Customer Care AI Chatbot Agent Development Task

Introduction

This document outlines a detailed task for an AI candidate to develop a Customer Care AI Chatbot Agent for COB Company. The goal is to create an intelligent conversational agent capable of handling a wide range of customer inquiries and requests, significantly improving customer service efficiency and satisfaction.

Objective

Develop an AI-powered chatbot that serves as the primary customer interface for COB Company. The chatbot must be able to:

1. **Provide accurate answers** to customer inquiries by leveraging a provided knowledge base.
2. **Perform specific actions** (e.g., scheduling appointments) through guided conversational flows.
3. **Intelligently classify user intent** to route requests appropriately:
    - Answer from the knowledge base.
    - Initiate an action-oriented dialogue.
    - Seamlessly escalate to a human agent when necessary.

Core Functionalities and Requirements

1. Knowledge Base (KB) Inquiry Answering

- **Requirement:** The chatbot must be able to understand natural language questions related to COB Company's products, services, policies, and general information.
- **Mechanism:** It should retrieve relevant information from a provided "Knowledge Base" (assumed to be a collection of documents, FAQs, or structured data).

- **Output:** Provide concise, accurate, and easy-to-understand answers to customer queries.
- **Considerations:**
    - Ability to handle variations in phrasing for the same question.
    - Graceful handling of queries where information is not available in the KB.
    - Potential for Retrieval-Augmented Generation (RAG) if using a large language model.

2. Action-Oriented Dialog Flows

- **Requirement:** The chatbot must be able to guide users through specific processes that require collecting information and performing an action. A primary example is "Scheduling an Appointment."
- **Mechanism:**
    - **Intent Recognition:** Identify the user's intent to perform an action (e.g., "I want to book an appointment," "Schedule a meeting").
    - **Entity Extraction:** Extract necessary information from the user's input (e.g., preferred date, time, service type, customer name, contact details).
    - **Context Management:** Maintain conversational context across multiple turns to gather all required parameters for the action.
    - **Confirmation:** Confirm collected information with the user before executing the action.
    - **Integration:** Simulate or integrate with an external API (e.g., a calendar or booking system) to perform the action. For

this task, a mock API endpoint or a clear demonstration of how such an integration would work is sufficient.

- **Example Scenario: Scheduling an Appointment**
    - User: "I'd like to schedule an appointment."
    - Bot: "Certainly. What type of service are you looking for, and what date and time would be convenient for you?"
    - User: "I need a consultation for a new product, sometime next Tuesday afternoon."
    - Bot: "Okay, for a new product consultation on Tuesday, [Date]. Do you have a preferred time, say between 1 PM and 5 PM?"
    - ... (dialog continues until all necessary details are gathered and confirmed)
    - Bot: "Great! Your appointment for a new product consultation on [Date] at [Time] has been scheduled. A confirmation email will be sent to [Email Address]."

3. Intelligent Intent Classification and Escalation

- **Requirement:** The chatbot must accurately classify the user's intent to determine the appropriate response strategy.
- **Classification Categories:**
    - **Knowledge Base Query:** The user is asking for information that can be found in the provided KB.
    - **Action Request:** The user wants to initiate a process that requires a specific action (e.g., scheduling, updating information).

    - **Human Agent Escalation:** The user's query is complex, sensitive, requires human empathy, or falls outside the chatbot's defined capabilities.
- **Escalation Mechanism:**
    - When escalation is required, the chatbot should politely inform the user that it needs to transfer them to a human agent.
    - It should ideally provide a mechanism (e.g., a mock "transfer" action, display of contact details, or a message indicating a human will follow up) to simulate this transfer.
    - The chatbot should be able to identify "frustration" or "repeated failure" patterns in user input as triggers for escalation.

Technical Requirements & Considerations

- **Natural Language Processing (NLP) / Natural Language Understanding (NLU):** Robust capabilities for intent recognition, entity extraction, and sentiment analysis (optional but a plus).
- **Dialog Management:** State management, context tracking, and turn-taking logic to maintain coherent conversations.
- **Scalability & Performance:** The solution should be designed with scalability in mind, capable of handling multiple concurrent users. Response times should be minimal.
- **Security:** Adherence to best practices for data privacy and security, especially when handling sensitive customer information.
- **Error Handling & Robustness:** The chatbot should gracefully handle unexpected inputs, ambiguities, and system errors without crashing or providing nonsensical responses.

- **User Experience (UX):** The conversational flow should be intuitive, natural, and user-friendly. Clear prompts, confirmations, and error messages are crucial.
- **Technology Stack:** Candidates are encouraged to choose a suitable technology stack (e.g., Python with frameworks like Rasa, Dialogflow, or custom NLP libraries; Node.js with similar tools). Justify your choice.
- **Deployment (Optional but a plus):** While not mandatory for this task, candidates may demonstrate how the chatbot could be deployed (e.g., a simple web interface, integration with a messaging platform).

Deliverables

The AI candidate should provide the following:

1. **Source Code:** Well-documented, clean, and runnable code for the chatbot agent.
2. **Setup & Run Instructions:** Clear, step-by-step instructions on how to set up and run the chatbot locally.
3. **Design Document (Optional but Recommended):** A brief document explaining the architecture, chosen technologies, NLP/NLU models, dialog flow design, and any key design decisions.
4. **Demo/Walkthrough:** A short video or detailed text walkthrough demonstrating the chatbot's capabilities for KB queries, action-oriented flows (especially appointment scheduling), and human agent escalation. Include examples of successful interactions and how errors/ambiguities are handled.

Evaluation Criteria

The solution will be evaluated based on the following criteria:

- **Accuracy & Relevance (40%):**
    - **Accuracy of answers from the knowledge base.**
    - **Correctness of intent classification.**
    - **Successful execution of action flows.**
- **Robustness & Error Handling (20%):**
    - **Ability to handle unexpected inputs and edge cases.**
    - **Graceful recovery from errors.**
    - **Effectiveness of escalation to human agents.**
- **User Experience & Conversational Flow (20%):**
    - **Naturalness and coherence of the dialogue.**
    - **Clarity of prompts and responses.**
    - **Overall ease of use for the customer.**
- **Code Quality & Documentation (10%):**
    - **Readability, modularity, and maintainability of the code.**
    - **Thoroughness of comments and documentation.**
- **Scalability & Performance Considerations (10%):**
    - **Evidence of design choices that support future scalability.**
    - **Reasonable response times.**