

MAIN PROJECT

Project Title	Early Prediction of Chronic Diseases with Machine Learning
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Class	IV ECE - B
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Name of the Guide	Dr. T. Prabhakar, Professor

Aim:

The main aim of this project is to develop a machine learning model that can predict chronic diseases like heart disease, diabetes and Parkinson's disease at an early stage.

Objectives:

1. To develop accurate and reliable predictive models for early detection of chronic diseases such as heart disease, diabetes, and Parkinson's disease.
2. To enhance patient outcomes by enabling personalized healthcare interventions based on individual risk profiles and disease progression predictions.
3. To improve early diagnosis and provide early warning signs to healthcare professionals.

Introduction:

Machine learning is a rapidly growing field with the potential to revolutionize healthcare. In recent years, there has been a growing body of research on the use of machine learning for early disease prediction[1]. The research has shown that machine learning models can be very accurate at predicting the development of a variety of diseases, including heart disease[1], diabetes[3], and Parkinson's disease[6].

Heart disease: Machine learning models have been used to predict the risk of heart disease based on factors such as age, gender and cholesterol levels[2].

Diabetes: Machine learning models have been used to predict the risk of diabetes based on factors such as blood pressure, glucose level and insulin level[3].

Parkinson's disease: Machine learning models have been used to predict the risk of Parkinson's disease based on factors such as age, family history, and tremors[6].

The system will output if the user has the disease or not, when the user enters several disease-related parameters[1]. Numerous people could benefit from this research by monitoring individual conditions and needs[1].

Proposed Methodology:

To build the best machine learning model, it is important to understand the problem statement accurately. For that, a diverse dataset is to be gathered which includes relevant features and labels indicating presence or absence of multiple diseases. The preprocessing of the dataset involves eliminating duplicates and dealing with anomalies. For disease identification, it is necessary to determine what characteristics are the most informative. For the given data and objective, the proper machine learning algorithms must be picked. The dataset must be divided into training and validation sets in order to train machine learning models. Utilizing relevant evaluation criteria, such as accuracy, precision, etc., the trained models must be tested. These metrics provide clarity on the model's efficiency in identifying various diseases. In order to ensure privacy and ethical compliance, the trained model must be used in a real-world healthcare setting. The model's performance needs to be tracked and evaluated to make sure it keeps working as intended.

What technical or social issue does project address? :

Machine learning has the potential to enhance early disease diagnosis, which could result in quicker treatment and better patient outcomes. By enabling faster and more precise disease diagnosis, it may also contribute to lower healthcare costs. This is a challenging undertaking because many diseases have symptoms that are similar and it can be challenging to tell one from the other.

Timeline:

By 15-07-2023: Literature survey
By 29-07-2023: Methodology Implementation
By 26-08-2023: Methodology Implementation
By 16-09-2023: Validation of Results
By 07-10-2023: Documentation

References:

- 1) Ali et al., "An Optimized Stacked Support Vector Machines Based Expert System for the Effective Prediction of Heart Failure", IEEE Access, vol. 7, pp. 54007-54014, 2019.
- 2) Mohan, C. Thirumalai and G. Srivastava, "Effective Heart Disease Prediction Using Hybrid Machine Learning Techniques," in IEEE Access, vol. 7, pp. 81542-81554, 2019.
- 3) D. Sisodia and D. S. Sisodia, "Prediction of diabetes using classification algorithms", Procedia Computer Science, vol. 132, pp. 1578-1585, 2018.
- 4) "Classification and Diagnosis of Diabetes", Standards of Medical Care in Diabetes— 2018 American Diabetes Association Diabetes Care, vol. 41, no. Supplement 1, pp. S13-S27, 2018.
- 5) Das, "Comparison of multiple classification methods for diagnosis of Parkinson disease", Expert Systems With Applications, vol. 37, pp. 1568-1572, 2018.
- 6) S. Roobini, Y. R. K. Reddy, U. S. G. Royal, A. K. Singh and K. Babu, "Parkinson's Disease Detection Using Machine Learning," 2022 (IC3IoT), Chennai, India, 2022, pp. 1-6, 2022.

Signature of the Project Guide