Project Proposal by Wardah Haya (2022622)

Project Title: Sentiment Analysis Integration in Conversational AI

Project Type: Natural Language Processing (NLP)

Project Summary:

The project aims to enhance conversational AI systems by integrating sentiment analysis capabilities. Sentiment analysis is a crucial aspect of understanding user input in natural language, providing valuable insights into user emotions and sentiments. The primary focus is on creating a more context-aware and emotionally intelligent AI model. The project involves utilizing pre-trained sentiment analysis models and integrating them into a conversational AI system based on the GPT-2 language model.

Background and Motivation:

Conversational AI systems have become integral in various applications, ranging from customer service chatbots to virtual assistants. However, current conversational models often lack the ability to discern user sentiments effectively. Understanding user sentiment is essential for providing appropriate and empathetic responses. This project addresses this gap by integrating sentiment analysis into the conversational flow, contributing to more meaningful interactions.

Existing research in sentiment analysis has yielded state-of-the-art models capable of accurately classifying sentiment in text. However, these models are often applied in isolation. The motivation behind this project is to seamlessly integrate sentiment analysis into conversational AI, allowing for a more holistic understanding of user input.

Methodology:

Data Collection and Pre-processing:

The project will leverage existing sentiment analysis datasets for model training and evaluation. Additionally, conversational datasets will be used to simulate real-world interactions. The collected data will undergo pre-processing to handle issues such as noise, irrelevant information, and tokenization.

Algorithms and Models:

The sentiment analysis component will utilize a pre-trained BERT-based sentiment analysis model available in the Hugging Face Transformers library. For the conversational AI aspect, the GPT-2 language model will be employed. The integration will involve adapting the two models to work seamlessly together, ensuring that sentiment information enhances the context of the generated responses.

Evaluation Metrics and Criteria for Success:

The success of the project will be measured using various metrics, including accuracy, precision, recall, and F1 score for sentiment analysis. For the overall conversational AI system, metrics such as coherence, user satisfaction, and context-awareness will be considered. The system's success will be validated through user testing and feedback, ensuring that sentiment-aware responses contribute positively to the user experience.