



Chapter 10

Real-Time Symptomatic Disease Predictor Using Multi-Layer Perceptron

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ABSTRACT

Early disease diagnosis is crucial for effective treatment, but current healthcare methods have limitations. Supervised machine learning algorithms, particularly deep learning networks, have proven effective in developing medical diagnostics and real-time applications for detecting high-risk diseases. This paper evaluates five algorithms: Multilayer perceptron (MLP), random forest, decision tree, Naive Bayes, and K-Nearest neighbours (KNN) for predicting diseases based on user-entered symptoms. MLP outperformed other algorithms, achieving an accuracy of 97.2%, which is 4-5% higher than existing disease prediction models. Notably, existing techniques account for only 94% accuracy on average. Highlighting the potential of MLP in early disease diagnosis, this paper concludes by summarizing its goals, challenges, and outcomes.

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1. INTRODUCTION

Algorithms for artificial intelligence (AI) and machine learning (ML) make it easier to create systems with tools that mimic human abilities like the capacity for logic, reason, and generalisation based on data from prior experiences. The proposed system is built on a machine learning model, which is a system of computer programming used to process data Fields(Sawhney et al., 2023). The expansion of technology has made everything crueller and more varied. In today's digital age, medical professionals will do anything to save lives. It is not practical for doctors to be on call constantly. However, we can always use this forecasting system to increase productivity when using modern techniques. Data in the form of the patient's symptoms, age, and gender can be sent to the ML model for additional processing. AI-based systems typically train on pre-processed datasets that can be used to obtain the desired results. Data science is a methodology and statistical combination that can be computed to analyse data to discover trends and forecast the future. Python is known to be one of the most efficient programming languages that can yield adequate results due to its dynamic nature which makes it feasible to operate.

These methods can aid in forming smart processes that can benefit the current healthcare sector by making it inexpensive, more effective, and equitable (Dangare & Apte, 2012). The doctor can use data collected from numerous facilities and patients to forecast treatment strategies that are superior to conventional practices and improve all facets of the healthcare industry. We can boost the economy and ensure the general welfare of society by utilising such methods in the healthcare sector. This system would help identify and examine the patient's symptoms in various body parts, and then careful analysis could be carried out to determine the necessary results (Mariappan et al., 2022). Providing a suitable and organised medical assessment of the ill is a crucial step in the treatment process. This system is very helpful for patients to track their health through self-analysis and management in addition to helping doctors during routine check-ups. Documenting all of the patient's data from the start of treatment, such as a thorough list of the patient's symptoms, lab results, and X-ray reports, can help to more accurately predict a disease (Devarapalli et al., 2012). In the healthcare industry, AI and MI algorithms have assisted in achieving success by automating routine diagnostic and therapeutic procedures and coming to conclusions about strategies that can also help medical professionals carry out a variety of tasks that cannot yet be automated. Using machine learning techniques makes it easier to identify people with more common diseases, which is also useful for classifying these diseases. Diseases are difficult to predict because similar types of symptoms can result in various outcomes.

As a result, the proposed system uses the data set and a deep learning algorithm to predict disease and then provides a disease prognosis based on the symptoms that the user has added. Early-stage detection of any chronic diseases can also benefit the diagnosis during the initial stages to bypass substantial concerns in the future. The disease prediction system can be useful for an entire range of individuals irrespective of their age group.

2. LITERATURE REVIEW

A literature review for symptomatic disease prediction in healthcare is an in-depth examination of existing research, studies, and publications that explore various methods, models, and technologies used to predict diseases based on symptoms. This type of literature review plays a crucial role in understanding

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