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MediGenius: A Virtual Health Assistant for Disease Prediction and Treatment A Review

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Abstract: In order to comprehend the technologies and terminologies utilized and to gain insight from the provided solutions, this work analyzed a number of previous research papers and studies pertaining to medical recommendation systems and disease prediction systems. It aims to develop a virtual platform that can diagnose diseases and provide personalised health recommendations on trained dataset, where user simply needs to enter the symptoms and accordingly it will suggest recommendations including the parameters like disease description, medication, diet plans, precautions and exercise.

By leveraging AI and advanced machine algorithms developing such system that can save patients time, money and efforts at the same time could be possible.

Keywords: Medicine Recommendation Systems, Healthcare Providers, Machine Learning, Symptoms, Diseases, MediGenius, Prediction, Accuracy, AI, Medical Data.

1. INTRODUCTION

In modern world every individual is suffering from health issues due to there unhealthy life styles. Visiting to hospitals and consulting to doctors for every minor symptoms and disease is time consuming and expensive that every poor and middle class people cannot afford. Therefore, most of the individuals avoid consulting to doctors for every minor symptoms instead of they try to find other alternatives to deals with the problems, they take help of

google search engine and use different platforms to gather information which again takes lots of time.

Imagine a platform that offers functionalities like search engine for symptoms input, diseases prediction with personalised recommendations including detailed description of disease, prescribing medications, listing the customised diet plans, necessary excises and precautionary measure that one should take. That's what our virtual health platform MediGenius is going to do. All these functionalities will not only help in saving time and money of patients but also this platform has potential to revolutionize the healthcare industries by assisting the healthcare providers, medical trainee and interns using enormous datasets.

By leveraging AI and advanced machine learning concepts we are going to develop MediGenius for the optimal solutions and accurate prediction. After exploring numerous research and studies we examined that many of the researchers have used various machine learning algorithms like Random Forest, Decision Tree, Naïve Bias, SVM, etc. for the better prediction and for recommendations they have used methods like content based filtering and collaborating filtering for the better results that has inspired us to work with machine learning (ML).

2. LITERATURE SURVEY

After exploring various studies and researches from "Google Scholar" by using keywords like "AI in Healthcare", "Medical Recommendation System", "Disease Prediction", "Diet Predictor" etc. we have conducted literature survey which are as follows:

Reviewing the first paper that we have explored is **"Drug Recommendation System in Medical Emergencies using Machine Learning"** published by **C. Silpa, B. Sravani, D. Vinay, C. Mounika, K. Poorvitha.** This paper has presented Drug Recommendation Systems by levaraging Machine Learning which is designed for assisting the patients during medical emergencies by providing the medication on the basis of there symptoms, blood pressure and diabetes level and other health parameters. They have used Decision Tree algorithm to achieve the good accuracy and reliable recommendations and also the have focused on patients data privacy. The reserchers has emphasized that how ML and Deep Learning enhanced the clinical decision-making by analysing the patterns in data.

Reviewing the second paper that we have explored is **"Medicine Recommender System Based on Semantic and Multi-Criteria Filtering"** published by **Qusai Yousef Shambour, Mahran Al-Zyoud, Ahmad Adel Abu-Shareha, Mosleh Abualha.** This study introduces with Hybrid Semantic-based Multi-Criteria Collaborative Filtering (HSMCCF) model, which effectively addresses sparsity challenges and enhances recommendation precision. In this study researchers claims that the traditional collaborative filtering (CF) methods struggle with

data sparsity and cold start issues that decreases the effectiveness of the recommending systems therefore to inhance the accuracy, semantic filtering is used to establish relationships between medications and medical conditions. By combining semantic-based filtering with CF techniques, hybrid approaches improve prediction accuracy and recommendation coverage.

Reviewing the third paper that we have explored is **"Design of Medicine Recommendation System (MRS) for Biomedical Application Using Machine Learning Techniques"** published by **Aditi Sarode, Sarang Dineshrao Pojage, Kapil Jajulwar, Snehlata Dongre, Priya Maidamwar.** This paper has introduced with Medicine Recommendation System (MRS) by leveraging machine learning which is designed to provide personalized drug prescriptions on the basis of patients symptoms, illness duration and there body temperature. The resarchers have used various techniques like Collaborative Filtering, Content-Based Filtering, Random Forest, and Decision Tree algorithms after considering various factors like to make doctors informed, data-driven decisions, improving the treatment accuracy and drug safety.

Reviewing the fourth study that we have explored is **"Medicine Recommendation System Using Machine Learning"** published by **Sujata Dawn, Netai Jana, Pijush Mondal, Biswajit Mondal, Asha Laha.** This study presents Machine Learning-based Medicine Recommendation System (MRS) which is designed to assist doctor and patients by providing the most suitable medication. By analyzing a patient's medical history, symptoms, and potential drug interactions, the system leverages Decision Trees, SVM, KNN, and Deep Learning to provide personalized treatment recommendations. The system integrates Natural Language Processing (NLP) and Collaborative Filtering to enhance accuracy by extracting insights from Electronic Health Records (EHRs). This system also supports the real time doctor consultations and has also automated the precription process.

Reviewing the fifth paper that we have explored is **"Alternative Medicine Recommendation System Using Machine Learning"** published by **Dr. M. Trupthi, Mr. G. N. Manoj, Mr. M. Akhil, Ms. P. Akshita.** This paper presents the Machine Learning powered Alternative Medicine Recommendation System which is designed to help patients and healthcare professionals by providing suitable medication during the unavailability of the healthcare professionals. In this paper the researchers have focused on reducing the risk of adverse drug reaction and improving the accuracy of the treatment. By analyzing a database of drugs and their effects, the system identifies the best treatment options through vectorization and similarity metrics.

3. CONCLUSION

After reviewing several studies and jounerals we came to conclusion that AI and Machine Learning has potential to revolutionize the medical industry. Medical Recommendation Systems are providing the advantage of assisting the heathcare providers and patients with

there better accuracy, efficiency and accesibility. These systems are easy to use, less time consuming and effective at the same time. Researchers have introduced with various technologies like Collaborative filtering, Content Based Filtering, Semantic Filtering, Hybrid Semantic-based Multi-Criteria Collaborative Filtering (HSMCCF), NLP, Deep Learning, SVM, KNN, Random Forest, Decision Tree and so on. for the better results. These systems are working as the alternatives of the healthcare providers in there absence. During the unavailability of the healthcare providers these systems have potential to become support system for the patients those who are in urgent need. Additionally these systems are also offering various properties like real- time health monitoring, personalised solutions, privacy concern, teleconsultation etc.

Similarly, MediGenius which is also quite similar to these systems that can predict diseases and provide treatment by recommending medications along with various additional functionalities like Diet plans , Detailed description of the disease, Necessary Workouts and Precautionary Measures with interactive UI. This system will help users to gather all the necessary information realated to there medical condition on the same platform. This can be beneficial for many individuals including new doctors, patients, gym trainers, underserved poors, and other healthcare providers.

AI driven these systems has so many advantages as we have mentioned above however it has some limitations also that can be some times life-threatening also for instance unstructured emergencies like rare complications, sudden allergic reactions or unexpected drug reactions cannot be handled by pre-programed algorithms as human biology is too complex and dynamic.

Ultimately the AI and Machine Learning can become alternatives of doctors but it can not replace doctors completely as AI can not be 100% correct all the time but it can be used for good prediction in most of the cases.

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