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EMERGENCY PATIENT CARE SYSTEM USING CHATBOT

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ABSTRACT

Digital assistant bots, also known as Chatbots, are one of the emerging technologies that are growing in popularity as a result of the continued growth in demand for artificial intelligence (AI)and machine learning. Most medical apps on the market today focus on a few conveniences, suchas making appointments online, sending messages, streaming videos, etc. The technologies behindartificial intelligence, and machine learning have greatly aided the healthcare industry. This effortconcentrated on the prediction of diseases based on user symptoms, describing the diseases, and the reservation system. The disease prediction chatbot is made with the help of machine learning and natural language processing. In this study, four classification algorithms were used to make the prediction system: Naive Bayes, neural networks, random forests, and support vector machines. In the performance evaluation, this work compared the four classifiers with accuracy, precision, recall, and f1-score calculation. After comparing how well different models worked, thebest one was chosen for predicting diseases and making medical chatbots. As per performance results, the support vector machine algorithm performed well compared to other models.

I.INTRODUCTION

Since the past few decades, humans have been tirelessly working day in and day out that theyfail to prioritize their health on a regular basis. In the longer run, this problem leads to jeopardizing the quality of life. Nevertheless, with the aid of Artificial Intelligence, we can now provide health care services to individuals at their convenience at reasonable prices. One of the biggest blessingswe possess is a healthy body. A healthy body and enhanced quality of life is something each one of us looks up to. The primary focus of this paper is to provide these services to fulfill the above mentioned purpose. It is difficult to imagine our lives without high tech gadgets because they havebecome an essential part of our lives. Therefore the field of Artificial Intelligence is prospering due to the various applications of it in the research field. Disease prediction is one of the main

goals of the researchers based on the facts of big data analysis which in turn improves the accuracyof risk classification based on the data of a large volume. [1] E-healthcare facilities in general, area vital resource to developing countries but are often difficult to establish because of the lack of awareness and development of infrastructure. A number of internet users depend on the internet for clearing their healthcare based queries. We have designed a platform for providing online medical services to patients with a goal to provide assistance to healthcare professionals. The user can also seek medical guidance in an easier way and get exposure to various diseases and diagnosis available for it. In order to make communication more effective, we have implemented a chatbot for disease prediction. Chatbots are the human version of software that is based on AI and uses Natural language processing (NLP) to interpret and accordingly respond to the user. This study proposes the disease prediction chatbot using the concepts of NLP and machine learning algorithms. The prediction is carried out using KNN and Decision tree algorithms. KNN and Decision tree are a few of the most used classification algorithms that are frequently used in diseaseprediction. It is assisted with the NLP driven chatbot. [2] The wordnet and tokenization concepts of NLP are used. The use of tokenization is to split the given text into a list of words whereas WordNet is a lexical database of dictionary designed for natural language processing. The study also focuses on the use of the Optical Character Recognition tool named Tesseract which is used to extract text from the patient's scanned pathology report. The generated text helps in translatingthe report in an easier manner by providing a graphical analysis of the test result.

LITERATURE SURVEY

Authors:-A. Geleukh (2005),

Paper:-Natural Language Processing, Hybrid Intelligent Systems 2005. HIS '05. 5 the International Conference on Hybrid Intelligent Systems (HIS '05), IEEE

•Summary form only given. Natural language processing (NLP) is a major area of artificial intelligence research, which in its turn serves as a field of application and interaction of a number of other traditional AI areas.

•Until recently, the focus in AI applications in NLP was on knowledge representation, logical reasoning, and constraint satisfaction - first applied to semantics and later to the grammar.

•In the last decade, a dramatic shift in the NLP research has led to the prevalence of very large scale applications of statistical methods, such as machine learning and data mining

•Naturally, this also opened the way to the learning and optimization methods that constitute the core of modern AI, most notably genetic algorithms and neural networks.

•In this paper we give an overview of the current trends in NLP and discuss the possible applications of traditional AI techniques and their combination in this fascinating area. Authors:Yu Wu, Gongxiao

Wang, Weisesheng Li, Zhizun Li (2008), Paper:"AutomaticChatbot Knowledge Acquisition from Online Forum via Rough Set and Ensemble Learning ", Network and Parallel Computing IFIP International Conference, IEEE

•Existing chatbot knowledge bases are mostly hand-constructed, which is time consuming and difficult to adapt to new domains. Automatic chatbot knowledge acquisition method from online forums is presented in this paper.

•It includes a classification model based on rough set, and the theory of ensemble learning is combined to make a decision. Given a forum, multiple rough set classifiers are constructed and trained first.

•Then all replies are classified with these classifiers. The final recognition results are drawn by voting to the output of these classifiers. Finally, the related replies are selected as chatbot knowledge.

•Relevant experiments on a child-care forum prove that the method based on rough set has high recognition efficiency to related replies and the combination of ensemble learning improves the results.

Authors:-S.J. du Preez, M. Lall, S.Sinha (2009).

Paper:-" An intelligent web-based voice chatbot". EUROCON 2009, EUROCON '09 IEEE.

•This paper presents the design and development of an intelligent voice recognition chat bot. The paper presents a technology demonstrator to verify a proposed framework required to support such a bot (a Web service).

•While a black box approach is used, by controlling the communication structure, to and from the Web-service, the Web-service allows all types of clients to communicate to the server from any platform.

•The service provided is accessible through a generated interface which allows for seamless XML processing; whereby the extensibility improves the lifespan of such a service.

•By introducing an artificial brain, the Web-based bot generates customized user responses, aligned to the desired character.

•Questions asked to the bot, which is not understood is further processed using a third-party expert system (an online intelligent research assistant), and the response is archived, improving the artificial brain capabilities for future generation of responses.

Authors:-J. P. McIntire, L. K. McIntire, and P. R. Havig,

Paper: "Methods for Chatbot Detection in Distributed Text-Based Communications," Proc. IEEE of 2010 International Symposium on Collaborative Technologies and Systems(CTS),2010,pp 463-472, doi:10.1109/CTS.2010.5478478.

•Distributed text-based communications (e.g., chat, instant-messaging) are facing the growing problem of malicious "chatbots" or "chatterbots" (automated communication programs posing as humans) attempting social engineering, gathering intelligence,

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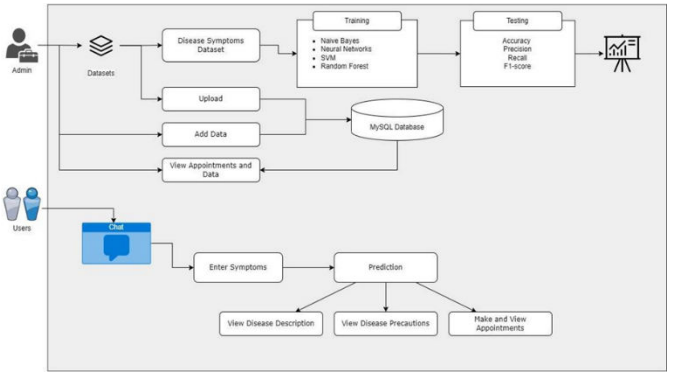
mounting phishing attacks, spreading malware and spam, and threatening the usability and security of collaborative communication platforms.

•We provide supporting evidence for the suggestion that gross communication and behavioral patterns (e.g., message size, inter-message delays) can be used to passively distinguish between humans and chatbots.

•Further, we discuss several potential interrogation strategies for users and chat room administrators who may need to actively distinguish between a human and a chatbot, quickly and reliably, during distributed communication sessions.

III.SYSTEM ARCHITECTURE:

The primary purpose of the system that is being suggested is to diagnose diseases based on the input of symptoms provided by the user, suggest information on the diseases and preventative measures, and build a reservation system for doctors. Figure 6.1 is a representation of the architecture that provides an explanation of a recommended approach that may be used to create this chatbot system. This architecture was conceived with the administrator (the first stakeholder), and users (the first stakeholder) both with their own distinct flows of execution, in mind.



IV.OUTPUT SCREENS

Medical Chatbot Homepage:

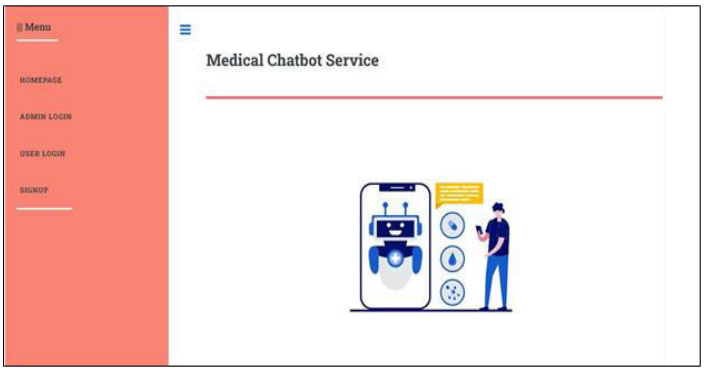


Figure 4.1: Medical Chatbot Homepage

Figure 4.2: Admin login page

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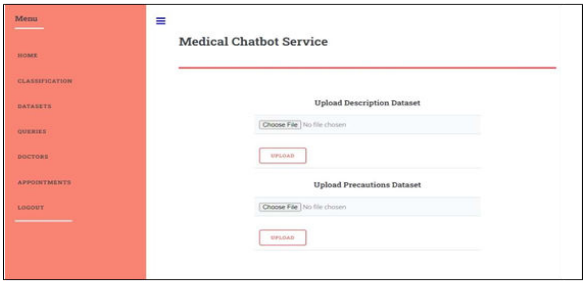

Figure 4.3: Upload datasets

Figure 4.4 : Classification page

Figure 4.5 : View performance page

Figure 4.6: Add and View Questions page

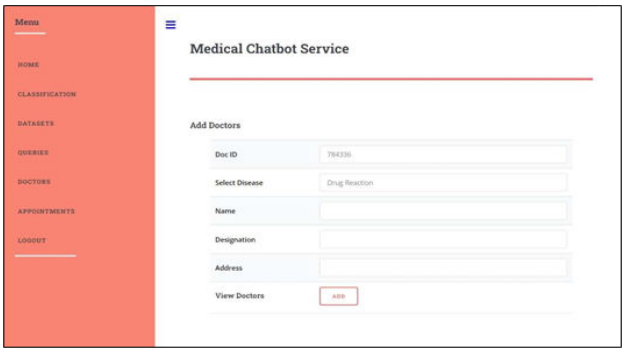

Figure 4.7: Add and View Doctors pages

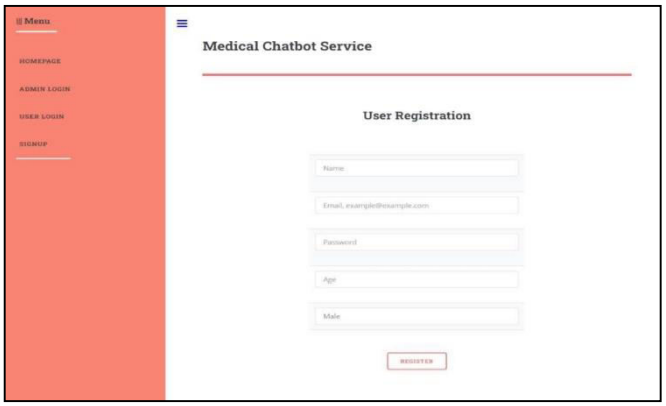

Figure 4.8: User Signup page

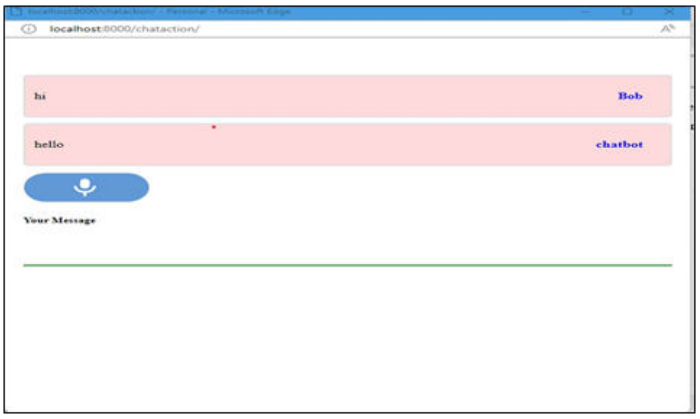

Figure 4.9: Chat bot page

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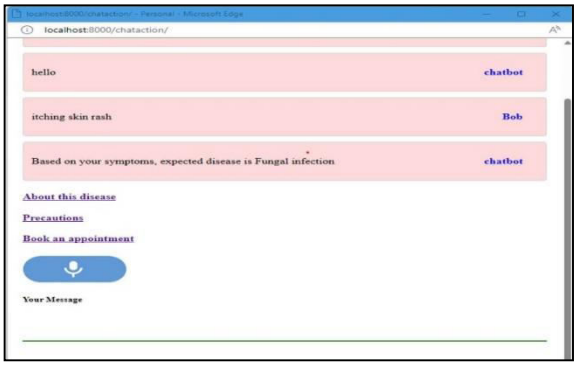

Figure 4.10: Disease Prediction in chatbot

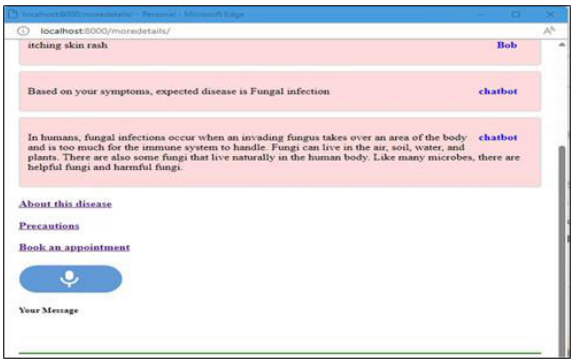

Figure 4.11: Get Disease Description in chatbot

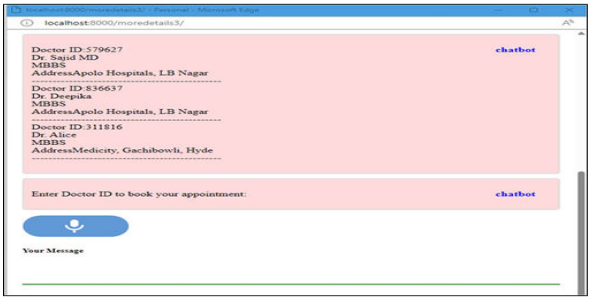

Figure 4.12: Book Doctor Appointment

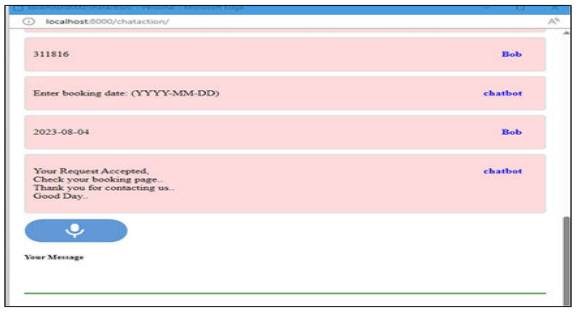

Figure 4.13: Confirming the Appointment

V.CONCLUSION

The field of medicine has been given a significant boost by the development of technologies such as computer science and machine learning. This research focuses on developing machine learning models that may predict illnesses by assessing symptoms and employing such models. With the help of this effort, we are able to define the disorders and offer some preventative measures. In order to accomplish this, we built a chatbot that can predict diseases using a combination of machine learning and natural language processing. we developed a disease prediction chatbot using machine learning and natural language processing (NLP) to assist in diagnosing diseases based on user-provided symptoms. The primary aim was to enhance healthcare accessibility by providing users with an AI-driven tool that predicts potential diseases and offers valuable medical information, alongside a reservation system for medical appointments.

The study utilized four classification algorithms—"Naive Bayes, Neural Networks, Random Forests, and Support Vector Machines (SVM)"—to build and evaluate the disease prediction system. The performance of these algorithms was measured using key metrics such as "accuracy, precision, recall, and F1-score. After comprehensive evaluation, the "Support Vector Machine (SVM)" algorithm emerged as the most effective model, outperforming the others in terms of prediction accuracy and overall performance. The results of the project highlight several key points:

1.Machine Learning in Healthcare: Machine learning and NLP can significantly improve the healthcare sector by offering automated, reliable, and accessible medical support. AI-driven tools such as disease prediction chatbots can enhance early disease detection, leading to better patient outcomes and more efficient use of healthcare resources.

2.Model Comparison: The SVM algorithm was found to be the most effective for this particular application, suggesting its strong ability to handle complex and high-dimensional medical data. Its robust performance in terms of accuracy, precision, recall, and F1-score indicates its suitability for real-time disease prediction.

3.Practical Implications: The development of disease prediction chatbots is a valuable step towards more efficient healthcare services. Such systems can assist doctors in making quicker, more informed decisions, and can also act as a first line of support for individuals seeking preliminary advice based on their symptoms.

VI.FUTURE ENHANCEMENT

This work depends on the conversational-based chatbot model in text and audio. It cannot process media data such as images or pdf files of medical reports, case studies, etc. For future work, it is suggested to continue the work of the chatbot based on other media data. While the disease prediction chatbot developed in this project shows promising results, there are several opportunities for further improvements and enhancements to make the system more robust, accurate, and user-friendly. Some of the key areas for future work include:

1.Improved Natural Language Processing (NLP) Capabilities:

-Contextual Understanding: Enhancing the chatbot's ability to understand complex user inputs and maintain context in ongoing conversations could improve the overall user experience. Using advanced NLP models like GPT or BERT can help the chatbot better comprehend nuances in language, such as slang, misspellings, or complex sentence structures.

-Multi-turn Conversations: Building the chatbot to handle multi-turn conversations would allow users to engage in more interactive dialogues, where the chatbot can ask follow-up questions and clarify ambiguous symptoms, leading to more accurate predictions.

2.Integration of Additional Data Sources:

-Patient History: Incorporating a user's medical history, including chronic conditions, previous diagnoses, and treatments, could significantly improve the accuracy of disease predictions. This would require secure handling of sensitive patient data, ensuring compliance with privacy regulations like HIPAA or GDPR. Environmental and Genetic Data: Future - versions of the system could integrate environmental factors (e.g., location, weather conditions, pollution levels) and genetic information (e.g., family history of diseases) to further refine predictions.

-Real-Time Health Data: Integrating the chatbot with wearable devices (e.g., smartwatches, fitness trackers) to gather real-time health data like heart rate, activity level,

and sleep patterns could enhance the chatbot's ability to make more informed predictions.

3.Enhanced Disease Prediction Models:

-DeepLearning Models: Exploring more advanced deep learning techniques, such as Convolutional Neural Networks (CNNs) or Recurrent Neural Networks (RNNs), could improve disease prediction by better identifying patterns in large datasets and making more accurate predictions, especially for diseases with complex symptoms.

-Ensemble Methods: Using ensemble learning techniques like Boosting or Bagging (e.g., XGBoost, LightGBM) could combine the strengths of multiple models to improve the overall accuracy and robustness of predictions.

-Explainability and Interpretability: AI models, especially deep learning models, can often be "black boxes." Providing clear explanations for the model's predictions (e.g., through SHAP or LIME) would help users trust the system and understand why certain diseases are predicted based on their symptoms.

VII.REFERENCES

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