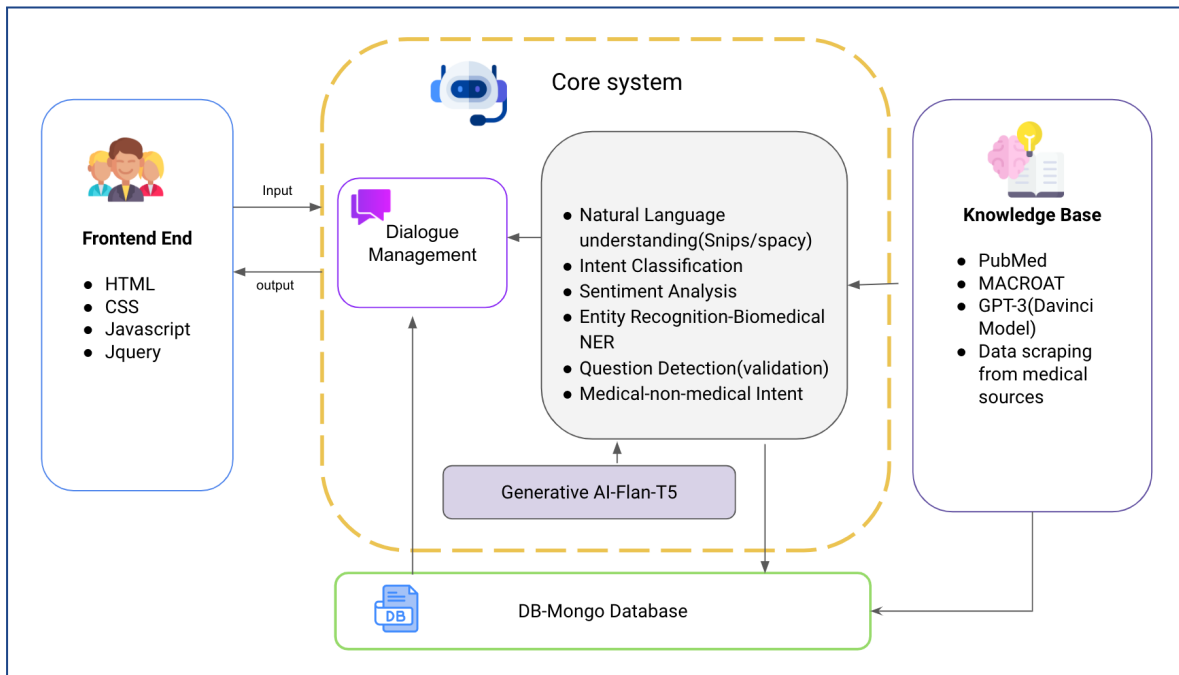
In the next step, we did R&D of the state-of-the-art models for generative AI. We analyzed the various machine learning, deep learning and natural language processing algorithms, to identify the suitable approach. We also did experiments with different models and architectures to optimize the chatbot's performance.

We build various custom AI-based pipeline to be used in the chatbot:

1. Followup question generator: Generative AI-based model

2. Question and statement detection: NLP (classification model)
3. Medical and non-medical intent detection: NLP (classification model)
4. GPT-3 based model

## Technical Architecture



## Impact

- The solution helped reduce the overall time taken to address the concerns of patients by about 20%.
- The organization was able to effectively utilize its resources as per the recommendations and insights generated by the chatbot.
- Implementation of the solution helped the organization to cater to about 3 times more the number of patients than before because the common patient queries were taken care of by the chatbot.