

# Survey on AI driven Chatbot Counselor

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Abstract -When it comes to human communication, speech and written data are essential. Therefore, textual and spoken contact between people occurs mostly through digital programs like Facebook, WhatsApp, and Twitter, among others. Since spoken language and sound make up emotional conversation, our model uses dual recurrent neural networks (RNNs) to encode the information from text and audio sequences. It then integrates the information from both sources to predict the emotion class. The difficult issue of speech emotion identification has led to a great deal of dependence on models that leverage audio characteristics to create effective classifiers. One significant area of natural language processing is filling in sentences or creating sentences from a given starting word. It illustrates if a computer is capable of human creativity and thought processes in one sense. We employ natural language processing to train the machine for certain tasks and then use it to help address various phrase production difficulties, particularly for application scenarios like summary creation, machine translation, and automatic question answering. Currently, the most popular language models for text creation and prediction are OpenAI GPT and BERT. The approaches based on handwritten instructions, patterns, or statistical methods have been quickly superseded by the latest developments in deep learning and artificial intelligence, such as end-to-end trainable neural networks. This research presents a novel approach to deep neural learning-based chatbot creation. This approach builds a multilayer neural network to analyse and learn from the data. Additionally, we utilise additional constraints to the generation model for

the right answer generation, which can identify the conversational context, the user's emotion, and the expected reply. This allows us to develop individualised counselling responses based on user input. This work will train the OpenAI GPT model on two new corpora, which will then be utilised to produce articles and lengthy sentences. Lastly, a comparative analysis will be conducted. Simultaneously, we will finish the job of context-based intermediate word prediction using the BERT model.

Keywords : Artificial Intelligence, Data Science, NLP, Deep Learning, Machine Learning, GPT, Generative AI, Sentiment Analysis, Speech Synthesis

# INTRODUCTION

The identification of human emotions has long been a subject of study. Artificial intelligence (AI) techniques are an appropriate strategy, according to several recent research. The research employs a variety of emotionally labelled data to construct different emotion classification models. Chatbots are computer programs that are typically made to realistically mimic human behaviour in order to help customers by acting as a chat partner. The job of natural language processing known as natural language generation (NLG) involves creating natural language using a logical form from a machine representation system, such a knowledge base. One may compare an NLG system to



a translator that transforms data into a representation in natural language. And hence when this type of chatbot would able to recognize the human emotions then counselling them will help patients in terms of there medical issues. One disadvantage of traditional chatbot systems is that their question-answer pairings are predefined in the database, so they always provide the same response for every client inquiry. When a consumer notices that a machine is responding to their query, they lose interest in the chatbot since it always provides the same answer. By generating variants of a predefined response using natural language generation, humanising the chatbot will give it a more human touch and personal touch. We'll employ strategies like paraphrasing to create variations and boost client satisfaction by having the response sound more genuine. Predicting the emotional content of speech and categorising speech based on one or more labels-such as happy, sad, neutral, or angry-are the objectives of speech emotion recognition. Although several deep learning techniques have been used to improve emotion classifier performance, this job is still regarded as difficult for a number of reasons. First, the costs of human involvement mean that there is not enough data available to train large neural network-based models. Second, low-level speech cues must be used to teach emotions and their traits. Using feature-based models for this situation shows their limitations.A variety of paraphrase strategies and machine learning algorithm combinations will be employed. Improving the current chatbot in any way to increase customer happiness will be the goal. One such area of natural language creation that focuses mostly on semantics is paraphrase generation. A single statement can be paraphrased by expressing it in several ways while maintaining its meaning.

# II. Related Work

An instructional discussion system that is automated. It is possible that the article "Chatbot: An automated conversation system for the educational domain" addresses the creation and use of chatbots in the educational sector. Using neural network-based models in conjunction with alternative machine learning approaches has been the subject of another line of research. Gender and naturalness were employed as auxiliary tasks in a multi object learning study by the researcher to help the neural network-based model learn more characteristics from the provided dataset. Because spoken content and sound make up emotional dialogue, researchers have also looked into the relationship between linguistic information and acoustic features, developed belief network-based techniques for identifying emotional key phrases, and evaluated the emotional salience of verbal cues derived from both phoneme sequences and words. None of these research, however, have used voice signal and text sequence data concurrently in an end-to-end learning neural network-based model for emotion classification.

III. Block Diagram



#### IV. Future Research Direction

Future research paths for AI-powered chatbots that provide therapy may vary and be influenced by changing societal demands and technological advancements. Future studies in the domain of AI-driven counselling chatbots might focus on the following areas:

1. Enhanced Emotional Intelligence: Improving the chatbot's capacity to identify and react to users' emotions with greater precision. This might entail more developments in sentiment analysis, emotion recognition, and natural language processing (NLP).

2. Personalization is the process of giving people more tailored experiences while taking into account their individual wants, interests, and histories. This can entail creating algorithms that modify counselling strategies according to the unique characteristics of users.

3. Multimodal Capabilities: Combining speech and video with other communication channels to offer a more thorough and human-like counselling experience.

4. Integration with Human Counsellors: Investigating how AI chatbots might work in tandem with human counsellors to offer insightful advice, support, and aftercare, particularly in situations that call for human involvement.

5. Cultural and Linguistic Sensitivity: Creating AI chatbots that can offer guidance in a variety of languages while taking into account various cultural customs and conventions.

6. AI Chatbots for Particular Mental Health conditions: This area of study focuses on creating AI chatbots with specialised interventions and techniques that are suited to address particular mental health conditions such as anxiety, PTSD, depression, and more.

7. User Input and Iteration: Gathering and using user input on a regular basis to improve the functionality and answers of the chatbots.

8. Education and Training: Creating educational materials and training courses to help mental health practitioners work together and utilise AI-driven chatbots in their practices.

9. Integration with Wearable Technology: Investigating how wearable technology and AI chatbots may work together to gather physiological and behavioural data in real-time for a more comprehensive picture of a user's mental health.

10. Developing for Emerging Platforms: Modifying AI chatbots for usage on social media, augmented reality (AR), and virtual reality (VR).

Paper Name	Author	Methodology
Chatbot: An automated conversation system for the educational domain	Anupam Mondal Monalisa Dey Dipankar Das Sachit Nagpal Kevin Garda	The paper titled "Chatbot: An automated conversation system for the educational domain" likely discusses the development and application of chatbots in the field of education
The ChatBot Feels You – A Counseling Service Using Emotional Response Generation"	Dongkeon Lee, Kyo-Joong Oh, Ho-Jin Choi	This research paper appears to be related to the development of a counselling service that utilises chatbots with the capability to generate emotionally responsive interactions.
A Deep Neural Network Based Human to Machine Conversation Model	G Krishna Vamsi Gaurav Hajela	This research paper discusses the development of a chatbot using deep neural networks for human-machine conversations
Humanising the Chatbot with Semantics based Natural Language Generation	Mayuresh Virkar Vikas Honmane	This paper discusses an approach to improve the efficiency of chatbots or artificial conversational entities, particularly in commercial and banking sectors. The main goal is to make chatbot responses more

IV. Summary of Reviewed Research Paper

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		natural and human-like.
Spectral Voice Conversion for Text to Speech Synthesis	Alexander Kain and Michael W. Macon* Centre for Spoken Language Understanding (CSLU) Oregon Graduate Institute of Science and Technology P.O. Box 91000, Portland, OR 97291-1000, USA	The paper presents a voice conversion methodology using Gaussian mixture models to modify a source speaker's speech to sound like a target speaker for text-to-speech synthesis, with evaluations showing its effectiveness.
A Text Generation and Prediction System: Pre-training on New Corpora Using BERT and GPT-2	Yuanbin Qu, Peihan Liu, Wei Song, Lizhen Liu*, Miaomiao Cheng Information and Engineering College, Capital Normal University, Beijing 100048, P. R. China AIEN College, Shanghai Ocean University, Shanghai 201306, P. R. China	The paper explores the use of pre-trained language models like GPT-2 and BERT for text generation tasks, assessing their performance with a focus on long sentence generation and masked word prediction.
Multimodal Speech Emotion Recognition using Audio and Text	Seunghyun Yoon, Seokhyun Byun, and Kyomin Jung Dept. of Electrical and Computer Engineering, Seoul National University, Seoul, Korea	This paper presents a novel multimodal approach for speech emotion recognition using audio and text data, achieving state-of-the-art performance on the IEMOCAP dataset, with applications in affective computing and human- computer interaction.
A Proposed Chatbot Framework for COVID-19	Eslam Amer Ahmed Hazem Omar Farouk Albert Louca Youssef Mohamed Michel Ashraf	The paper presents a chatbot framework for COVID-19 using BERT-based question- answering, with a focus on categorising questions and providing accurate responses.
Speaker-Aware BERT for Multi-Turn Response Selection in Retrieval-Based Chatbots	Jia-Chen Gu1, Tianda Li2, Quan Liu1,3, Zhen-Hua Ling1, Zhiming Su3, Si Wei3, Xiaodan Zhu2 1National Engineering Laboratory for Speech and Language Information Processing, University of Science and Technology of China,	The paper's methodology involves enhancing the pre-trained language model with speaker embeddings and segmentation tokens to handle multi-turn response selection, along with a speaker-aware disentanglement strategy and domain adaptation, which collectively lead to improved chatbot performance.
Journal of Biomedical Informatics	Ruth M. Reeves a,d,*, Lee Christensen g, Jeremiah R. Brown e, Michael Conway g, Maxwell Levis e, Glenn T. Gobbel a,c,d, Rashmee	The paper discusses adapting a natural language processing (NLP) system to identify social determinants of health (SDoH) in clinical narrative documentation,

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Iben Ricket e, Freneka Minter a,

Andrew Bohm e, Bruce E. Bray

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Wendy Chapman

Volume: 07 Issue: 11 | November - 2023

 November - 2023
 SJIF Rating: 8.176

 U. Shah f, Christine Goodrich e, aiming to address the i

aiming to address the influence of SDoH on healthcare outcomes, particularly for acute myocardial infarction patients, and transforming this information into a common data model for broader applications.

ISSN: 2582-3930

# V. Summary

"A Deep Learning Approach for Emotion Recognition in Conversations' is the title. In order to improve sentiment analysis and human-computer interaction, this work presents a deep learning model that uses attention mechanisms to identify emotions model achieves talks. The competitive in performance on benchmark datasets.Title: 'Combining Text and Audio Features for Multimodal Speech Emotion Recognition' In order to enhance speech emotion recognition, this study integrates text and audio data, producing state-of-the-art outcomes on the IEMOCAP dataset. The suggested method has important uses in human-computer interaction and affective computing. "'Enabling

Decentralised Privacy-Preserving Machine Learning on the Blockchain' is the title." In order to improve data security and decentralisation in machine learning applications, this study presents a blockchain-based method for privacy-preserving machine learning. It presents a fresh method for safeguarding private information and enabling cooperative model training on the "Humanising the Chatbot with blockchain. Semantics based Natural Language Generation". This study presents approaches to enhance chatbot responses through the application of natural language generation (NLG) and natural language processing (NLP) techniques. The goal of paraphrase generation is to produce more organic responses. Enhancing client happiness through more humanlike chatbot interactions is the aim."A Methodology for Generating Natural Language Paraphrases" A system for creating natural language paraphrases is presented in this work. It covers several computational paraphrase techniques, like creation, identification, and acquisition techniques. The study looks at ways to increase the variety of paraphrases, which is useful for answering questions, among other things. "Learning to Paraphrase for Question Answering" The task of learning to create paraphrases for

question responding is covered in this study. To discover paraphrase sentence embeddings, it leverages bitext that has been back-translated. In the context of question-answering systems, the research attempts to improve the quality of paraphrases, which may lead to an increase in response accuracy.

VI. Conclusion

In summary, the goal of this research is to show the viability and promise of modelling a person's mental processes. To do this, a prepared dataset will be trained using a suitable GPT model using text from books and audio recordings. It highlights how important ethical concerns are at every stage of the project, especially when it comes to protecting privacy and data protection.

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