IJARCCE ISSN (O) 2278-1021, ISSN (P) 2319-5940



International Journal of Advanced Research in Computer and Communication Engineering

Impact Factor 8.471 ⁜ Peer-reviewed & Refereed journal ⁜ Vol. 15, Issue 11, November 2026

DOI: 10.17148/IJARCCE.2026.1511209

AI-Powered Emotional Interaction System

Kavya K[1], Keerthi H[2], Keerthi Somaraddi[3], Layashree L[4], Dr. Virupaksha Gouda R[5]

Department of Computer Science and Engineering, Ballari Institute of Technology and Management (BITM), Ballari, Karnataka – 583104, India[1,2,3,4]

Associate Professor, Department of Computer Science and Engineering,

Ballari Institute of Technology and Management (BITM), Ballari, Karnataka – 583104, India[5]

Abstract: This project is dedicated to the creation of a mental health assistant chatbot. The project utilizes Groq's new LPU-powered large language models (LLMs) and the implementation of a retrieval-augmented generation (RAG) pipeline that makes use of a vector database (Chroma) and relevant documents from Hugging Face for performing semantic searches and providing appropriate responses. It is noteworthy that the chatbot was designed using the gradio library to provide personalized assistance and raise awareness about mental health issues. Furthermore, a proactive alert system has been incorporated that proactively informs a predetermined trusted individual by email if the chatbot detects concerning trends in the user's communications, thus improving the integrity and trustworthiness of the service. The documents chosen for this project are related to mental health and illnesses as they contain a definition of key terms, prevalence of mental health problems among adolescents, consequences of stigma, and strategies to address these problems. I would like to use this chatbot to increase mental health literacy, dispel myths, and offer high-quality and easily accessible free assistance. The combination of the capabilities of large language models and the use of additional documents will provide accurate information that will be helpful in addressing the growing number of mental health concerns.

Keywords: Mental Health Chatbot, Large Language Models (LLMs), Retrieval-Augmented Generation (RAG), Generative AI, Natural Language Processing (NLP), Chroma Vector Database, Semantic Search, Groq LPU, Mental Health Literacy, Proactive Alert System.

I. INTRODUCTION

Mental health is a critical component of most people's wellbeing encompassing their emotions, psyche, behavior, and attitude towards the world. Besides the current situation in the world, more people suffer from emotional stress and do not receive the needed help because of the existence of many difficulties. These factors lead people to address professionals but rarely friends and family due to the fear of a stigma, lack of available resources, or the absence of professional guidance. However, recent achievements in the field of Artificial Intelligence (AI), Natural Language Processing (NLP), and Large Language Models (LLMs) enabled the creation of virtual assistants that can understand and recognize human emotions. However, chatbots which work on conventional algorithms are not always helpful because they cannot provide reliable and informative answers. Hence, the AI-Powered Emotional Interaction System concept is to implement Large Language Models with Retrieval-Augmented Generation (RAG) and Chroma vector database to ensure necessary information retrieval. The system will also have a distress detection module and contact support via email to guarantee the safety and privacy of users. Therefore, the creation of such AI-Powered Emotional Interaction System will respond to the growing need for emotional support by providing high-quality personalized interaction focused on providing factual information and trustworthy advice.

A. Background

Mental health challenges and emotional stress are increasing, while many people lack accessible and reliable emotional support. Recent advancements in AI, NLP, and LLMs provide opportunities to develop intelligent systems that can understand emotions and offer personalized support.

B. Problem Statement

Many people face emotional stress but lack instant and accessible mental health support. Existing systems fail to understand human emotions effectively. Hence, an Ai powered system is needed to provide real-time, empathetic interaction and support.

 This work is licensed under a Creative Commons Attribution 4.0 International License

IJARCCE ISSN (O) 2278-1021, ISSN (P) 2319-5940



International Journal of Advanced Research in Computer and Communication Engineering

Impact Factor 8.471 ⁜ Peer-reviewed & Refereed journal ⁜ Vol. 15, Issue 11, November 2026

DOI: 10.17148/IJARCCE.2026.1511209

C. Need for the System

There is a need for an AI-based system that can provide accessible, personalized, and reliable emotional support to individuals experiencing emotional stress. The system can use LLMs, RAG, and distress detection to provide meaningful responses, evidence-based information, and safety alerts when required.

D. Role of OCR

OCR (Optical Character Recognition) converts text present in images or scanned documents into machine-readable text. It enables the system to extract, process, and analyze textual information from images, making the data available for further AI-based processing.

E. Proposed Solution

The proposed AI-Powered Emotional Interaction System uses LLMs with RAG and a Chroma vector database to retrieve relevant information and generate empathetic, personalized responses. It also includes distress detection and trusted-contact email alerts to improve user safety while providing reliable, evidence-based emotional support.

F. Main Objectives

To design a chatbot using LLMs powered by Groq LPU.
To implement a RAG (Retrieval-Augmented Generation) pipeline for accurate responses.
To integrate semantic search using Chroma vector database.
To provide empathetic and personalized responses.
To detect distress patterns and send alert notifications via email.
To improve mental health literacy and reduce misinformation.

II. LITERATURE REVIEW

Several studies have investigated the use of Artificial Intelligence, Natural Language Processing, and emotional computing for mental health support. Rawat, Sangeetha, and Khan (2025) proposed an Emotional Chatbot for AI-based Mental Health Support, which utilizes LSTM for emotion classification and GPT for chatbot replies. Sa'dulloyeva et al. (2024) introduced a human-centered AI chatbot for mental health support, emphasizing the recognition of mental health conditions. Banjar et al. (2024) introduced Motus Up, a mobile user interface, which utilizes a chatbot based on a rule system with an EEG-based emotion recognition component for users to cope with negative emotions. Antony et al. (2020) presented a survey of emotion-recognition-based mental healthcare chatbots, investigating the various techniques for emotion recognition and their applicability within a mental healthcare context, especially in low-resource settings. Devaram (2020) discussed the design space of an empathetic chatbot, focusing on the concept of empathy and its applicability within a mental health context. Research conducted prior to the proposed solution also investigated critical elements required for empathetic and supportive dialogues. Rashkin et al. (2019) introduced research on empathetic open-domain conversation models, focusing on generating empathetic responses. Zhou et al. (2018) introduced the Emotional Chatting Machine, which utilized additional memory for emotional information, including internal and external memory. The EmotionLines corpus was introduced by Hsu et al. (2018), providing a valuable resource for multi-party conversation analysis. Ghosh et al. (2017) introduced Affect LM, a neural language model capable of generating customizable affective text. The reviewed research provides valuable insights into the utilization of emotion recognition and empathetic dialogue systems for mental health support. However, the solutions explored in the reviewed articles apply a variety of methods, ranging from rule-based emotion recognition and classification to complex neural networks and large language models. The proposed AI-Powered Emotional Interaction System is built upon the foundation of existing research in the field. The solution implements an LLM combined with Retrieval-Augmented Generation and a Chroma vector base to provide relevant information retrieved from relevant sources and personalized recommendations based on the user's input. To ensure well-being, the chatbot includes distress detection and trusted-contact email notification features.

III. PROPOSED SYSTEM

The proposed system presents an AI-Powered Emotional Interaction Platform that aims to offer accessible, reliable, and personalized emotional assistance to the users. Advanced technologies such as Artificial Intelligence (AI), Natural Language Processing (NLP), and Large Language Models (LLMs) are utilized to ensure the ability of the system to comprehend and address the users' requests effectively. The focus of the current design is on creating a conversational agent, based on the principles of the LLM paradigm, that would differ from the traditional chatbot models by providing a higher degree of personalization and contextuality in communication. The proposed solution employs Groq LPU-based LLMs, which are integrated with the Retrieval-Augmented Generation (RAG) pipeline to ensure that responses generated by the chatbot are grounded in the information retrieved from the specified mental health-related database. Within the

 This work is licensed under a Creative Commons Attribution 4.0 International License



International Journal of Advanced Research in Computer and Communication Engineering
Impact Factor 8.471 ⁜ Peer-reviewed & Refereed journal ⁜ Vol. 15, Issue 11, November 2026
DOI: 10.17148/IJARCCE.2026.1511209

RAG pipeline, the Chroma vector database is leveraged to perform semantic similarity-based searches and find relevant mental health information associated with the users' queries. The Hugging Face model is used to provide the chatbot with semantic processing and retrieval capabilities. The proposed system aims to offer empathic and effective support to the users by prioritizing the mental health-related information pulled from the database during the response generation. The information includes recommendations on mental health and illnesses, teenage mental health issues, de-stigmatization strategies, and treatments. As a result, the chatbot is expected to provide accurate and reliable advice and reduce the risks of providing harmful or incorrect information. In addition, the system features an innovative distress detection mechanism that scans the conversations with the users for critical signs that may suggest the possibility of a person being distressed. If critical patterns are detected, an email notification will be sent to the pre-specified contact to ensure additional safety measures. Overall, the Gradio-based interface will be used to offer a convenient way for users to communicate with the chatbot. The proposed AI-powered emotional interaction platform will be built using the LLMs paradigm, which will be empowered by the RAG pipeline, semantic similarity search, and the use of the specialized database. The system will be able to offer personalized responses, provide accurate information on mental health issues, and feature a distress detection mechanism to ensure the safety of the users. Additionally, the chatbot will be able to notify the trusted person if the user begins exhibiting distress symptoms, which may indicate that additional help is needed.

A. Key Features

1. AI emotional chatbot: utilizing large language models for understanding and interaction.
2. AI-Powered Emotional Interaction: Using LLMs to understand and respond to user needs in a natural, empathetic way.
3. Retrieval-Augmented Generation: Extracting relevant information from relevant mental health resources before responding.
4. Semantic Search: The app uses Chroma vector database to find relevant information in the knowledge base.
5. Personalized Responses: Generating responses based on the information the user has provided.
6. Distress Detection: Detecting patterns of emotional distress in the user's conversation.
7. Trusted-Contact Alerts: Sending an email to a trusted contact if concerning patterns of distress are detected.
8. Evidence-Based Guidance: Providing guidance based on trustworthy information from the knowledge base to reduce the risk of spreading misinformation.
9. User-Friendly Interface: The app is built with Gradio to provide a simple and accessible interface for users .
10. Privacy and Security: The app is designed to keep the user's information private and secure during the emotional support conversation.

IV. METHODOLOGY

The proposed AI-Powered Emotional Interaction System employs an AI-based methodology to provide personalized and reliable emotional interaction. The system leverages Large Language Models (LLMs), Retrieval-Augmented Generation (RAG), semantic search, Chroma vector database, Hugging Face models, and distress detection to process and generate a meaningful response.

1. User Input and Interaction The system initiates with the user interacting via a Gradio-based web interface. The user is permitted to convey their thoughts, concerns, or inquiries via the available input mechanism. The input is further passed onto the processing pipeline for further analysis and processing.

2. Data and Input Processing The collected input is further processed to comprehend its textual meaning and conversational context. NLP-based processing helps prepare the input for further semantic analysis. The system detects the relevant information from the user's query that will enable the system to provide an appropriate response.

3. Knowledge Base Preparation Curated knowledge base, containing relevant mental-health information, is prepared for the system. The knowledge base focuses on topics such as mental health and illness, adolescent mental health problems, the impact of stigma, and evidence-based interventions. These sources provide supporting information for the chatbot's responses.

4. Document Processing and Embedding The information collected from the knowledge sources is further processed and converted into vector representations with the assistance of Hugging Face embedding models. The embeddings represent the semantic meaning of the stored information. This enables the system to compare a user's query with the knowledge base based on contextual similarity.

 This work is licensed under a Creative Commons Attribution 4.0 International License



International Journal of Advanced Research in Computer and Communication Engineering
Impact Factor 8.471 ⁜ Peer-reviewed & Refereed journal ⁜ Vol. 15, Issue 11, November 2026
DOI: 10.17148/IJARCCE.2026.1511209

5. Chroma Vector Database The generated embeddings are further stored within the Chroma vector database. Chroma acts as the semantic-search layer of the system. Whenever a user submits a query, the system is able to search the vector database and retrieve information that is semantically relevant to the user's input. The use of semantic search enables the system to identify relevant information even if the user's wording does not match the wording present in the stored documents.

6. Retrieval-Augmented Generation The retrieved information is further passed onto the Retrieval-Augmented Generation (RAG) pipeline alongside the user's query. Rather than generating a response only from the LLM's internal knowledge, RAG provides additional context retrieved from the curated knowledge base. This approach is intended to support more relevant and evidence-based responses. RAG is one of the main objectives of the proposed system.

7. LLM-Based Conversational Processing The processed query is further passed onto an LLM powered by Groq LPU. The LLM interprets the information and generates a natural-language response. The system is designed to be able to provide empathetic, personalized, and contextually relevant responses according to the user's interaction.

8. Emotional and Distress Detection The system also possesses a distress detection module that analyzes the user's interactions for patterns that could suggest distress. This module acts as an additional safety measure for the system. The identified distress information is further considered alongside the conversational context while processing the user's interaction.

9. Trusted-Contact Alert Mechanism Whenever concerning distress patterns are identified, the system incorporates an email-based alert mechanism to notify a trusted contact. This feature is intended to provide proactive support and enhance the safety aspect of the system.

10. Personalized Response Generation Following the consideration of the retrieved information and the user's conversational context, the system further generates a personalized response. The response is intended to provide relevant mental-health information and meaningful emotional interaction rather than relying only on the chatbot responses.

11. Response Delivery The final response is further presented to the user via the Gradio interface. The interface provides an accessible mechanism for the users to interact with the system and receive the generated response.

12. Privacy and Security Considering that the system involves processing sensitive emotional and mental-health-related information, user privacy and data security are deemed as important aspects of the proposed system. The project specifically highlights privacy and security while handling sensitive mental-health information as part of its mission.

Overall Methodology Flow User Input → Gradio Interface → Input/NLP Processing → Knowledge Base → Hugging Face Embeddings → Chroma Vector Database → Semantic Search → RAG Pipeline → Groq LLM → Personalized Response → Distress Detection → Trusted-Contact Email Alert (if required) → Response to User The overall methodology incorporates AI-based conversational processing along with knowledge retrieval and safety mechanisms. By leveraging LLMs, RAG, semantic search, curated mental-health information, personalized responses, and distress detection, the proposed system aims to provide accessible emotional interaction and reliable mental-health guidance.

 This work is licensed under a Creative Commons Attribution 4.0 International License

IJARCCE ISSN (O) 2278-1021, ISSN (P) 2319-5940

International Journal of Advanced Research in Computer and Communication Engineering

Impact Factor 8.471 ⁜ Peer-reviewed & Refereed journal ⁜ Vol. 15, Issue 11, November 2026

DOI: 10.17148/IJARCCE.2026.1511209

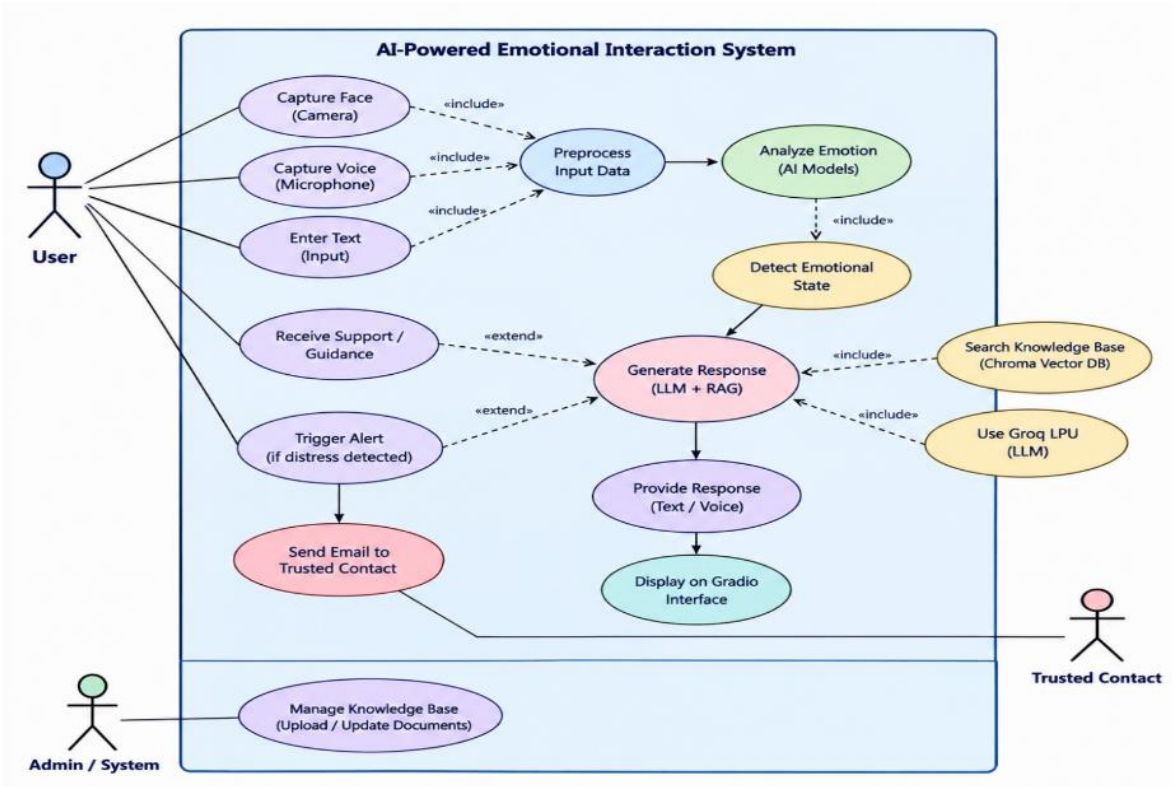

Fig. 1 Use case diagram-The diagram shows how the system captures user input, detects emotions using AI, generates personalized responses using LLM and RAG, and provides support or alerts when distress is detected.

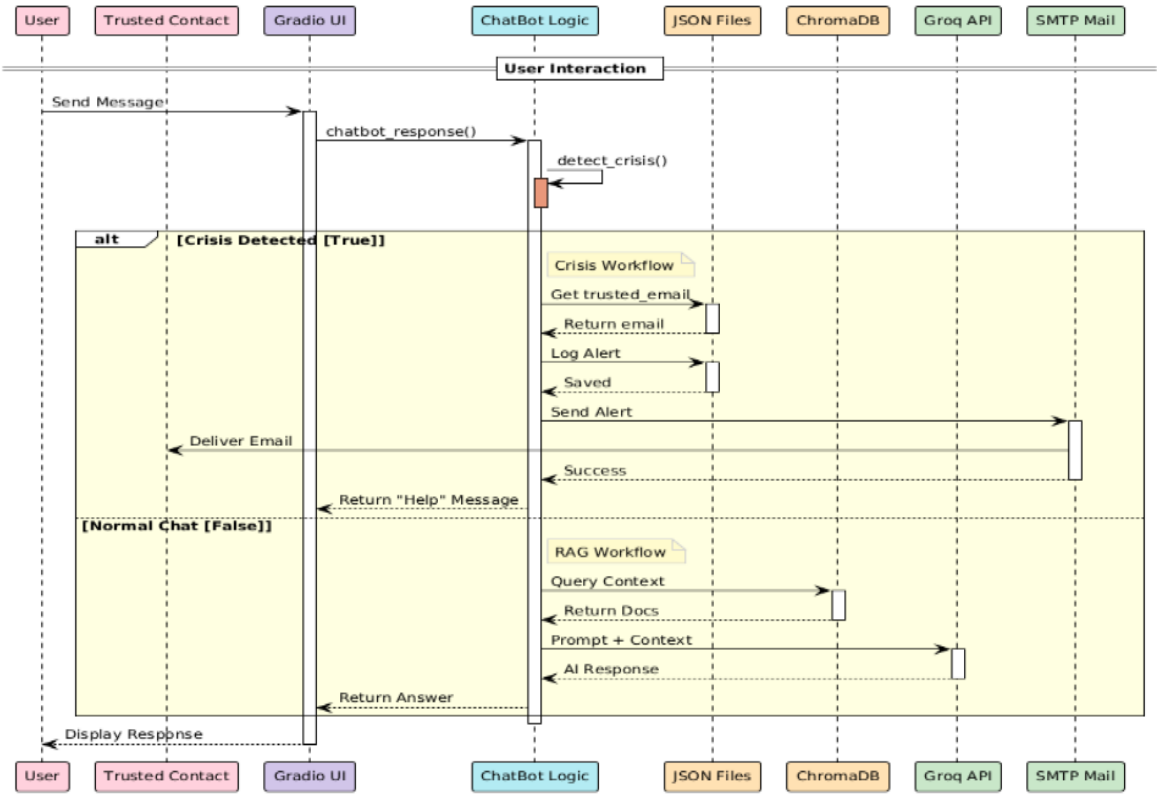

Fig. 2 Sequence diagram-The diagram shows the chatbot workflow, where user messages are checked for crisis situations and either trigger an alert or generate a RAG-based AI response.

 This work is licensed under a Creative Commons Attribution 4.0 International License

IJARCCE ISSN (O) 2278-1021, ISSN (P) 2319-5940

International Journal of Advanced Research in Computer and Communication Engineering

Impact Factor 8.471 ⁜ Peer-reviewed & Refereed journal ⁜ Vol. 15, Issue 11, November 2026

DOI: 10.17148/IJARCCE.2026.1511209

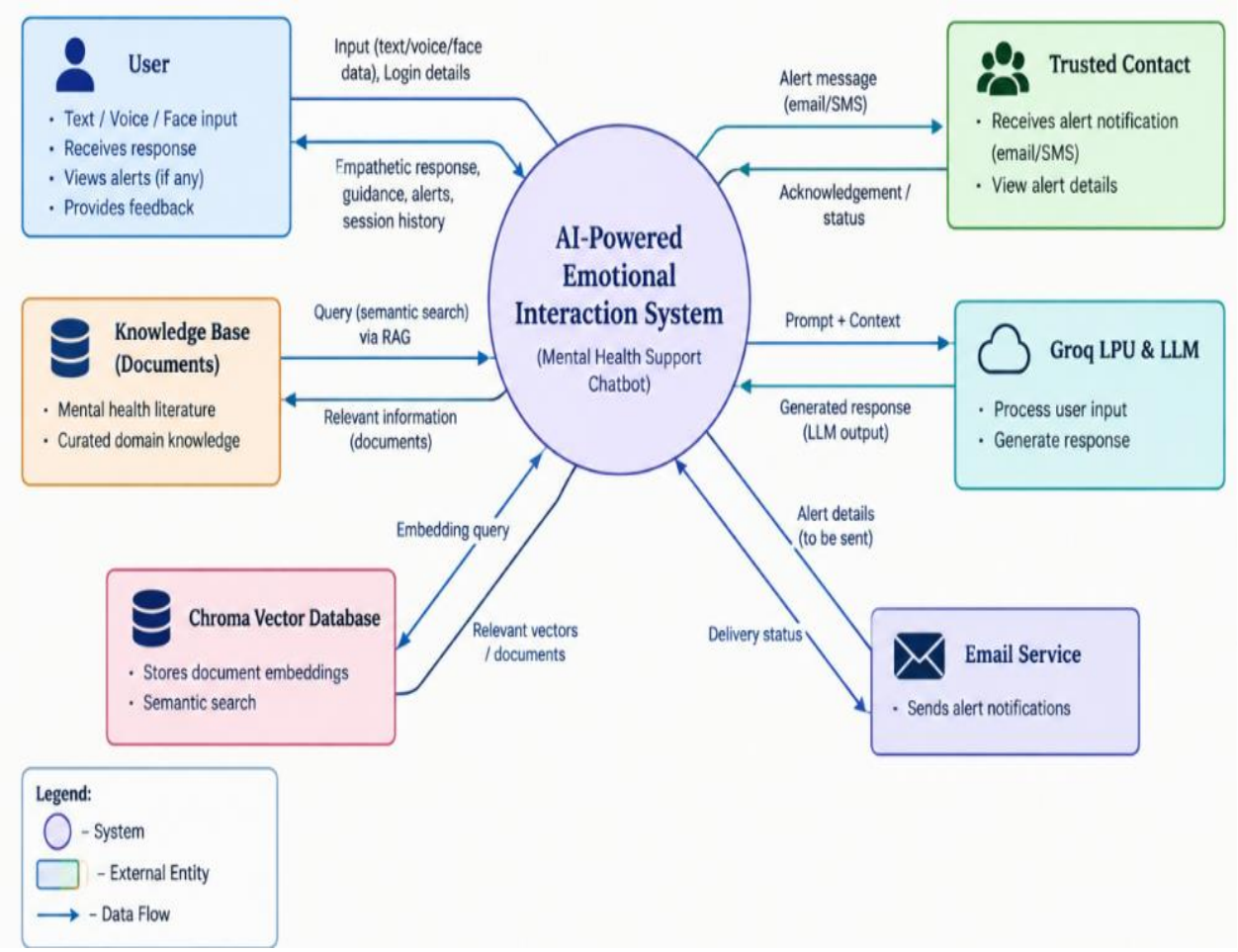

Fig. 3 Context diagram-The diagram shows how the AI-powered system connects the user, knowledge base, LLM, vector database, and email service to provide personalized support and alerts.

V. RESULT

The proposed solution, the AI-Powered Emotional Interaction System, is an innovative concept that uses the power of LLM-based conversation and information retrieval to create a personalized emotional interaction experience for the user. The project uses a Groq-powered LLM to understand and respond to the user's messages with empathy and support. The system employs RAG and the Chroma vector database to retrieve relevant information from the mental-health resources, thus providing more accurate and informative responses while reducing the reliance on generic chatbot answers. The system is also capable of providing personalized emotional responses to the user's conversations, which is achieved through the implementation of a distress detection component and a trusted-contact email alert mechanism. Finally, a Gradio interface has been created for the chatbot to provide an easy-to-use platform for the users to access the service. In summary, the project presents a comprehensive solution that integrates the LLM, RAG, semantic search, personalized response, distress detection, and alert notification capabilities into an emotionally aware chatbot that aims to improve the accessibility of mental-health resources and support.

 This work is licensed under a Creative Commons Attribution 4.0 International License

IJARCCE ISSN (O) 2278-1021, ISSN (P) 2319-5940

International Journal of Advanced Research in Computer and Communication Engineering

Impact Factor 8.471 ⁜ Peer-reviewed & Refereed journal ⁜ Vol. 15, Issue 11, November 2026

DOI: 10.17148/IJARCCE.2026.1511209

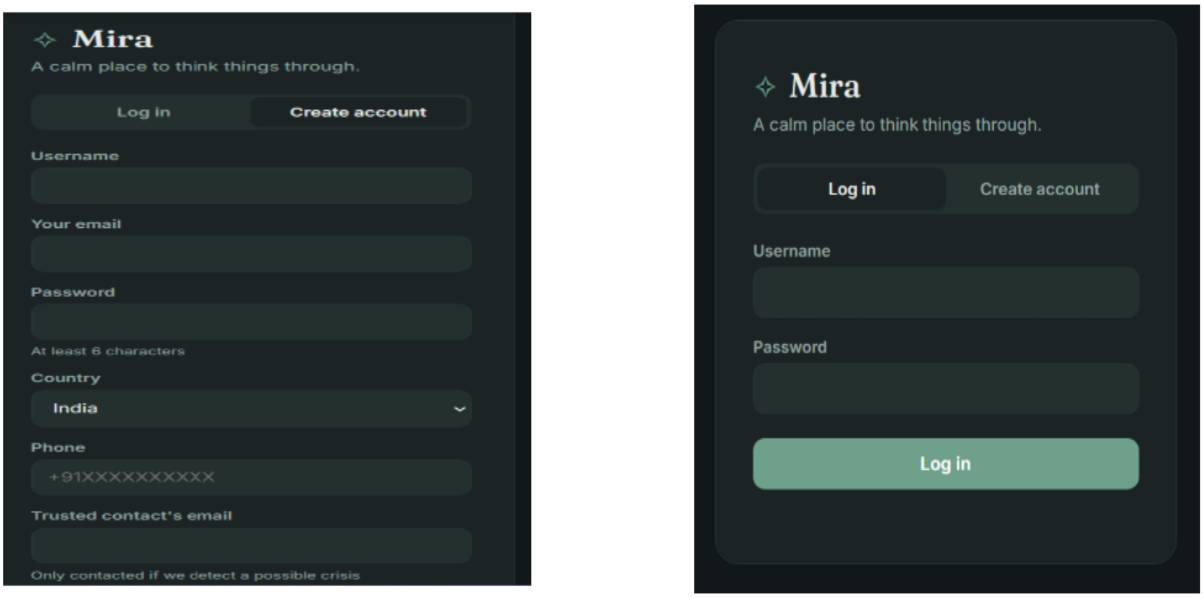

Fig. 4 The diagram shows Mira's user authentication interface, providing account creation and secure login with user and trusted-contact details.

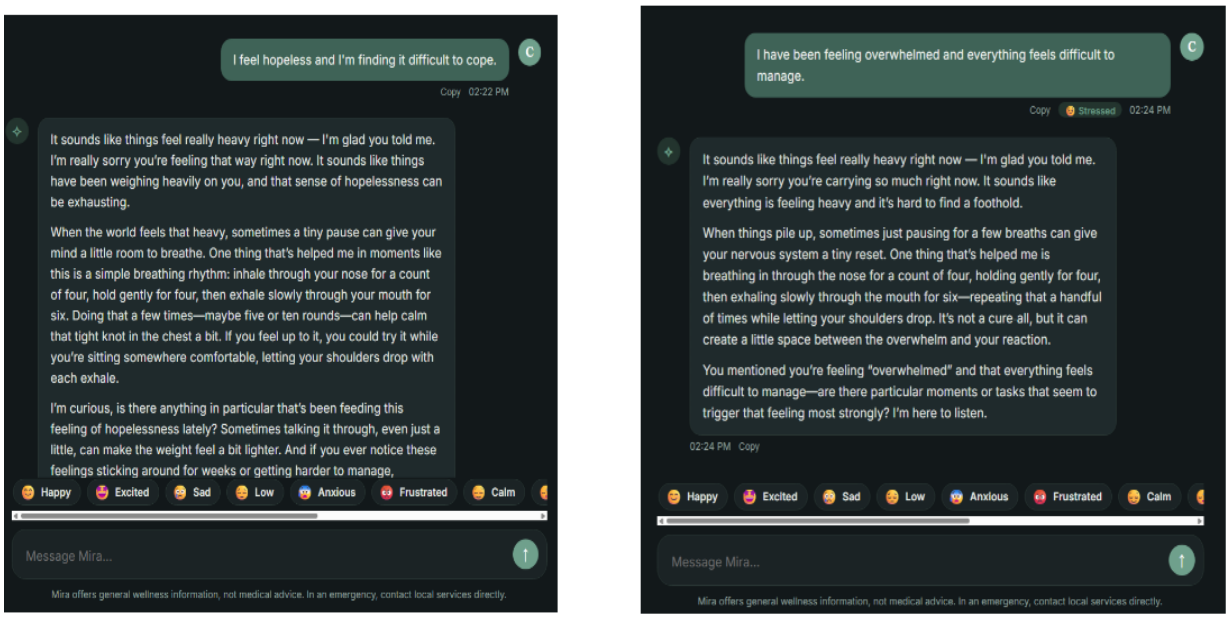

Fig. 5 The diagram shows Mira's empathetic chat interface, where the AI identifies emotions and provides supportive, personalized responses.

IJARCCE ISSN (O) 2278-1021, ISSN (P) 2319-5940

International Journal of Advanced Research in Computer and Communication Engineering

Impact Factor 8.471 ⁜ Peer-reviewed & Refereed journal ⁜ Vol. 15, Issue 11, November 2026

DOI: 10.17148/IJARCCE.2026.1511209

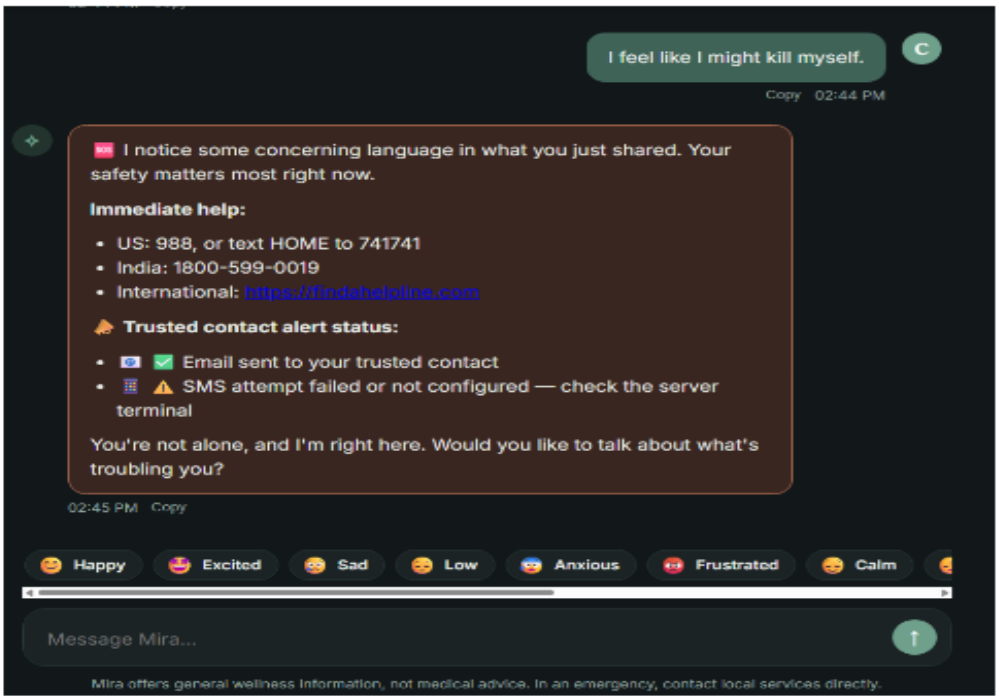

Fig. 6 The diagram shows the crisis-detection feature, where Mira identifies concerning messages and provides immediate help information while alerting the trusted contact.

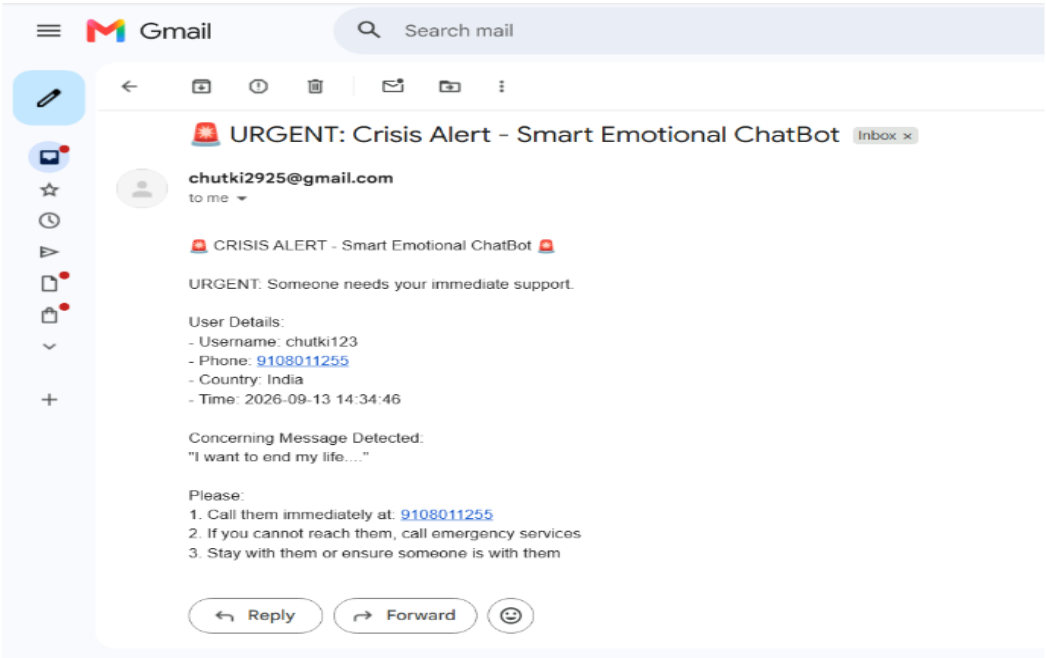

Fig. 7 The diagram shows the email alert system notifying a trusted contact with crisis details and instructions to provide immediate support.

VI. CONCLUSION

The AI-Powered Emotional Interaction System is an intriguing idea involving the use of artificial intelligence to provide cheap and personalized emotional support. The system makes use of Large Language Models (LLMs), Retrieval-



International Journal of Advanced Research in Computer and Communication Engineering
Impact Factor 8.471 ⁜ Peer-reviewed & Refereed journal ⁜ Vol. 15, Issue 11, November 2026
DOI: 10.17148/IJARCCE.2026.1511209

Augmented Generation (RAG), Chroma vector database, and semantic search to address the request and extract relevant information from the provided mental-health resources. It is possible to efficiently provide relevant information and personalized advice on the user's issue rather than general chatbot responses. Moreover, the system includes a distress detection system that recognizes alarming patterns in the conversation, and a contact-trust email alert system that provides an additional safety level for vulnerable users.

With the Gradio interface, the system is able to provide engaging and accessible conversations while providing the user with AI-powered emotional support and valuable information. As a whole, the proposed system excellently combines various approaches and techniques to address the issue of the growing need for accessible mental-health resources.

It provides a reliable source of information, personalized emotional support and an additional safety feature for those who may require assistance in distress. The system excellently addresses the problem of inadequate mental health understanding and dangerous misinformation by implementing an easily accessible solution that considers the sensitivity of the topic as well as the personal nature of the information required. The proposed approach offers excellent future development opportunities, including advanced emotion recognition features, additional input methods, and the inclusion of more comprehensive databases.

ACKNOWLEDGMENT

We would like to express our gratitude to our institution for providing us with necessary facilities, resources, and academic environment, which enabled us to perform this project successfully. We are extremely grateful to our project guide for their valuable guidance, constant support, and helpful suggestions for implementing the AI-Powered Emotional Interaction System.

Moreover, we would like to thank the faculty members of the Department of Computer Science and Engineering for their support and encouragement. Finally, we extend our thanks to our parents, friends, and everyone who supported and encouraged us while preparing this project.

REFERENCES

[1]. Rawat, D., Sangeetha, K., & Khan, S. (2025). Emotional Chatbot: AI for Mental Health Support. This study presents a hybrid chatbot using LSTM and GPT for emotion classification and response generation, achieving 90.27% accuracy.

[2]. Sa'dulloyeva, I., Raufov, F., Bakhadirova, M., Nasirova, N., Pekhanova, Y., Mamarasulova, I., Pulatova, B., & Khakimova, M. (2024). Development of a Chatbot for Mental Health Support Using AI-Intelligent. Focuses on a human centered chatbot for pandemic-related distress, achieving 98.75% accuracy in mental disorder classification.

[3]. Banjar, H. R., Alsefri, L., Alshomrani, A., Hamdhy, M., Alahmari, S., & Sharaf, S. (2024). Activating the Mobile User Interface With a Rule-Based Chatbot and EEG Based Emotion Recognition to Aid in Coping With Negative Emotions. Describes "Motus Up," a mobile app integrating EEG-based emotion recognition to aid emotional coping.

[4]. OpenAI. (2022). ChatGPT: Optimizing Language Models for Dialogue. OpenAI Blog. https://openai.com/research/chatgpt

[5]. Antony, C., Pariyath, B., Safar, S., Sahil, A., & Nair, A. R. (2020). Emotion Recognition-Based Mental Healthcare Chatbots: A Survey. Surveys methods in emotion recognition chatbots, proposing a four-phase framework and discussing applications in low-resource settings.

[6]. Devaram, S. (2020). Empathic Chatbot: Emotional Intelligence for Mental Health Well-being. The paper discusses emotion recognition in chatbots and their application in mental health support, noting both benefits and limitations.

[7]. Rashkin, H., Smith, E. M., Li, M., & Boureau, Y. L. (2019). Towards Empathetic Open-domain Conversation Models: A New Benchmark and Dataset. Proceedings of the 57th Annual Meeting of the Association for Computational Linguistics (ACL 2019). https://doi.org/10.18653/v1/P19-1359

[8]. Zhou, H., Huang, M., Zhang, T., Zhu, X., & Liu, B. (2018). Emotional Chatting Machine: Emotional Conversation Generation with Internal and External Memory. AAAI Conference on Artificial https://doi.org/10.1609/aaai.v32i1.11247

[9]. Hsu, W.-N., Lin, C.-K., Xu, P., Glass, J., & Lee, H.-Y. (2018). Emotion Lines: An Emotion Corpus of Multi-Party Conversations. Proceedings of the Eleventh International Conference on Language Resources and Evaluation (LREC 2018). https://aclanthology.org/L18-1181

[10]. Ghosh, S., Chollet, M., Laksana, E., Morency, L.-P., & Scherer, S. (2017). Affect LM: A Neural Language Model for Customizable Affective Text Generation. Proceedings of the 55th Annual Meeting of the Association for Computational Linguistics (ACL 2017). https://doi.org/10.18653/v1/P17-1175