INTERNATIONAL JOURNAL OF PROGRESSIVE RESEARCH IN ENGINEERING MANAGEMENT AND SCIENCE (IJPREMS)
(Int Peer Reviewed Journal)
Vol. 05, Issue 09, September 2025, pp : 121-122

www.ijprems.com
editor@ijprems.com

e-ISSN : 2583-1062
Impact Factor : 7.001

SMART HEALTH PREDICTING OBESITY LEVELS USING MACHINE LEARNING ALGORITHMS

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ABSTRACT

Millions of individuals worldwide suffer from obesity, which has become a serious health concern. It causes a number of illnesses and joint problems. Complex disorder influenced by a wide range of factors, such as environmental conditions, food, physical activity, lifestyle choices, and heredity. Traditional approaches to evaluating obesity tend to focus on BMI (body mass index) and other basic measures, but these frequently ignore the complexity of the condition and are unable to predict obesity-related hazards.

By combining several machine learning and statistical algorithms, a multi-algorithm-based obesity analysis system aims to close this gap and provide a analysis of obesity. The system can offer individualized insights into obesity risk and suggest focused therapies by using a variety of data sources, such as food patterns, physical activity levels, genetic predispositions, and medical records.

1. INTRODUCTION

Overview of Project:

Machine learning (ML) approaches have become effective instruments in medical research to address this problem. Large and complicated datasets can be analyzed using ML algorithms, which can also find subtle patterns and produce predictions that frequently beat those of conventional statistical techniques. ML is being utilized more and more in diabetes research for predictive and diagnostic purposes.

Existing System

The majority of the systems used today for obesity analysis rely on traditional techniques like body mass index (BMI) and basic health indicators like blood pressure, cholesterol, and physical activity to assess the risk of obesity. Following categories can be used to group these systems:

Literature review since it gives a summary of previous investigations, approaches, and important contributions that serve as the basis for creating a suggested system. The literature review for the project "Obesity Prediction Using Numerical and Lifestyle Data" focuses on earlier research on machine learning in healthcare, dietary pattern analysis, BMI evaluation, health analytics, and obesity prediction.

Simple BMI estimates and manual health examinations were the primary methods used in the early assessment of obesity. Although helpful, these methods were inaccurate since they ignored comorbidities, exercise levels, heredity, and dietary patterns. The application of statistical models and machine learning to enhance the prediction of obesity risk has been investigated in recent research.

Limitations of Existing System

- Heavy reliance on static BMI-based classification.
- Lack of integration of multiple risk factors (genetic, behavioral, lifestyle).
- Limited visualization and insights for end-users.
- Scalability issues with larger datasets.
- Privacy and security concerns with health-related data.

Proposed System

These drawbacks are addressed by the suggested method, "Obesity Prediction Using Numerical and Lifestyle Data," which offers a simple, user-friendly, and privacy-focused solution. It predicts obesity risk by combining behavioral and medical characteristics (dietary patterns, frequency of exercise, smoking/alcohol habits, genetic diseases) with anthropometric measures (height, weight, waist-to-hip ratio, BMI).

By analyzing these traits using machine learning approaches (Decision Trees, Logistic Regression, Random Forest), th e system categorizes users into groups such as Normal Weight, Overweight, and Obese. In contrast to conventional techniques, this approach prioritizes feature engineering, data preprocessing, and visualization, resulting in more precise forecasts and insights.

Advantages of proposed system

- Incorporates multiple risk factors, improving prediction accuracy.

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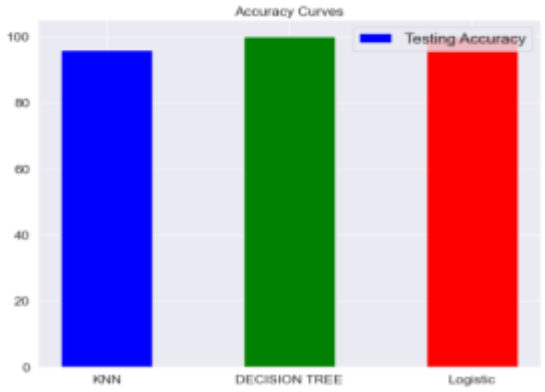
- GUI-based interface for non-technical users.
- Real-time prediction and visualization using graphs and tables.
- Secure data handling with a database for persistent storage.
- Scalable and modular design for future enhancements

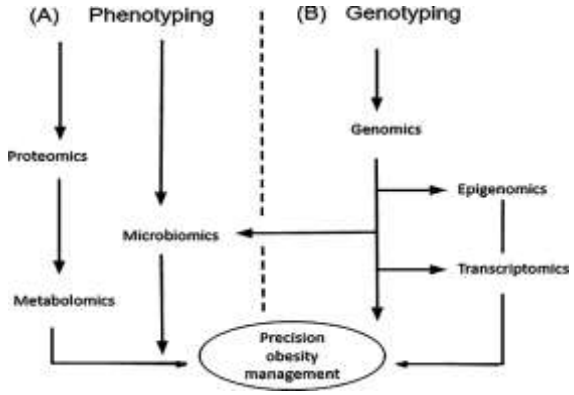
2. SYSTEM DESIGN

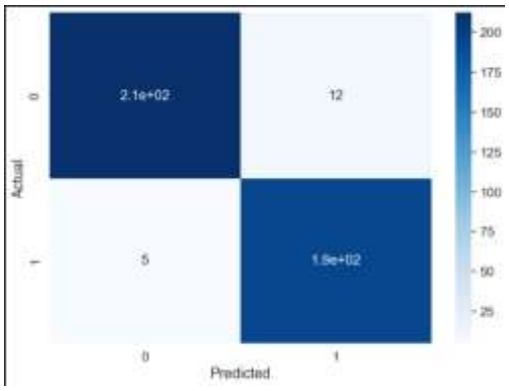
System Perspective

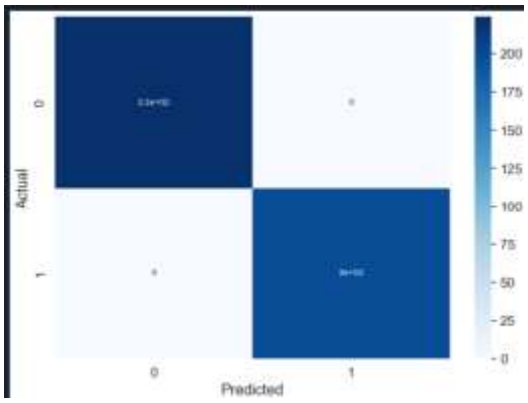
The system aims to build an intelligent and automated obesity prediction system that assists in early detection of obesity. It integrates a user-friendly GUI using Python's tkinter module, allowing users to browse and load patient datasets seamlessly. Once loaded, the system stores the data into a MySQL database for efficient processing and retrieval. Feature extraction is performed to identify relevant medical parameters for accurate prediction.

Architecture Diagram









3. CONCLUSION

The "Obesity Prediction Using Numerical Data" research effectively illustrated how ML may be used to forecast obesity trends using health data. Structured numerical and categorical parameters, such as BMI, nutrition, and exercise levels, were the main focus of the system. The experiment demonstrated that even with basic datasets, precise predictions can be made by utilizing the Decision Tree, Logistic Regression, and KNN algorithms. It is simple to use and can be further developed to incorporate more sophisticated functions.

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