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Experiment 10

An AI-Based Medical Chatbot Model for Infectious Disease Prediction

Abstract:-

This paper discusses the use of chatbots in the medical sector to combat infectious diseases. It proposes an AI chatbot interaction and prediction model using a deep feedforward multilayer perceptron. The study identifies a gap in knowledge on theoretical guidelines and practical recommendations for AI chatbots for lifestyle improvement programs. The model achieves a minimum loss of 0.1232 and a highest accuracy of 94.32%. The findings aim to improve medical chatbot functionality and prevent COVID-19.

INDEX TERMS:- Artificial intelligence, chatbot, LSTM algorithm, machine learning, natural language processing, query processing.

Introduction:-

Covid-19, caused by the SARS-CoV-2 virus, has affected around 15 million people worldwide, with over one million deaths. The affordability and sustainability of oxygen have been a significant issue in poor and underdeveloped countries. In India, the demand for oxygen cylinders is growing between 6%-8% daily. To prevent massive problems associated with COVID-19 and facilitate a quick cure, a chatbot has been developed to facilitate natural interconnection between users and computers. Chatbots use artificial intelligence algorithms to interact with users through voice commands, over communication, or text-based messages. The application uses matching patterns, Natural Language Processing (NLP), and data mining to train the system. AI chatbots can be deployed on the web, mobile applications, or computers, working 24/7 without delay. They have a significant role in various fields, especially in the medical field. The

World Health Organization (WHO) launched a chatbot on Facebook Messenger to counter wrong information and provide accurate information about COVID-19.The paper presents a detailed analysis of popular, efficient methods, discusses the proposed model's applications and benefits, and concludes with a discussion of future research scopes.

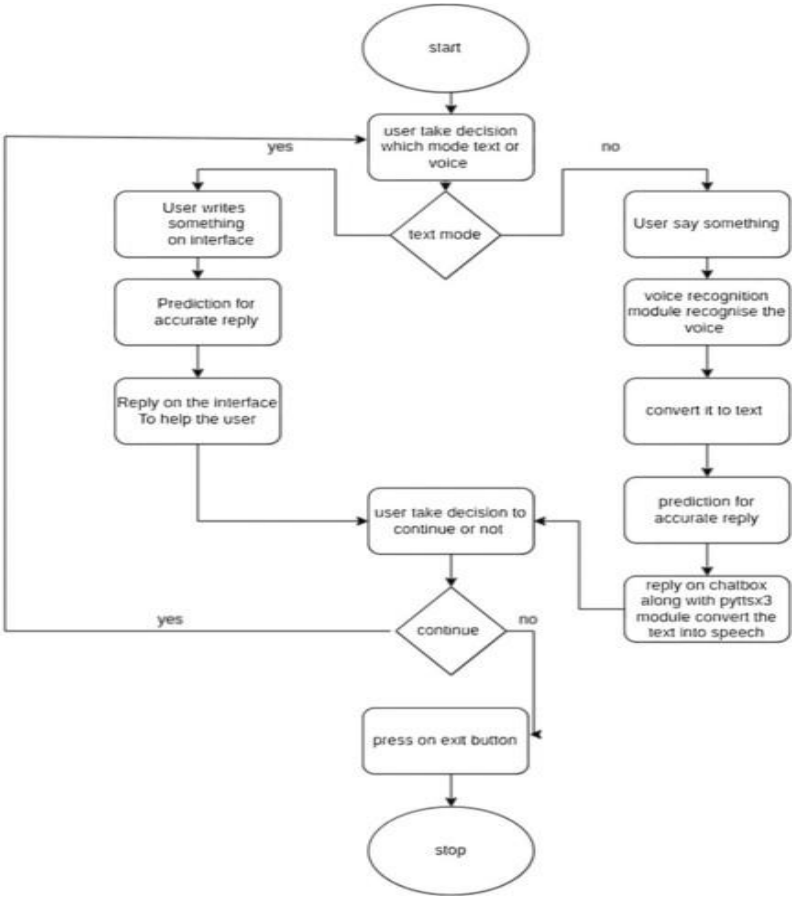
Background LSTM:-

Long-Short Term Memory (LSTM) is a popular artificial neural network used in artificial intelligence and deep learning. It has four main gates: forget gate, input gate, output gate, and cell gate. Each gate performs a specific function, such as discarding irrelevant information, updating cell state, determining necessary records, and storing data in memory. The output gate determines the next hidden state, while the cell gate calculates new cell states. The LSTM algorithm's running time cost is O(n), with the proposed time complexity being O(4h(3d+h+d)), where d, h are the neural network layers. The chatbot's interface uses the Tkinter library, which has an O(n) time complexity for loading the library and creating the bot's interface.

Proposed Model:-

The chatbot uses machine learning and NLP to predict accurate answers to user queries. It responds to user queries in both text and voice formats. The bot uses a training model, which includes tags and responses, to train the bot. TensorFlow is used to build the NLP for chatbots and utilizes deep neural network architecture. The bot predicts the correct answers to user queries and even tries to predict them closer by checking sentences and their words. Users can choose their mode, either text or voice. The bot makes predictions using the training model, responds to queries, and then responds. If the user doesn't want to continue, they can click on the exit button. The bot will turn off if they don't want to continue. The algorithm for predicting user text and giving accurate replies involves detecting the type of query and predicting the most accurate answers. The proposed chatbot system has a block diagram with tags, question patterns, and responses.

The text describes the process of creating a chatbot model using a list of words, lemmatizing them, and storing them in a new variable called "words." The model is then trained using a binary file and shuffled elements. The model is then created using Dense and Dropout, and saved as "chatbot_model.h5". The chatbot predicts responses to user inputs, even in voice mode, and converts voice to text. The Tkinter library is used for creating the chatbot interface.



Result Analysis And Discussion:-

The model's results require a discussion of the dataset used, as text-based predictions facilitate user communication and help solve complex issues.The dataset, in JSON format, is used for pattern recognition and input-output mapping, with key factors including questions and responses separated by a tag with text-based features.The dataset discusses the configurations of hardware and software, with Python code and

Tkinter GUI used. Tests and demos were conducted on Intel core i3 10th gen, 1TB HDD, 4GB RAM, Windows 10th operating system, Ubuntu, Fedora, 128GB SSD, 1GB RAM to 12GB RAM.The training model for a bot helps predict user answers by loading a JSON file and creating a training model. The accuracy and loss percentage of the model change per epoch, with higher accuracy as epoch increases and lower accuracy as epoch decreases. The highest accuracy is shown at epoch 200/200, with a minimum loss of 0.1232 and a maximum accuracy of 94.32%. The LSTM algorithm has four components: forget gate, input gate, output gate, and cell gate. Each gate plays a different role, with the forget gate deciding what information will be kept or discarded,the input gate determining the value to be updated, and the cell gate combining all information. The accuracy increases per epoch, with higher accuracy resulting in closer,more efficient responses. The encoder-decoder configuration plays a crucial role in higher accuracy, and a bidirectional wrapper is added to the LSTM layers to achieve both results and great performance.

Conclusion:-

This paper presents a chatbot that offers medical-related information in a user-friendly language, including doctor's contact details, hospital addresses, oxygen cylinder information, disease symptoms, prevalence, diagnosis, and treatment procedures. The findings could help researchers develop medical chatbots and prevent COVID-19. The chatbot uses TensorFlow for NLP and deep neural network architecture, predicting correct answers to user queries. The authors declare no conflict of interest and no external funding involved in the research.