BỘ THÔNG TIN VÀ TRUYỀN THÔNG

HỌC VIỆN CÔNG NGHỆ BƯU CHÍNH VIỄN THÔNG

Fifth Report

Foundation Internship

Project Title: Smart Shop AI Assistant

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INTERNSHIP BASE REPORT - WEEK 5

1. Overview of This Week's Work

During the fifth week of my internship, I focused on enhancing the chatbot system by implementing contextual memory. The primary goal was to enable the chatbot to understand and maintain the conversation history with users, leading to more coherent and relevant responses. Additionally, I extended the backend to store chat history persistently in the database for future reference and analytics.

2. Work Completed

2.1. Implementing Contextual Memory for Chatbot

To improve the chatbot's conversational abilities and deliver context-aware responses, I made the following upgrades:

- **Conversation Tracking**:
  Developed logic to track user queries and bot responses within each session.
  The chatbot now recognizes if the user refers to previous messages (e.g., "nó", "có chứ") and responds accordingly, without requiring users to restate the full context.

- **Context-Aware Prompt Engineering**:
  Modified prompt generation to include recent chat history and current product focus.
  Ensured that prompts sent to the Gemini API include relevant background to guide accurate, natural responses.

2.2. Storing Chat History in Database

To facilitate future analysis and maintain conversation logs, I implemented a system to persist chat data:

- **Database Structure**:
  Updated the `chat_history` table to store:

    - `session_id`
    - `user_query`
    - `bot_response`
    - `related_product_id`
    - `related_category`
    - `created_at` timestamp

- **Data Insertion**:
  Integrated logic to insert each user query and corresponding bot response into the `chat_history` table in real-time.

- **History Retrieval**:
  Implemented functions to load session history efficiently during conversation flow, enabling seamless follow-up question handling.

2.3. Improving Response Accuracy

With the enhanced context memory, the chatbot can now:

- Understand references to previous products or messages.
- Maintain a coherent conversation across multiple turns.
- Provide more relevant and detailed answers based on prior user inputs.

3. Technologies Used

Backend:

- Python (FastAPI): Extended the chatbot API to handle conversation memory.
- MySQL: Updated schema to store and retrieve chat history efficiently.

Frontend:

- HTML, CSS, JavaScript: No major updates this week; primary focus remained backend.

Others:

- Gemini API: Improved prompt engineering for better conversational flow.
- Input Validation & Error Handling: Ensured database operations are secure and reliable.

4. Completed Features

- Developed a persistent chat history storage system in MySQL.
- Enabled the chatbot to understand and maintain conversational context.
- Improved the naturalness and accuracy of chatbot responses.
- Strengthened backend infrastructure for future analytics and user insights.

This week's improvements significantly enhance the user experience, allowing conversations with the chatbot to feel more natural and intelligent while providing valuable data for ongoing system refinement.