Pertanika Proceedings 1 (5): 71 - 75 (2025)

PERTANIKA JOURNALS

PERTANIKA PROCEEDINGS

Journal homepage: http://www.pertanika.upm.edu.my/

Conversational AI-SKY companion for Emotional Support

Karnam Akhil, Vadlana Baby* and Tamma Bhuwan Vamsi

Department of Computer Science and Engineering, VNR Vignana Jyothi Institute of Engineering and Technology, Telangana 500118, India

ABSTRACT

In recent times, mental illness has increased exponentially which is a threat to individual's mental well-being. Major problems such as anxiety, depression, and loneliness affect millions of people worldwide, preventing them to seek help or express their feelings. This paper proposes a conversational artificial intelligence (AI) chatbot named SKY which human-like conversations with users, that provide emotional support to people who suffering from emotional illness. The chatbot develops a safe and non-judgmental environment for users to convey their emotions openly. The chatbot can identify signs of distress, such as sadness and hopelessness, and respond with empathy and sensitivity. By using natural language processing (NLP) and machine learning (ML), SKY generates messages based on the user's current emotional state, offering assistance when necessary. A reinforcement learning approach was deployed to state the rewards for the Bot when it receives feedback from users or engages in conversations based on the prompts.

Keywords: Conversational AI, emotional well-being, NLP, reinforcement learning, sky chatbot

INTRODUCTION

Chatbots are computer programs developed to simulate human conversations via text or speech. They include procedural, rule-based models with predetermined responses to advanced AI-driven modules which use NLP and ML functionalities to deliver context-specific responses (Bendig et al., 2022). In the field of mental health, chatbots have become exponentially dominant in helping individuals with depression (Parmar et al., 2022). Moreover, chatbots are an inexpensive alternative to therapy (Calvo et al., 2017; Fadhil & AbuRa'ed, 2019). They also offer anonymity and a judgement-free zone, which helps reduce the stigma about seeking mental health care (Parmar et al. 2022). Chatbots can identify early stages

ARTICLE INFO

Article history:
Received: 29 August 2025
Published: 31 October 2025

DOI: https://doi.org/10.47836/pp.1.5.014

E-mail addresses:
akhilresearch18@gmail.com (Karnam Akhil)
baby_v@vnrvjiet.in (Vadlana Baby)
bhuwanvamsi@gmail.com (Tamma Bhuwan Vamsi)
* Corresponding author

e-ISSN: 3083-9475

© Universiti Putra Malaysia Press

of depression using NLP, guide users down a relevant path and assist therapists by automating menial tasks (Fadhil & AbuRa'ed, 2019).

Chatbots were originally designed to provide basic repeated tasks such as answering frequently asked questions. However, they have evolved into sophisticated systems that can interpret and recognize human emotions, intent, and circumstances (Rapp et al., 2021). With the evolution of NLP, chatbots can now comprehend and produce text that intelligible to humans and make the exchanges between humans and chatbots feel more natural and personalized (Bendig et al., 2022; Calvo et al., 2017).

The capability of recognizing early indications of symptoms makes chatbots an important resource in preventing mental health from deteriorating. (Fadhil & AbuRa'ed, 2019; Dingler et al., 2021). With the power of NLP, conversational chatbots stand out among all tools in acknowledging and responding to human needs, particularly in mental health (Calvo et al., 2017). The main objective of developing SKY CHAT-BOT is to ensure that individuals can complete the task and successfully navigate their career pathways.

RELATED WORKS

The existing chatbots in healthcare and emotional support towards depression have used AI and NLP technologies to provide personalized support. However, challenges such as privacy, accuracy, and real-world applicability are the common concerns. Wang et al. (2020) developed a chatbot aimed at access the mental health of pregnant women using the EPDS and WEMWBS examinations. The system achieved high accuracy, with 86% in detecting anxiety, 89% in identifying depression, and 91% overall within three weeks. The chatbot employed a Support Vector Machine (SVM) trained on NHS Mental Health Data to provide real-time evaluations. However, it lacks the ability to intervene directly, did not adequately address mother-child bonding and offers static recommendations without awareness of context.

Kanodia et al. (2021) developed a chatbot for freshmen at Victoria University using the BERT model, enabling relevant answers in a conversational manner by training it on an Informal Question Answering dataset. It aimed to enhance the onboarding experience for new students but requires a strategy to maintain user engagement throughout the conversation. Xu et al. (2019) conducted a study using a multimodal approach to classify emotional weakness in participants by analysing ECG data and WeChat communications over ten days. The system achieved 85% accuracy using a combination of a multi-channel convolutional autoencoder and a Text-CAE model. Anastasiia and Korotyeva (2022) developed an emotional tracking system based on an LSTM RNN model, which helped users regulated their emotions by providing inputs to the chatbot. The system joined phrase and mood vectors to identify directions regarding the past patterns of emotions.

METHODOLOGY

This section discussed the development of a conversational AI chatbot designed to assist users dealing with depression, wherein users were engaged in conversation with the chatbot through prompts. Furthermore, reinforcement learning techniques wereutilized to understand the user experience through feedback loop, which helped the chatbot adapt its responses for a more empathetic interaction.

Chatbot Development Process

To develop a chatbot which provided emotional support to people suffering from depression, the chatbot must be able to understand and respond effectively to users' prompts. A key component of this ability or power was accurately identifying emotions within the prompt. Emotion classification therefore served as a key component for this functionality, as it allows the chatbot to detect multiple emotions, including depression.

Proposed Architecture

The proposed architecture illustrated in Figure 1 is a conversational AI system designed to engage with users through a graphical user interface (GUI). The system integrated a database to store user credentials, session tokens, interests, and emotional states, enabling personalized interactions. A trained model incorporated components such as NLP, intent-entity classification, generative response generation, and an interests-fetching API to

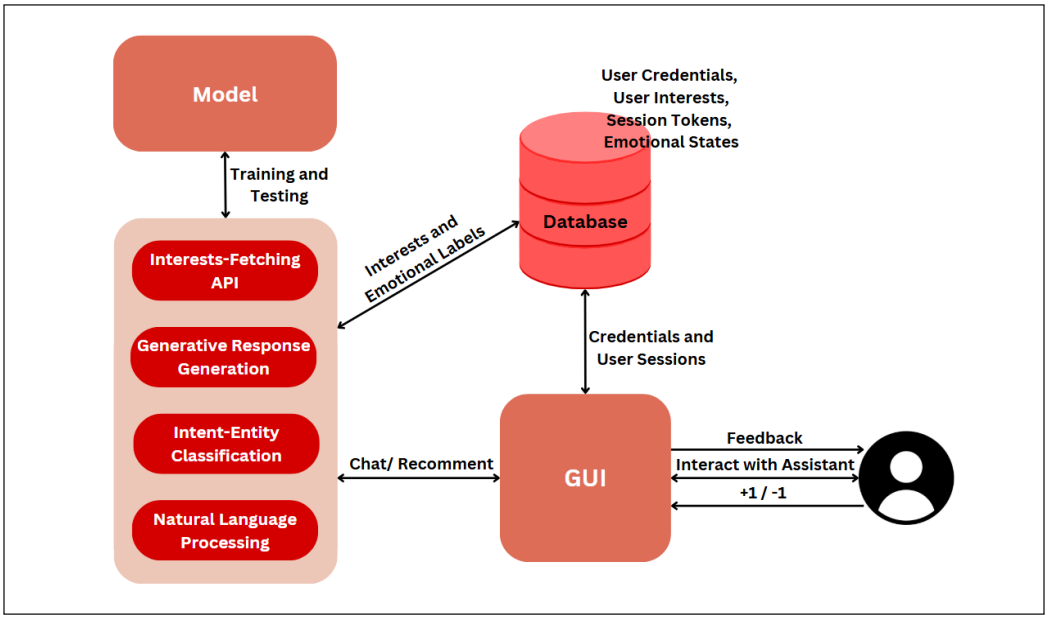


Figure 1. Sky AI based CHAT-BOT architectural framework

provide meaningful responses. User inputs, processed through the GUI, were transmitted to the model for analysis, where responses were generated based on user data retrieved from the database. Feedback from users, in the form of positive (+1) or negative (-1) scores, helped improve the model's effectiveness through reinforcement learning.

In relation to depression support and chatbot engagement with its users, models BERT, DistilBERT, RoBERTa, ALBERT, XLNet, DeBERTa, DistilRoBERTa, and Electra were employed to identify emotions from text which ultimately assisting to identify whether the user might be experiencing emotional distress.

RESULTS AND DISCUSSION

All the models tested for classification suffered from below-average accurate performance, and they struggled especially to identify emotions like depression. DeBERTa and ALBERT were the optimal performers, achieving an accuracy of around 29%. Although below the desired threshold, this indicated the positive element that the models were still identifying depression-related emotions better than the others. Despite these perceived accuracies, the models displayed low precision and recall scores, revealing they continued to misclassify depression-related emotions in many instances. This suggested that these models especially DeBERTa and ALBERTshowed improvement in depression classification, showed improvementbut require additional tuning and adjustments, especially in terms of the class imbalance. Although the results were no optimal, but provide a foundation for understanding the challenges of emotion classification in sensitive topics and underscore the importance of improving both the datasets and the models to better serve individuals dealing with mental health challenges.

CONCLUSION AND FUTURE WORK

In the proposed work, models were evaluated to detect depression or emotionally low-related emotions for a chatbot to understand the cause emotion of a user's prompt. The evaluation was conducted using a dataset of text samples and emotion labels. Although there were no models to achieve accuracy above 30%, the results were informative about the difficult problems associated with emotion classification. Some models such as DeBERTa and ALBERT showed some potential, although degradation issues like fine tuning were apparent. These findings contributed to understanding the complexities of emotion detection and highlight areas for improvement in future work. The performance of the models significantly improved by addressing issues such as class imbalance for specific tasks like emotion detection. In the future, we aim to perform the task of emotional illness on different datasets (through survey based-real time and publicly available datasets) applying various algorithms. The goal is to provide a Cognitive based Context Recommender System based on individuals' responses for emotional stability.

ACKNOWLEDGEMENT

Authors would like to express their gratitude for VNR Vignana Jyothi Institute of Engineering and Technology, India for providing the resources for achieving the results.

REFERENCES

Anastasiia, M., & Korotyeva, T. (2022). A chatbot of a person's emotional state using a neural network. In *IEEE 17th International Conference on Computer Sciences and Information Technologies (CSIT)* (pp. 13-16). IEEE. https://doi.org/10.1109/CSIT56902.2022.10000558

Bendig, E., Erb, B., Schulze-Thuesing, L., & Baumeister, H. (2022). The next generation: Chatbots in clinical psychology and psychotherapy to foster mental health–a scoping review. *Verhaltenstherapie*, *32*(Suppl. 1), 64-76. https://doi.org/10.1159/000501812

Calvo, R. A., Milne, D. N., Hussain, M. S., & Christensen, H. (2017). Natural language processing in mental health applications using non-clinical texts. *Natural Language Engineering*, *23*(5), 649-685. https://doi.org/10.1017/s1351324916000383

Dingler, T., Kwasnicka, D., Wei, J., Gong, E., & Oldenburg, B. (2021). The use and promise of conversational agents in digital health. *Yearbook of Medical Informatics*, *30*(1), 191-199. https://doi.org/10.1055/s-0041-1726510

Fadhil, A, & AbuRa'ed, A. (2019). OlloBot-towards a text-based arabic health conversational agent: Evaluation and results. In R. Mitkov & G. Angelova (Eds.) *Proceedings of the International Conference on Recent Advances in Natural Language Processing* (pp. 295-303). INCOMA Ltd. https://doi.org/10.26615/978-954-452-056-4_034.

Kanodia, N., Ahmed, K., & Miao, Y. (2021). Question answering model based conversational chatbot using bert model and google dialogflow. In *31st International Telecommunication Networks and Applications Conference (ITNAC)* (pp. 19-22). IEEE. https://doi.org/10.1109/ITNAC53136.2021.9652153

Parmar, P., Ryu, J., Pandya, S., Sedoc, J., & Agarwal, S. (2022). Health-focused conversational agents in person-centered care: A review of apps. *NPJ Digital Medicine*, *5*(1), Article 21. https://doi.org/10.1038/s41746-022-00560-6

Rapp, A., Curti, L., & Boldi, A. (2021). The human side of human-chatbot interaction: A systematic literature review of ten years of research on text-based chatbots. *International Journal of Human-Computer Studies*, *151*, Article 102630. https://doi.org/10.1016/j.ijhcs.2021.102630

Wang, R., Wang, J., Liao, Y., & Wang, J. (2020). Supervised machine learning chatbots for perinatal mental healthcare. In *International Conference on Intelligent Computing and Human-Computer Interaction (ICHCI)* (pp. 378-383). IEEE. https://doi.org/10.1109/ICHCI51889.2020.00086

Xu, J., Hu, Z., Zou, J., & Bi, A. (2019). Intelligent emotion detection method based on deep learning in medical and health data. *IEEE Access*, *8*, 3802-3811. https://doi.org/10.1109/ACCESS.2019.2961139