Capstone Project Problem Statement: Customer Support Assistant

Introduction

Chatbot support Assistants are becoming very popular in the era of Generative AI evolution. Building chatbot assistant which caters the need of customers based the nature of queries is need of the hour for many customers and clients. To address this need, we propose developing a conversational chatbot which will automate and reduce day to day activities of customer support executives or customer representation officers within the organization. This chatbot will serve as an accessible, efficient, and reliable resource for customer support employees, for effectively improvise the customer engagement activities and experience.

# Problem Statement

Background

Customer representatives and customer relations officers will handle multitude of customer queries daily. They also need to go through the customer queries to further understand the customer sentiments, segregate customer queries as either genuine complaint or usual queries. This Chatbot will enable them to do all those activities in background by catering the customer queries as a live and real time agent.

Objective

The primary objective of this capstone project is to develop a conversational chatbot that can provide timely and accurate information to customers and automate day to day activities of the customer representatives and customer relation officers. This chatbot will leverage Generative AI, natural language processing (NLP) and machine learning (ML) techniques to understand and respond to user queries effectively. By providing a seamless and interactive experience, the chatbot will help customer representatives feel supported and informed, ultimately improving and reducing their daily activities. It also acts as friendly assistant to end users who are willing to get answers for their queries on time.

# Project Scope

The scope of this project includes the following key components:

* Chatbot Development: Design and develop a conversational chatbot capable of understanding and responding to common queries.
* Sentiment analysis and Query Categorization: Analyze the user sentiment from the customer queries and Categorize queries into usual query and complaints, based on query segregation respective dynamic responses need to be generated.
* Training and Evaluation: Train the chatbot using data from free models such as LLaMA and Hugging Face. Evaluate the chatbot's performance using multiple models and baselines and select the best-performing model based on predefined metrics.
* Workflow Creation: Develop workflows to handle various types of queries and ensure a smooth user experience.
* Testing: Conduct extensive testing with multiple models to ensure the chatbot's effectiveness and reliability. Use real-world scenarios to validate the chatbot's performance and make necessary improvements.

# Methodology

The project will follow a structured methodology to ensure the successful development and deployment of the chatbot:

## 1. Requirement Gathering

Identify and document the specific requirements of the conversational chatbot, including the types of queries it should handle and the information it should provide.

## 2. Data Collection and Preprocessing

Collect relevant data for training the chatbot, including policies, FAQs, and other materials. Preprocess the data to ensure it is clean and suitable for training.

Extract the data from website <https://www.xfinity.com/terms/web> and use it as KB source and store in Vector DB.

## 3. Model Selection

Evaluate multiple free models such as LLaMA and Hugging Face to determine their suitability for the chatbot. Compare the performance of these models using baseline metrics such as accuracy, response time, and user satisfaction.

## 4. Chatbot Development

Develop the chatbot using the selected model and integrate it with the organization's existing HR and information systems. Design workflows to handle different query types and ensure a seamless user experience.

## 5. Training and Fine-Tuning

Train the chatbot using the collected data and fine-tune it to improve its performance. Use a combination of supervised and unsupervised learning techniques to enhance the chatbot's ability to understand and respond to user queries.

## 6. Testing and Evaluation

7. Deployment and Monitoring

Deploy the chatbot in the organization's environment and monitor its performance continuously. Collect feedback from users to identify areas for improvement and update the chatbot as needed.

Project Flow Diagram

1. Customer sends queries\complains to the bot
2. Analyzing the customer sentiment and Customer message Categorization
3. If user msg is Query, then Get answer relevant to query from Policy KB (using RAG)
4. If user msg is Complaint, then generate default response template.
5. Saving customer name, email-d, query\complain, sentiment-analysis, categorization, response from LLM to DB, which can be utilized by CR in backend

Note:

1. Build Agentic and RAG based solutions.

2.  Build User interface where the user can chat with user-assistant.

Possible agents to build:

* Agent Tool 1:  For Sentiment analysis,
* Agent Tool 2: (Conditional):   Email categorization and Dynamic response generation.
* For Query: Get answers from Policy KB using RAG
* For Complaint: Generate default response

# Expected Outcomes

The successful completion of this project will result in the following outcomes:

* A functional and reliable conversational chatbot that can handle various nature of queries and respond accordingly.
* Improve productivity of Customer engagement leading to higher satisfaction and productivity.
* Automate the activities or reduce the workload of customer representative and customer relation officers, allowing an organization or clients to focus on more strategic tasks.
* A framework for evaluating and selecting the best-performing chatbot models based on predefined metrics.
* A Customer oriented project which acts as an automation agent and differentiator in the market.

# Enhancement expectation

* Add and build a differentiator and innovative feature from your side which acts as a value addition or feature addition to above problem statement, which must be innovative.

# Conclusion

Developing a conversational chatbot which improvises the customer engagement is a crucial step toward improving the customer relations in organizations. This capstone project aims to leverage advanced NLP and ML techniques to create a reliable and efficient chatbot that can provide timely and accurate information as per customer requirements to better handle different nature of activities. By following a structured methodology and evaluating multiple models, we will ensure that the chatbot meets the organization's needs and delivers meaningful results. The successful implementation of this project will not only benefit for better customer engagement, but also contribute to the overall success of the organization.