

## **E-Health Monitoring System With Diet and Fitness Recommendation Using Machine Learning**

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### **ABSTRACT:**

Machine health monitoring is the precept focal component for now as many industries are evolving to enterprise. Industry is the revolution in enterprise that comprise the Internet of Things (IoT) and artificial intelligence in the direction of automation and statistics sharing for production overall performance improvement. Currently no person is following their weight loss program and exercises. This health Care recommendation gadget to be able to provide unique data based mostly on clients requirements and constraints. It's important to keep ordinary health checkup and body health. Hence, we advocate a gadget that objectives at improving the health of the humans tormented by severe ailments via recommending them greater wholesome weight loss program and exercising plans via analyzing and monitoring health parameters from their current day critiques related to the disease. This gadget is in maximum instances useful for the medical doctors to indicate weight loss program and exercising based mostly on their current day critiques and personal health details. This will help advocate and determine if a selected food item and exercising should take delivery of to a selected person or now not with respect to our customized critiques. Finally, this is very useful to each and every person for a better health.

**Key words:** *Health monitoring, IOT, weight.*

### **I. INTRODUCTION**

The fitness is likewise a crucial aspect in human life. Due to busy schedules, workload, humans aren't listening to their fitness and

fitness. Physical state of no activity is the maximum crucial hassle in today's generation. Maintaining their each day recurring of weight-reduction plan and exercising is what humans want to be fit. So humans want a few quantity

of vitamins to be healthful and keep their fitness. Diet and exercising, if kept in mind in general, varies from customers having exclusive lifestyles, height, weight, sex, age, and interest level. Diet and exercising are each correlated. To keep sugar level, it's far required to stabilize the consumption of calories. So, the proposed gadget might assist medical doctors to endorse weight-reduction plan and exercising to their sufferers laid low with Diabetes, Blood pressure, or Thyroid at the side of the medicine they offer on each follow-up on the pressing in their mouse. In this paper, we've modeled a Health Monitoring gadget with Diet and Fitness advice. We are unique to three illnesses on this version i.e. Diabetes, Blood pressure, and Thyroid. These illnesses are maximum extensively unfold throughout the humans which require right fitness tracking and treatment. The advice gadget will offer data primarily based totally on consumer necessities and constraints. We divided our gadget into 2 modules 1. Health Monitoring System 2. Diet & Exercise Recommendation. For Diet and Exercise Recommendation module, the C4.5 classifier is used. It has extra functions like pre pruning, managing non-stop attributes and lacking values, and rule induction which allows within side the accuracy of the version than a everyday selection tree classifier. Multiple comparisons

are carried out for locating perfect set of rules for the advice gadget. ID3 and C4.5 is carry out and with admire to the homes of the algorithms and C4.5 fulfills perfect situations with the subsequent homes.

## 2. LITERATURE SURVEY

1) A framework for personalized Healthcare Service Recommendation  
AUTHORS: Choon-oh Lee, Minkyu Lee  
Development of the Internet enables numerous healthcare services to be available to many service consumers. As a result, many brokering web sites such as healthcare service portals and search engines are deployed to support users' choice. However, to provide better healthcare to the novice users, systems need more sophisticated mechanism for healthcare recommendation. In this paper, we propose healthcare service recommendation framework (HSRF) that considers health status and various contexts of each user. HSRF arranges healthcare services based on medical similarities between user and services. We successfully implemented the framework and confirmed its functionality and feasibility. 2) Machine Learning in Cardiac Health Monitoring and Decision Support  
AUTHORS: Shrouq Hijazi, Alex Page, Burak Kantarci, Tolga Soyata  
Portable medical devices generate volumes of data that could be useful

in identifying health risks. The proposed method filters patients' electrocardiograms (ECGs) and applies machine learning classifiers to identify cardiac health risks and estimate severity. The authors present the results of applying their method in a case study. 3) Personalized Health Monitoring using Predictive Analytics AUTHORS : Poojitha Amin; Nikhitha R. Anikireddypally; Suraj Khurana Disease identification and diagnosis of ailments are at the forefront of machine learning research in healthcare. Today, the increasingly sedentary nature of many forms of recreation time and increasing urbanization results in decreased physical activity and thereby leading to a rise in health problems. A lot of wearables available today can provide important cues to people; however, these devices are not able to perform advanced predictions from the collected data about a disease condition. In this paper, we propose a real-time analytics approach on sensor data to monitor the vital signs of a person, e.g., heart rate, and notify the user if there is a risk of cardiovascular disease. A machine learning model is developed to perform predictions based on the captured physiological parameters. The outcome is a personalized healthcare service, which can significantly improve diagnostic accuracy, healthcare quality, and patients' quality of life .

4) The analysis of cases based on decision tree AUTHORS : Yurong Zhong Data mining is an data intelligent analysis technology in the late 20th century, it can automatically extract or find useful model knowledge from large amounts of data in databases, data warehouses or other databases. In this process, the classification of data is an important research topic in the field of data mining. Currently there are different methods for classification, the classification algorithm of decision tree is clear, easy to understand and easy to convert into certain classification rules, so this classification algorithm is widely studied and applied. Based on the background of "data platform for public petition", it aims to study how data mining system combined with the existing database, extracting useful information from the mass characteristics hidden in the data, and provide comprehensive analysis for system managers and decision makers. This paper focus on the study of basic principle of data mining and basic algorithms. The classification of the cases, this module was developed based on decision tree algorithm. Based on improved ID3 decision tree algorithm, according to the case information of the library and the client information of the other library, decision tree model can be built, to give certain case an assessment of the comprehensive analysis.

## **Existing System:**

In this world, for any type of records, human beings rely on net. They use hunt machines like Google to look records over net. The queries which are written at the net ought to be correct which could supply the relevant records associated with stoner`s Health Care. But there may be large quantum of records at the net and so it is sensitive to get the relevant records fluently. The fitness is likewise an crucial aspect in mortal life. Due to busy schedules, workload, none is looking after their fitness. So, this machine will assist every and each existent to set their fitness accurate them. In case of quests on proper meals exercise, human beings normally have their veryown preferences. Also folks that suffers from a few clinical situations they may be limited to a few ingredients and physical games. So they may be attracted in the direction of different meals and physical games. This allows them to pick accurate meals and physical games which undergo to them consequently.

**Proposed System:** In Data analysis was done using different machine learning models like Random Forest, Support Vector Machine, and Deep Learning for remote health monitoring for Elderly People. In The system extracts the features from UCI Chronic kidney data set which was responsible for Chronic kidney

Disease, After that, ML automated the classification of different stages in the CKD with respect to its severity. None were specific to the disease like diabetes, Thyroid, and Blood Pressure collectively. As C4.5 is used as a prediction model and not a recommendation . The advantage of our system is we combine all the above research gaps to make a combined Health Monitoring with Diet and Exercise Recommendation along with customized Separate Data sets for diet and exercise specifically for patients suffering from Diabetes, Blood Pressure, and Thyroid and used C4.5 for recommendation of diet and exercise.

## **MODULES:**

The User can register the first. While registering he required a valid user email and mobile for further communications. Once the user register then admin can activate the user. Once admin activated the user then user can login into our system. User can upload the dataset based on our dataset column matched. For algorithm execution data must be in float format. Here we took BMI repository dataset for testing purpose. User can also add credentials like height, weight, age, activity level, using the Machine Learning technique the new data for dataset based on our Django application. User can click the Data

Preparations in the web page so that the data cleaning process will be starts. The data and its required values will be displayed.

**ADMIN:** Admin can login with his login details. Admin can activate the registered users. Once he activate then only the user can login into our system. Admin can view the overall data in the browser. He can also check the algorithms BMI checkup. The comparison accuracy weight loss, weight gain, healthy also displayed here.

**DATA PREPROCESSING:** A dataset can be viewed as a collection of data objects, which are often also called as a records, points, vectors, patterns, events, cases, samples, observations, or entities. Data objects are described by a number of features that capture the basic characteristics of an object, such as the mass of a physical object or the time at which an event occurred, etc. Features are often called as variables, characteristics, fields, attributes, or dimensions. The data preprocessing in this forecast uses techniques like removal of noise in the data, the expulsion of missing information, modifying default values if relevant and grouping of attributes for prediction at various levels.

**ALGORITHMS:** Based on the split criterion, the cleansed data is split into 60% training and

40% test, then the dataset is subjected to five machine learning classifiers such as Logistic Regression (LR) with pipeline, Support Vector Machine (SVM), Decision Tree (DT), Random Forest (RF), K-Nearest Neighbors (KNN). The accuracy of the classifiers was calculated. For arch algorithm BMI checkup, weight loss, weight gain, healthy and user can also view suggested food items then accuracy has been calculated and displayed in my results.

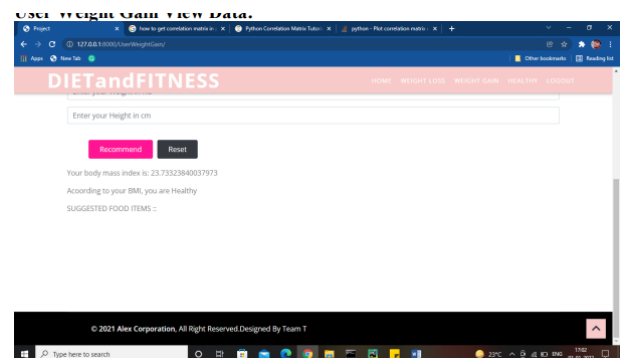


Fig.1. User weight gain data.

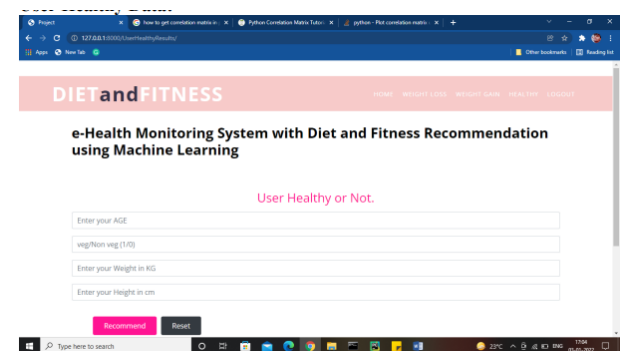
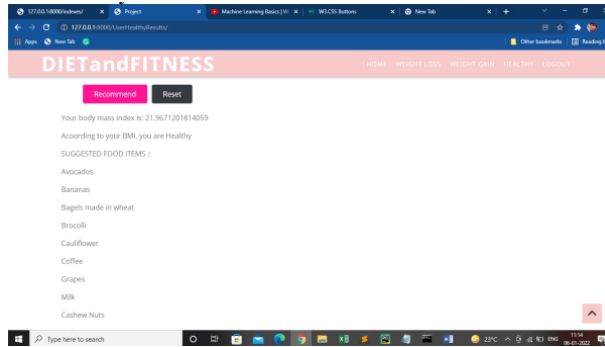
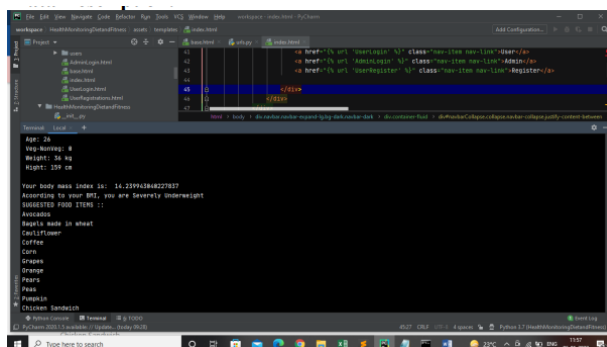


Fig.2. User health display.





**Fig.3. User data upload.**



**Fig.4. Data description.**

## V. CONCLUSION

The work presented lies in the field of Machine Learning in Health Care. We designed a system which can help doctors to recommend diet and exercise to the patients. It precisely deals with health monitoring of disease like Diabetes, Blood Pressure, and Thyroid based on the patient's latest report looking for improvements in every follow-up session and recommending suitable and updated diet and exercise plan in each follow-up session based on the reports and other

credentials like height, weight, age, activity level, using the Machine Learning technique i.e. C4.5 decision tree algorithm. We can clearly infer that, C4.5 is better than ID3 algorithm with respect to both the data-sets we used. We conclude that although C4.5 being predictive model, C4.5 can be used for recommendation but it requires some more improvements.

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