Internship Report: Sentiment-Aware Chatbot

Introduction

This project focuses on developing a Multilingual Sentiment-Aware Chatbot with natural language understanding and multilingual support. The chatbot analyzes user sentiment and dynamically adapts its tone and responses while supporting multiple languages, including English, Spanish, French, and Hindi.

Background

The Multilingual Sentiment-Aware Chatbot integrates sentiment analysis with generative AI while offering multilingual support. It utilizes CardiffNLP's Twitter-RoBERTa sentiment model for analyzing user sentiment and Groq's Mixtral-8x7b for language generation. The chatbot also incorporates language detection and dynamic prompt generation to ensure context-aware and language-specific responses.

The project uses Streamlit for building an interactive user interface and session management to maintain conversational history.

Learning Objectives

1. Develop a chatbot capable of multilingual and sentiment-aware response generation.
2. Integrate sentiment analysis, language detection, and LLM-based response generation.
3. Learn to handle multi-language prompts and dynamic context management.
4. Enhance skills in creating user-friendly interfaces using Streamlit.
5. Implement robust logging and session management to maintain chat continuity.

Activities and Tasks

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1. Streamlit Interface for Multilingual Chatbot:

Designed an interactive and multilingual chat interface using Streamlit.

2. Sentiment Analysis Integration:

Integrated CardiffNLP's Twitter-RoBERTa model to detect user sentiment (Positive, Neutral, or Negative).

3. Multilingual Support:

Implemented dynamic language detection using the LangDetect library and created language-specific system prompts for English, Spanish, French, and Hindi.

4. Dynamic Response Generation:

Used Groq's Mixtral-8x7b model to generate responses with sentiment-aware and language-specific contexts.

5. Chat History Management:

Implemented session-based chat history to ensure continuity and improve user experience.

Challenges and Solutions

Challenge 1: Handling Multilingual Inputs Dynamically

Solution: Integrated language detection and dynamic prompt generation to ensure chatbot responses adapt to the detected or user-specified language.

Challenge 2: Combining Sentiment Awareness with Multilingual Context

Solution: Designed sentiment-aware response templates and language-specific system instructions

to improve the chatbot's empathetic and coherent responses.

Challenge 3: Maintaining Session State and Logging Sentiment Analysis

Solution: Utilized Streamlit's session state to store chat history and implemented sentiment logging for performance evaluation.

Outcomes and Impact

The Multilingual Sentiment-Aware Chatbot successfully integrates sentiment analysis, language detection, and response generation into a single platform. Key achievements include:

- **Multilingual Support**: Dynamic detection of user language and tailored responses in English, Spanish, French, and Hindi.
- **Sentiment-Aware Responses**: Empathetic and contextually appropriate responses based on sentiment analysis.
- **Interactive User Experience**: A clean and robust chat interface that maintains user engagement.

Conclusion

The Multilingual Sentiment-Aware Chatbot demonstrates the power of combining sentiment analysis, multilingual support, and generative AI for interactive applications. By integrating advanced models with a dynamic user interface, the chatbot enhances user experience across multiple languages while ensuring empathetic and context-aware communication.

This work serves as a foundation for expanding language support, deploying real-time applications,

and improving response generation capabilities.