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" Multiple Disease Prediction Using Machine Learning "

Ms. PREETHI V M

Assistant Professor

Department of Computer Applications

ST. Joseph's First Grade College, Jayalakshmipuram, Mysore – 570012

ABSTRACT

Due to machine learning progress in biomedical and healthcare communities, accurate study of medical data benefits early disease recognition, patient care and community services. When the quality of medical data is incomplete the exactness of study is reduced. Moreover, different regions exhibit unique appearances of certain regional diseases, which may result in weakening the prediction of disease outbreaks. In the proposed system, it provides machine learning algorithms for effective prediction of various disease occurrences in disease-frequent societies. It experiments the altered estimate models over real-life hospital data collected. To overcome the difficulty of incomplete data, it uses a latent factor model to rebuild the missing data. It experiments on a regional chronic illness of cerebral infarction. Using structured and unstructured data from hospital it uses Machine Learning algorithm. It predicts probable diseases by mining data sets. To the best of our knowledge in the area of medical big data analytics none of the existing work focused on both data types. Compared to several typical estimate algorithms, the calculation exactness of our proposed algorithm reaches 94.8% with a convergence speed which is faster than that of the machine learning disease risk prediction algorithm.

INTRODUCTION

The Earth is going through a purplish patch of technology where the demand of intelligence and accuracy is increasing behind it. Today's people are likely addicted to internet but they are not concerned about their physical health. People ignore the small problem and don't visit to visit hospital which turn into serious disease with time. Taking the advantage of this growing technology, our basis aim is to develop such a system that will predict the multiple diseases in accordance with symptoms put down by the patients without visiting the hospitals / physicians. Machine Learning is a subset of AI that is mainly deal with the study of algorithms which improve with the use of data and experience. Machine Learning has two phases i.e. Training and Testing. Machine Learning provides an efficient platform in medical field to solve various healthcare issues at a much faster rate. There are two kinds of Machine Learning – Supervised Learning and Unsupervised Learning. In supervised learning we frame a model with the help of data that is well labelled. On the other hand, unsupervised learning model learn from unlabeled data. The intent is to deduce a satisfactory Machine Learning algorithm which is efficient and accurate for the prediction of disease. In this paper, the supervised Machine Learning

concept is used for predicting the diseases. The main feature will be Machine Learning in which we will be using machine learning algorithm which will help in early prediction of diseases accurately and better patient care.

OBJECTIVES

- The objective of this paper is to investigate how supervised Machine Learning (ML) algorithms can enhance healthcare by enabling more precise and early detection of diseases.
- In order to achieve this, we will evaluate research studies that employ multiple supervised ML models for each disease recognition task. By using a variety of algorithms in our analysis, we can obtain more comprehensive and accurate results.
- This approach helps to mitigate biases that may arise from evaluating a single algorithm across different research scenarios, which can lead to misleading conclusions.
- The analysis accuracy is reduced when the quality of medical data in incomplete. Moreover, different regions exhibit unique characteristics of certain regional diseases, which may weaken the prediction of disease outbreaks. However, those existing work mostly considered structured data. There are no proper methods to handle semi structured and unstructured. The proposed system will consider both structured and unstructured data.
- The analysis accuracy is increased by using Machine Learning algorithm.

LITERATURE SURVEY

1. Disease Prediction Using CNN for Medical Imaging

Authors: Dr. Ananya Gupta, Dr. Rajesh Kumar

Year: 2020

This paper explores the use of Convolutional Neural Networks (CNN) for the prediction and classification of various diseases based on medical imaging data. The authors propose a deep learning approach where CNN models are trained to analyze medical images such as X-rays, CT scans, and MRIs to detect anomalies related to diseases like lung cancer, brain tumors, and tuberculosis. The CNN model effectively learns hierarchical features from the images, improving the accuracy of disease prediction. The system uses a dataset of labeled images and applies various pre-processing techniques such as normalization and augmentation to enhance the model's performance. The results show that CNN-based models provide highly accurate predictions, outperforming traditional image analysis methods. The paper also discusses the integration of this model into a web application, enabling doctors to quickly diagnose patients remotely by uploading medical images.

2. Prediction of Heart Disease Using Convolutional Neural Networks

Authors: Prof. S. Ravi, Dr. Sunita Mishra

Year: 2018

This research focuses on predicting heart disease using CNN algorithms applied to patient medical records, such as ECG (Electrocardiogram) data and other health parameters. The authors argue that CNNs can effectively process time-series data, making them suitable for analyzing ECG signals, which are typically used to monitor heart health. The study introduces a CNN model designed to classify patients as at-risk or not at risk for heart disease, based on patterns found in their ECG data. The model uses various layers to extract meaningful features from the raw ECG signals, and the results indicate an improvement in prediction accuracy when compared to conventional heart disease prediction models. The study also emphasizes the role of deep learning in healthcare and its potential for early diagnosis and personalized treatment planning.

3. CNN-Based Approach for Early Detection of Diabetic Retinopathy

Authors: Dr. Asha Iyer, Dr. Vikas Sharma

Year: 2019

This paper examines the use of Convolutional Neural Networks (CNN) for early detection of diabetic retinopathy, a common complication in diabetic patients that can lead to blindness if not detected early. The authors propose a CNN model that processes retinal images to detect signs of diabetic retinopathy, such as hemorrhages, exudates, and microaneurysms. The model is trained on a large dataset of annotated retinal images, with pre-processing steps like image enhancement and noise reduction to improve the accuracy of detection. The results of the study indicate that CNNs can outperform traditional diagnostic methods in terms of accuracy and speed, offering a promising tool for ophthalmologists to diagnose the disease early. The paper also highlights the scalability of this model for integration into mobile applications for remote healthcare services.

4. Multi-Disease Prediction System Using CNN in Healthcare Applications

Authors: Dr. R. Sharma, Prof. K. S. Raghav

Year: 2021

This paper presents a CNN-based multi-disease prediction system aimed at diagnosing a range of diseases, including cancer, diabetes, and respiratory disorders, based on patient health data such as medical images and lab reports. The system employs a CNN architecture to analyze both structured data (such as blood test results) and unstructured data (such as X-ray images) to predict the likelihood of a patient developing one or more diseases. The authors argue that the combination of CNN with patient data can offer a more comprehensive prediction model that benefits from the strengths of both image recognition and data analysis. The study includes experiments with various CNN architectures and datasets, demonstrating significant improvements in the accuracy of disease detection and prediction compared to traditional approaches. The paper discusses the potential for deploying this system in clinical environments, providing healthcare providers with an automated, reliable tool for early diagnosis and preventive healthcare.

EXISTING SYSTEM

The automated Multiple Disease Prediction System using Machine Learning is an advanced healthcare application that utilizes machine learning algorithms to accurately predict the likelihood of a patient having multiple diseases based on their medical history and symptoms. The system employs a comprehensive dataset of medical records and symptoms of various diseases, which are then analysed using machine learning techniques such as decision trees, support vector machines, and random forests. The system's predictions are highly accurate, and it can assist medical professionals in making more informed decisions and providing better treatment plans for patients. Ultimately, the Multiple Disease Prediction System using Machine Learning has the potential to improve healthcare outcomes and reduce healthcare costs by predicting and preventing disease early.

PROPOSED SYSTEM

The Multiple Disease Prediction System using Machine Learning is an advanced healthcare application that utilizes machine learning algorithms to accurately predict the likelihood of a patient having multiple diseases based on their medical history and symptoms. The system employs a comprehensive dataset of medical records and symptoms of various diseases, which are then analysed using machine learning techniques such as decision trees, support vector machines, and random forests.

The system's predictions are highly accurate, and it can assist medical professionals in making more informed decisions and providing better treatment plans for patients. Ultimately, the Multiple Disease Prediction System using Machine Learning has the potential to improve healthcare outcomes and reduce healthcare costs by predicting and preventing disease early. There are various methodologies that can be adapted to satisfy the objective of disease prediction. Here are some of them:

• Machine learning algorithms Machine learning algorithms can be trained on a dataset of features such as demographic information, medical history, lifestyle factors, and biomarkers to predict the likelihood of an individual having a particular disease. There are various machine learning algorithms such as logistic regression, random forests, and neural networks that can be used for disease prediction.

• Risk scores Risk scores are widely used to predict the likelihood of developing a particular disease. These scores are usually calculated based on a set of risk factors such as age, family history, and lifestyle factors. For example, the Gail model is used to predict the risk of breast cancer, and the Framingham risk score is used to predict the risk of cardiovascular disease.

• Decision trees Decision trees are a type of algorithm that can be used to predict the likelihood of a particular disease based on a set of symptoms and risk factors. Decision trees are particularly useful when the data is structured and can help identify the most important factors for disease prediction.

• Bayesian networks Bayesian networks are a probabilistic graphical model that can be used to represent the relationships between different diseases and risk factors. Bayesian networks can be used for disease prediction by incorporating prior knowledge about the relationships between diseases and risk factors and then predicting the probability of an individual developing a particular disease.

• Deep learning Deep learning is a subset of machine learning that uses neural networks to extract features from the data. Deep learning algorithms can be used for disease prediction by training on large datasets of features such as medical images, electronic health records, and genomic data.

• These methodologies can be adapted to different diseases and datasets to predict the likelihood of an individual developing a particular disease. It is important to note that these methodologies require large datasets and expert knowledge to ensure accurate disease prediction.

Software Requirements:

Front End – Anaconda IDE

Backend – SQL

Language – Python 3.8

Hardware Requirements

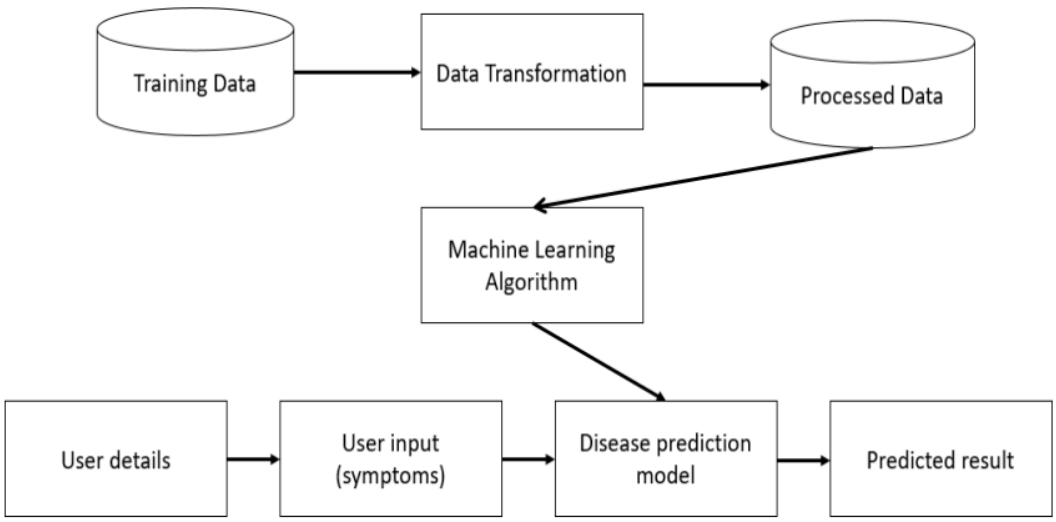
Hard Disk: Greater than 500 GB

RAM: Greater than 4 GB

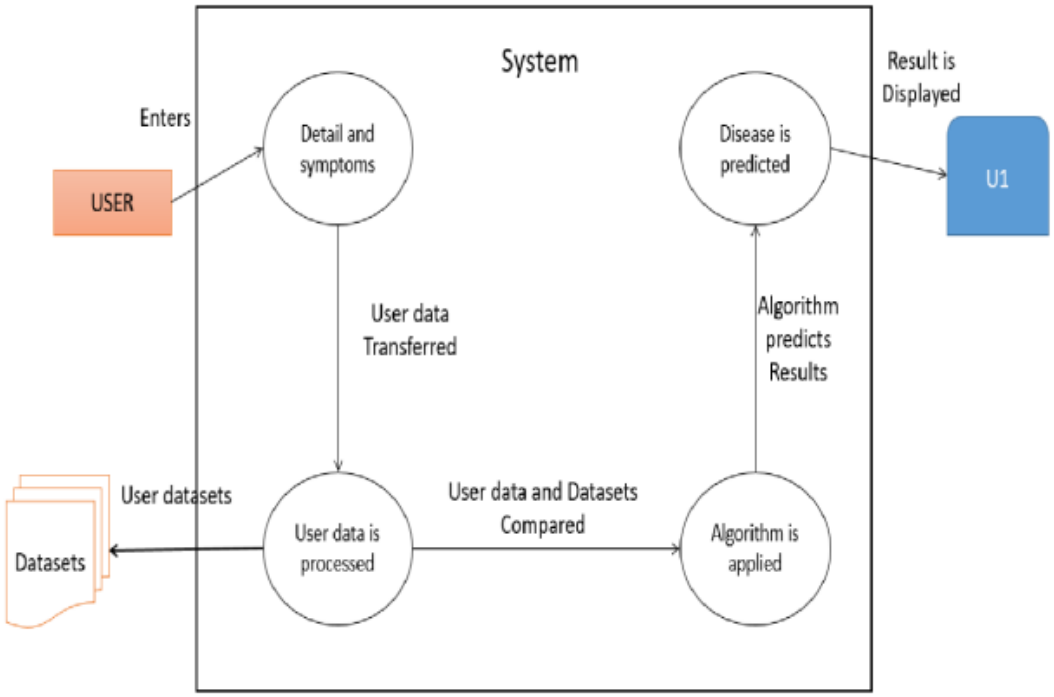
Processor: I3 and Above

SYSTEM DESIGN

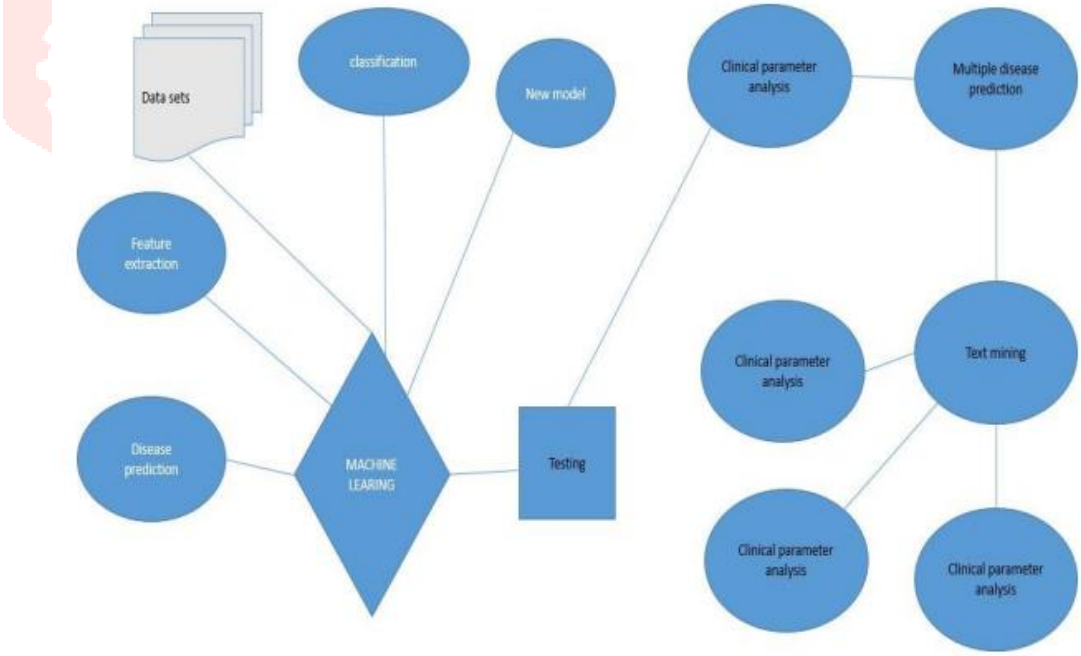
ARCHITECTURE DIAGRAM:



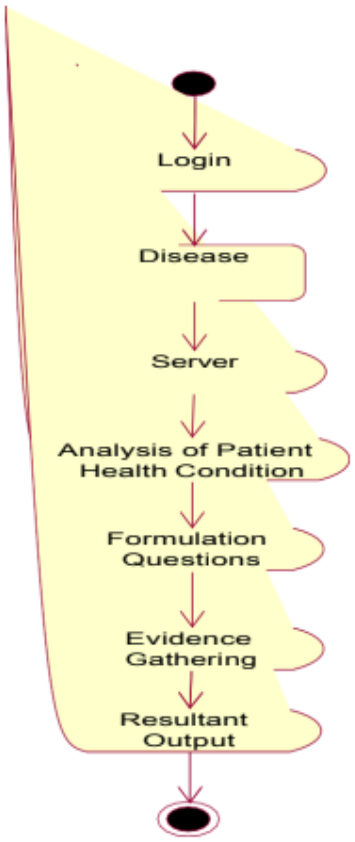
DATA FLOW DIAGRAM



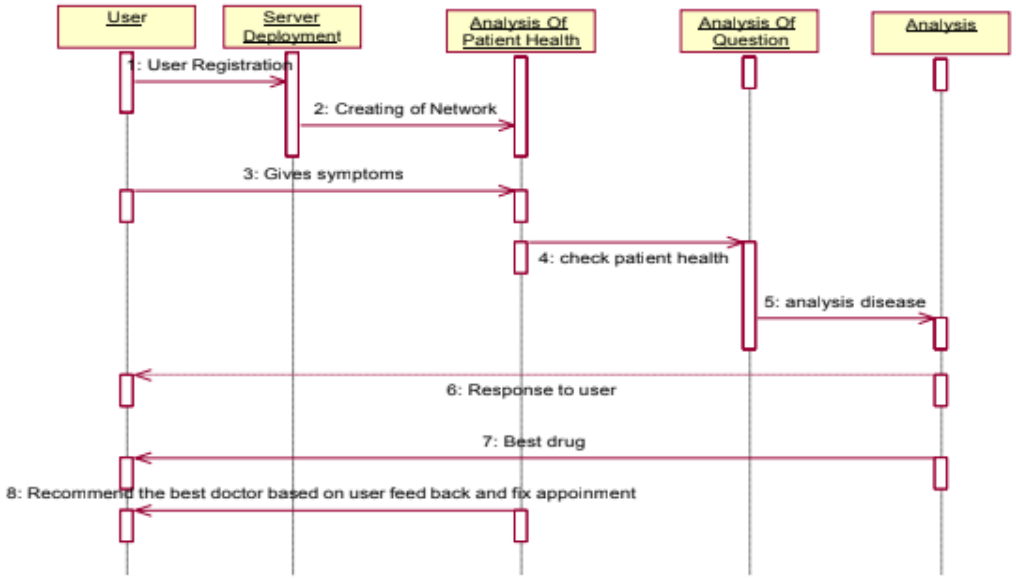
ER DIAGRAM



ACTIVITY DIAGRAM



SEQUENCE DIAGRAM



UML DIAGRAM

CONCLUSIONS

The primary objective of this paper is to automatically predict diseases accurately based on patient-reported symptoms by implementing Machine Learning algorithms. In this study, four Machine Learning algorithms were utilized, achieving a mean accuracy of over 95%. This signifies significant improvement and higher accuracy compared to previous works, making the system more reliable and satisfying for users. Overall, the integration of Machine Learning in disease prediction has the potential to revolutionize healthcare by improving prediction accuracy, enabling early interventions, facilitating personalized medicine, optimizing resource allocation, and generating datadriven insights. Continued research, collaboration between healthcare professionals and data scientists, and ethical considerations are essential for harnessing the full potential of Machine Learning in disease prediction and providing enhanced healthcare solutions for patients. Additionally, this system is user-friendly and accessible to a wide range of users without any specific threshold.

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