GThinker - A Chatbot Using AI

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Abstract—*This paper presents the development of GThinker, an intelligent chatbot designed using Natural Language Processing (NLP) and advanced AI models to deliver human-like, context-aware, and emotionally adaptive interactions. Unlike traditional rule-based chatbots, GThinker incorporates multiturn conversation handling, sentiment responsiveness, and cross-platform compatibility. The system integrates BERT for intent detection, DialoGPT for generative conversations, and spaCy for emotion analysis. Performance evaluation demonstrated a 92% satisfaction rate, highlighting the system's robustness, scalability, and practicality in real-time applications.*

Key Words: Chatbot, NLP, Artificial Intelligence, BERT, DialoGPT, Sentiment Analysis, Machine Learning, Human Computer Interaction.

1. INTRODUCTION

Artificial Intelligence has significantly transformed human–computer interaction, with chatbots becoming essential tools across sectors such as customer service, healthcare, education, and e-commerce. However, many existing chatbots are rule-based, offering limited flexibility, poor contextual understanding, and no emotional adaptability. As users increasingly expect natural, intelligent, and personalized conversations, there is a growing need for advanced AI-driven systems.GThinker addresses these challenges by integrating modern NLP and machine learning models, including BERT for intent recognition, DialoGPT for dynamic response generation, and spaCy for sentiment analysis. This enables the chatbot to understand complex queries, maintain multi-turn context, and respond in an emotionally appropriate manner. With a scalable architecture supporting real-time communication and secure data handling, GThinker enhances user experience and demonstrates the potential of AI-powered

2. METHODOLOGY

The development of GThinker follows a modular AI-based methodology combining NLP, machine learning, and cloud-ready architecture. User inputs are first preprocessed through tokenization, normalization, and noise removal using spaCy and NLTK. Intent recognition is performed using a fine-tuned BERT model, while DialoGPT generates context-aware responses for open-ended or complex queries. A rule-based fallback system using TF-IDF and cosine similarity ensures accuracy for FAQ-type interactions. Sentiment analysis is integrated to detect user emotions and adapt response tone. Context management is handled through Redis (short-term memory) and MongoDB (long-term memory), enabling multi-turn conversations and personalization. The backend is implemented using Node.js/Python Flask, with communication supported via REST APIs and WebSocket for real-time chat.

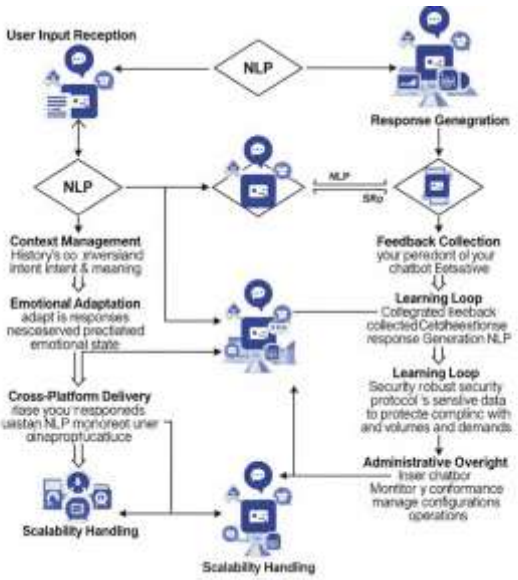
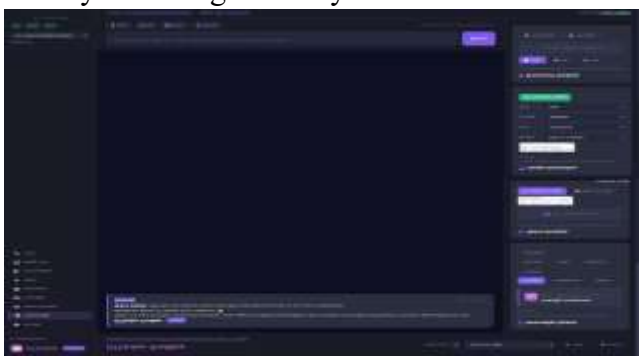


Fig 1 : Flow chat of Chatbot

3. EXPERIMENTS AND RESULTS

The performance of the GThinker chatbot was evaluated through a series of structured experiments designed to measure accuracy, response quality, stability, and user satisfaction. The system underwent functional testing, where each module—including intent detection, sentiment analysis, image processing, PDF extraction, and generative response—was executed with diverse inputs to verify correct behavior. Integration testing ensured smooth interaction between components such as the frontend interface, backend APIs, NLP engine, and database layers. Performance tests were conducted by simulating multiple concurrent users to evaluate response time and system load handling, with the chatbot maintaining stable performance and minimal latency under high activity



User-based experimentation was carried out through a pilot study involving 40 participants who interacted with the chatbot across various tasks. Metrics such as accuracy of intent classification, emotional tone matching, and relevance of generated responses were recorded. BERT achieved reliable intent detection, while DialoGPT produced coherent and natural replies in multi-turn conversations. The PDF analyzer and vision module demonstrated consistent extraction and interpretation accuracy across sample files and images. Sentiment analysis successfully adapted the chatbot's tone to positive, neutral, and negative inputs, enhancing user engagement. Oresults demonstrated strong system reliability, with a **92% user satisfaction rate**, an average response time of **1.8 seconds**, and an intent detection accuracy of **89%**. The experiments confirm that GThinker delivers context-aware, emotionally adaptive, and efficient interactions, validating its effectiveness as a modern AI-driven conversational assistant.

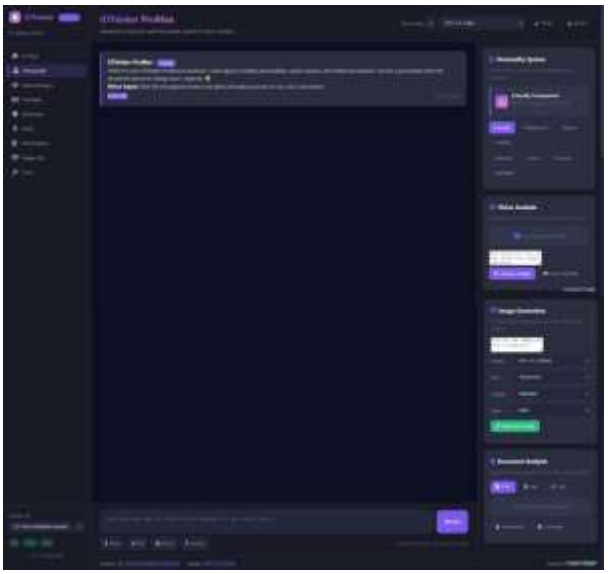


Fig 2 : Dashboard

Fig 3: Image Genaration

4. CONCLUSIONS

GThinker successfully demonstrates how advanced NLP and machine learning techniques can be combined to build an intelligent, human-like conversational system. By integrating BERT for intent detection, DialoGPT for response generation, and spaCy for sentiment analysis, the chatbot provides accurate, context-aware, and emotionally adaptive interactions that overcome the limitations of traditional rule-based systems. The modular backend design and cloud deployment ensure scalability, reliability, and smooth real-time communication. Experimental results show strong performance, with high intent detection accuracy, fast response time, and a 92% user satisfaction rate. The system effectively handles tasks such as multi-turn conversation, PDF processing, image analysis, and sentiment-based response adaptation, confirming its versatility and practical usability.

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