Industrial Engineering Journal
ISSN: 0970-2555
Volume : 53, Issue 5, May : 2024

ESTIMATION OF NUTRITION COMPONENTS USING MACHINE LEARNING

Dr.K Rekhadevi, *Assistant Professor CSE, Vaagdevi College of Engineering (Autonomous), India*
E.Namratha, *UG Student, CSE, Vaagdevi College of Engineering (Autonomous), India*
MD.Younus Qureshi, *UG Student, CSE, Vaagdevi College of Engineering (Autonomous), India*
K.Abhinaya, *UG Student, CSE, Vaagdevi College of Engineering (Autonomous), India*
G.Maniraja, *UG Student, CSE, Vaagdevi College of Engineering (Autonomous), India*

Abstract:
Food is essential for human life and has been the concern of many healthcare conventions. Nowadays nutrition analysis tools enable more opportunities to help people understand their daily eating habits, exploring nutrition patterns and maintain a healthy diet. Nowadays people mainly focus on diet because of diabetics and obesity problem. The problem here is not about having enough food, it is about the people not having knowledge of what's in their diet.In this paper, weare using python web framework Django which estimates the amount of calories in the food and find the calorie limit of a person based on their age, height and weight.

In this system we will analyze the nutritional ingredients based on the food items we take day to day life and generate a report by calculating the amount of calories and it also displays the amount of the calories burnt by doing an exercise in a specific amount of time in a day.The experimental results show that our system is able to gives the result based the food items we consumed and generate the nutrition analysis report efficiently, which will benefit the users with a clear insight of healthy dietary and guide their daily recipe to improved body health and wellness.

I. INTRODUCTION

Problem Statement & Motivation A disappointing trait of maintaining the body fit is that the outcomes can't be seen quickly as they should go through months and years to accomplish a definitive outcomes. In this way, one of the disturbing issues in the general public these days is that they have a helpless following capacity where it is hard to follow along of their activity insights like calories, water intake, healthy diet. It is practically difficult to monitor every one of these insights helpfully due to reasons like absence of estimating instruments and self – determination. Other than that, individuals likewise should not disregard diet has a significant influence in accomplishing a solid way of life yet it is additionally an intense work [1],[2] with regards to monitor their eating regimes as far as what they devour and the amount they burn through consistently on a daily basis. Subsequently , every one of these issues referenced above lead to the development of the project.

The web application will store the users information and gives them the individual planning according to their own needs and specifications. Additionally, because of people's poor tracking ability in diet insights where it might prompts a few undesired outcomes, there is a critical need in helping individuals to improve a few dietary habits by providing insights. In addition , the consideration of giving badges as a appreciation for those who complete the goal for the day

LITERATURE SURVEY

1. Nowadays, standard intake of healthy food is necessary for keeping a balanced diet to avoid obesity in the human body. In this paper, we present a novel system based on machine learning that automatically performs accurate classification of food images and estimates food attributes. This paper proposes a deep learning model consisting of a convolutional neural network that classifies food into specific categories in the training part of the prototype system. The main purpose of the proposed method is to improve the accuracy of the pre-training model. The paper designs a prototype system based on the client server model. The client sends an image detection request and processes it on the server

side[3] . The prototype system is designed with three main software components, including a pre-trained CNN model training module for classification purposes, a text data training module for attribute estimation models, and a server-side module. We experimented with a variety of food categories, each containing thousands of images, and through machine learning training to achieve higher classification accuracy.

2. Bodyweight, blood pressure, and cholesterol are all risk variables that can aid people in making educated decisions regarding their health promotion activities. Food choices are among the most effective methods for preventing chronic illnesses, including heart disease, diabetes, stroke, and some malignancies. Because various meals give varying amounts of energy and minerals, good eating necessitates keeping track of the nutrients we ingest. Furthermore, there is a paucity of information on whether understanding food constituents might aid in more accurate nutrition calculations. Therefore, this research suggests processing food images on social media to anticipate the contents of each food and extracting nutrition information for each food image to serve as healthy implicit feedback to take advantage of the rapid accumulation of rich photos on social media. The proposed methodology is a framework based on a machine-learning [3]-[4] model for predicting food ingredients. We also compute critical health metrics for each ingredient and combine them to obtain nutrition data for the food. The result revealed a promising way of extracting food components and nutrition information. Compared with other researchs, our proposed prediction and attribute extraction strategy achieves a remarkable accuracy of 85%.

3. Machine Learning (ML) is a very powerful and important technology in the world today. With the help of ML modules, various appropriate algorithms such as Faster RCNN [16] algorithm, canny edge detection algorithm and Grab Cut segmentation algorithm are applied to the proposed system. This system focuses mainly on the calculation of calories and other nutrients present in food. The whole thing will be automated as opposed to existing systems where the user needs to manually deliver the values. However, users will only need to click on the food image and provide it as an input to the system. Further processes can be automated quickly, such as the use of nearer R-CNN [8] to perceive for each food and standardization item. The Grab Cut algorithm is used to get the outline of each food. Then the volume of individually food is determined by formulas for volume valuation. Lastly, it estimates the calories of each food and experimental studies have shown that by providing production with information of calories and nutrients present in the food, the proposed estimation method is effective.

4. Data currently generated in the field of nutrition are becoming increasingly complex and high-dimensional, bringing with them new methods of data analysis. The characteristics of machine learning (ML) make it suitable for such analysis and thus lend itself as an alternative tool to deal with data of this nature. ML has already been applied in important problem areas in nutrition, such as obesity, metabolic health, and malnutrition. Despite this, experts in nutrition are often without an understanding of ML, which limits its application and therefore potential to solve currently[5] open questions. The current article aims to bridge this knowledge gap by supplying nutrition researchers with a resource to facilitate the use of ML in their research. ML is first explained and distinguished from existing solutions, with key examples of applications in the nutrition literature provided. Two case studies of domains in which ML is particularly applicable, precision nutrition and metabolomics, are then presented. Finally, a framework is outlined to guide interested researchers in integrating ML[6] into their work. By acting as a resource to which researchers can refer, we hope to support the integration of ML in the field of nutrition to facilitate modern research.

Project Scope

Subsequent to referencing the issues over, the deliverable of the project is a fitness web application considered P Fit in which the users can utilize the application to monitor their activity food and water

insights like calories, reminding of their water consumption etc.
Then huge loads of data can be accessible in the application so that users can be furnished with useful as well as helpful tips and [7]tricks about health to make their life more grounded than previously. There are more details for modules involved in this paper as shown below:

Select Food Module
This module permits the users to create meal with existing foods stored in the database and afterward log the suppers that they have burned – through as per the sort of supper like breakfast , lunch, and supper to monitor the consumption while the measure of calories will likewise be logged alongside the suppers so that they will get an exact idea [9]-[14] regarding how much they ate in their daily meals. Along with it users can also create custom food item and enter the information required in case if they can't find it in the database.
BMI Feature
The user can check their body mass index according to their height and weight. Calorie Tracker
This feature allows the user to check the required calories for a day by entering their weight and their activity level.
Health Tips
While the user opens the application, they get the tips for maintaining good health.

2. PROBLEM STATEMENT
Major health problems that are faced by most of the people nowadays are due to obesity. One of the reasons for obesity is unbalanced food. Therefore, we have to consume [15] good food for healthy life. Good nutrition is important to maintain our health. Many people prefer dieting to overcome from obesity.

1.2 EXISTING SYSTEM
Major health problems that are faced by most of the people nowadays are due to obesity. One of the reasons for obesity [15] is unbalanced food. Therefore, we have to consume good food for healthy life. Good nutrition is important to maintain our health. Many people prefer dieting to overcome from obesity.

DISADVANTAGES OF EXISTING SYSTEM
- Due to imbalanced food facing obesity problem.
- Quick fixes lead to short-term results followed by weight regain.
- Restrictive diets can cause nutrient deficiencies and health problems.
- Extreme calorie restriction slows down metabolism, hindering long-term weight loss.
- Unsustainable diets result in frustration and eventual return to unhealthy habits.

1.3 PROPOSED SYSTEM
Counting calorie is one of the important roles in part of healthy lifestyle. Calorie is a unit of measurement for the energy[10] value of food. Calorie counter [17]calculates the required calorie and consumed calorie, then provides the dietary plans and workout suggestion for the user.

ADVANTAGES OF PROPOSED SYSTEM
- Raises awareness of food choices and promotes accountability.
- Offers personalized guidance for diet and exercise plans.
- Empowers individuals to control their nutrition and weight management.
- Allows flexibility in food choices while maintaining calorie targets.
- Tracks progress and provides motivation for continued healthy habits.

4. IMPLEMENTATION
4.1 USER

Industrial Engineering Journal
ISSN: 0970-2555
Volume : 53, Issue 5, May : 2024

Here user should register with the application after successful registration then login into application then he can perform some operations such as
Add limit calories
There are two options to generate and add calories limit

4.1.1 Diabetic patient

These peoples are should enter the sugar level above 100 then submit the data then automatically calories limit will generate and confirm data.

4.1.2 Non Diabetic

There peoples should enter their age, weight , height then submit details then he can get the calories limit and confirm data
Add food items: here user should select the food items then enter no of items he had View food items: here user can have the chance to view food items
Add exercise: here user should add exercise details like type, time, and burned calories View exercise: here user can have change to view exercise details
View results: here user can have the change to view results.

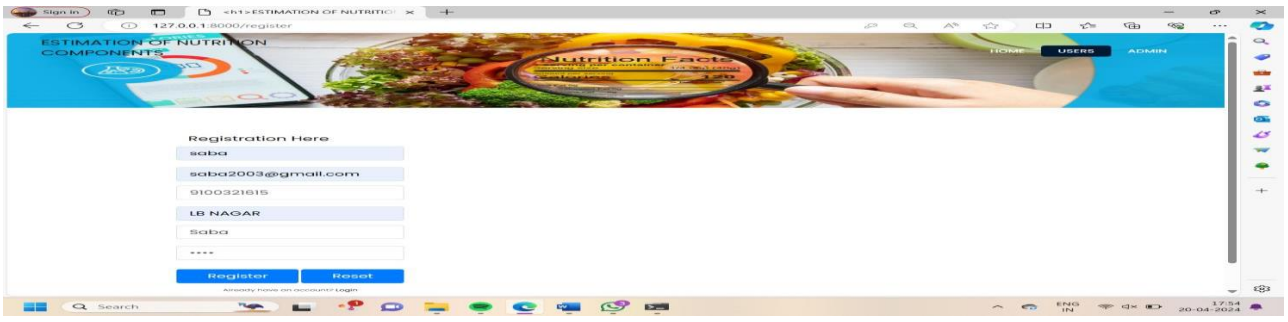
4.2 ADMIN

Here admin is a module should login with the application after successful login he can perform some operations such as add food items like food name, calories, facts, carbohydrates, proteins and view items list and logout.

5. EXPECTED RESULTS

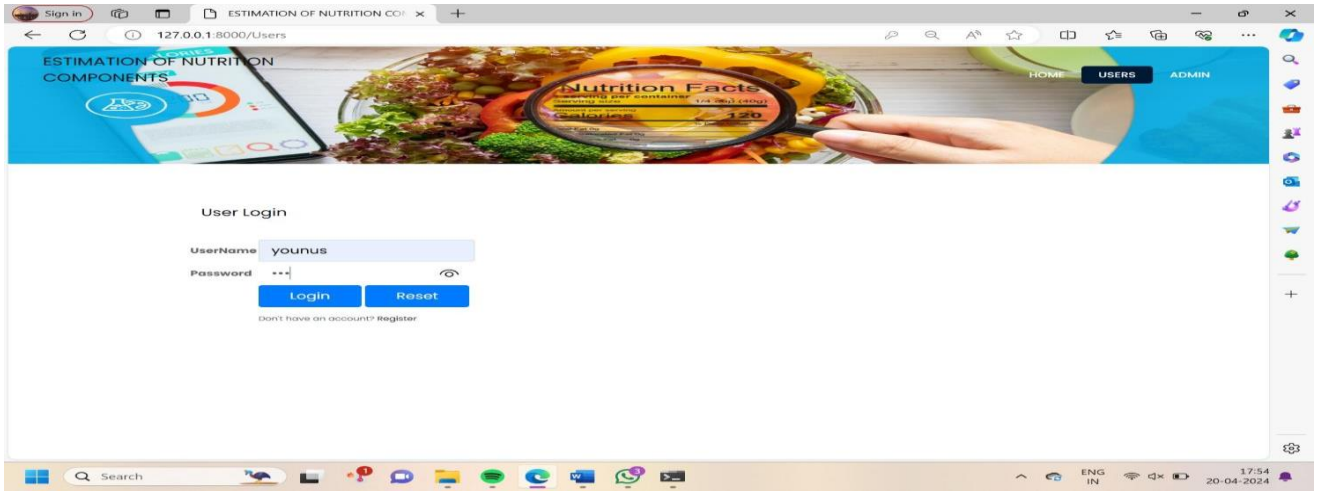
HOME PAGE

NEW USER REGISTRATION



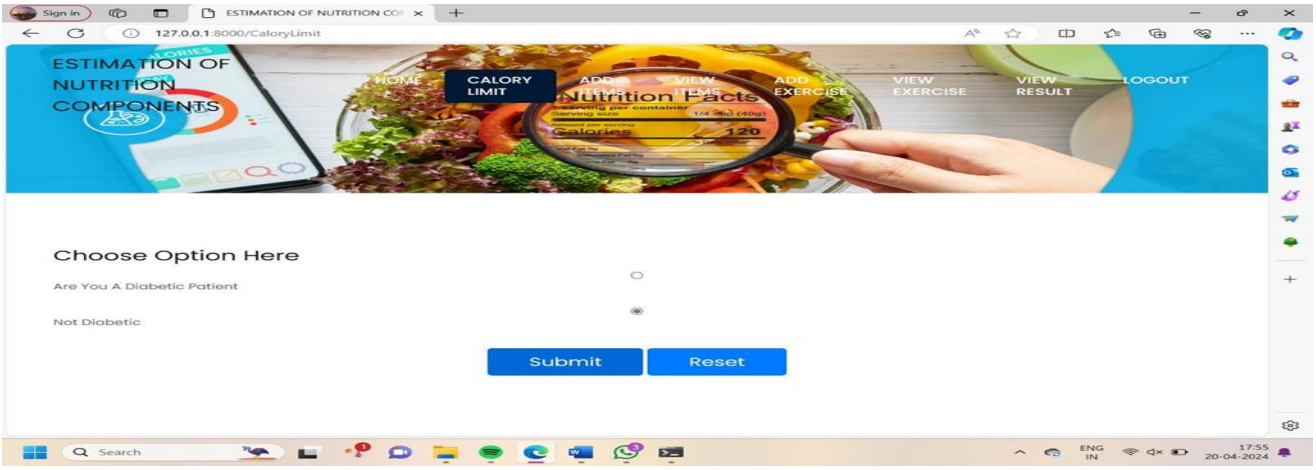
USER LOGIN

Industrial Engineering Journal
ISSN: 0970-2555
Volume : 53, Issue 5, May : 2024



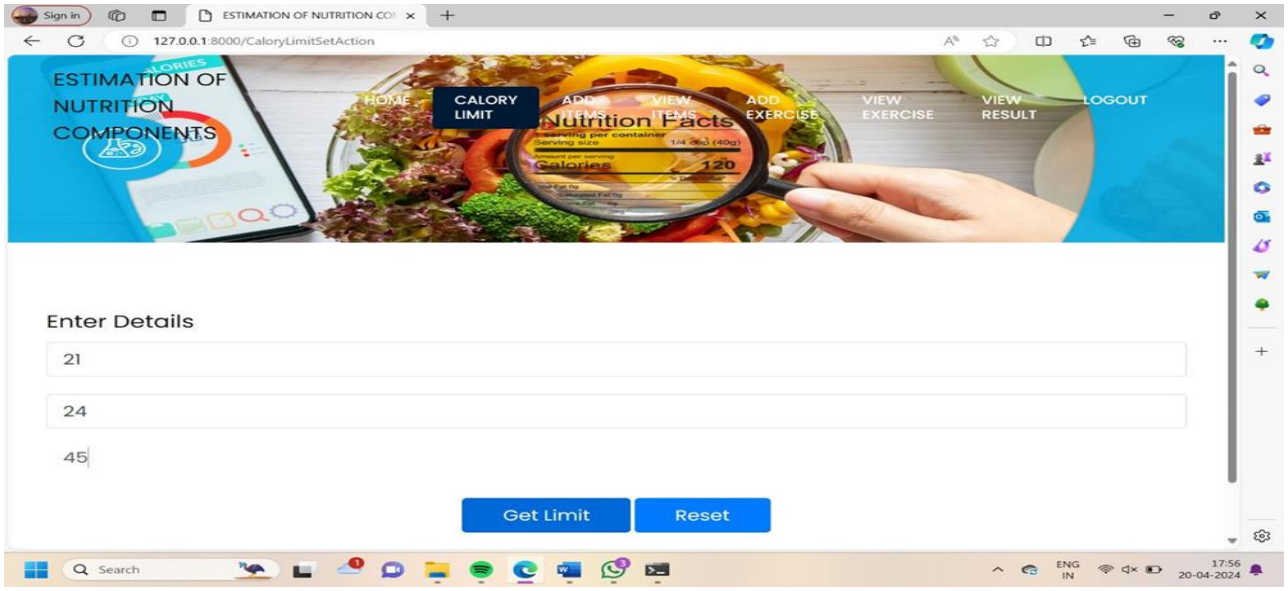
WELCOME TO USER HOME

ENTER TYPE OF PATIENT

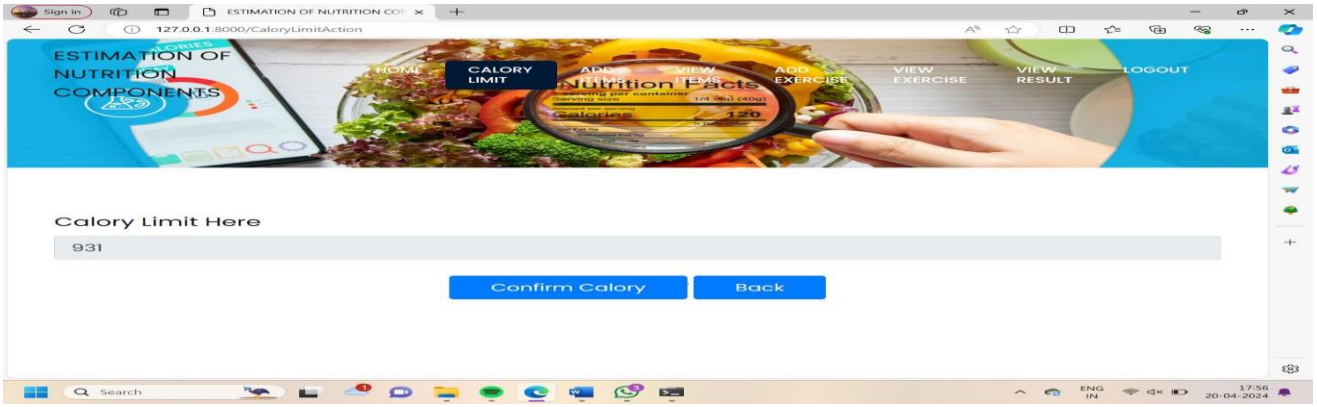


ENTER DETAILS

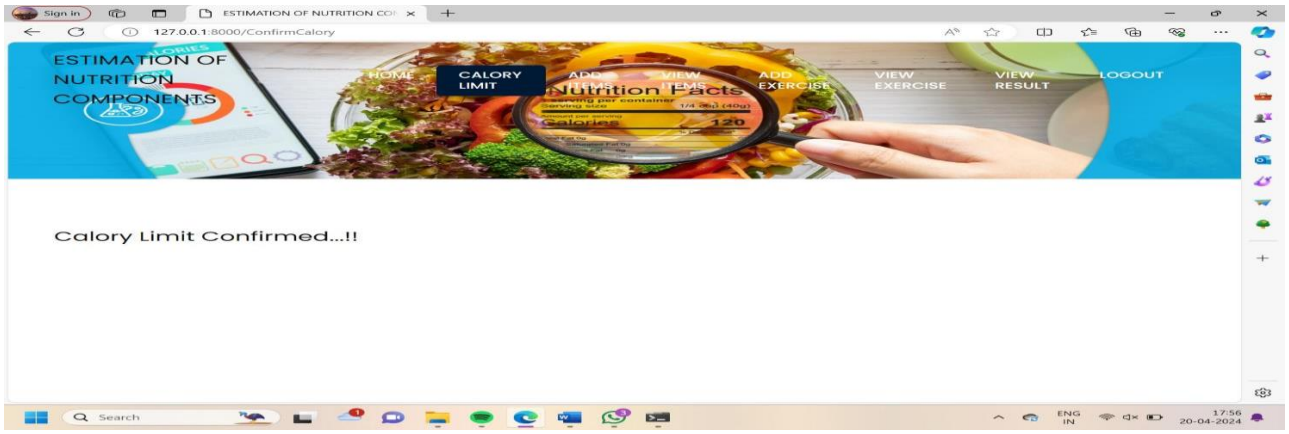
Industrial Engineering Journal
ISSN: 0970-2555
Volume : 53, Issue 5, May : 2024



CALORIE LIMIT GENERATION

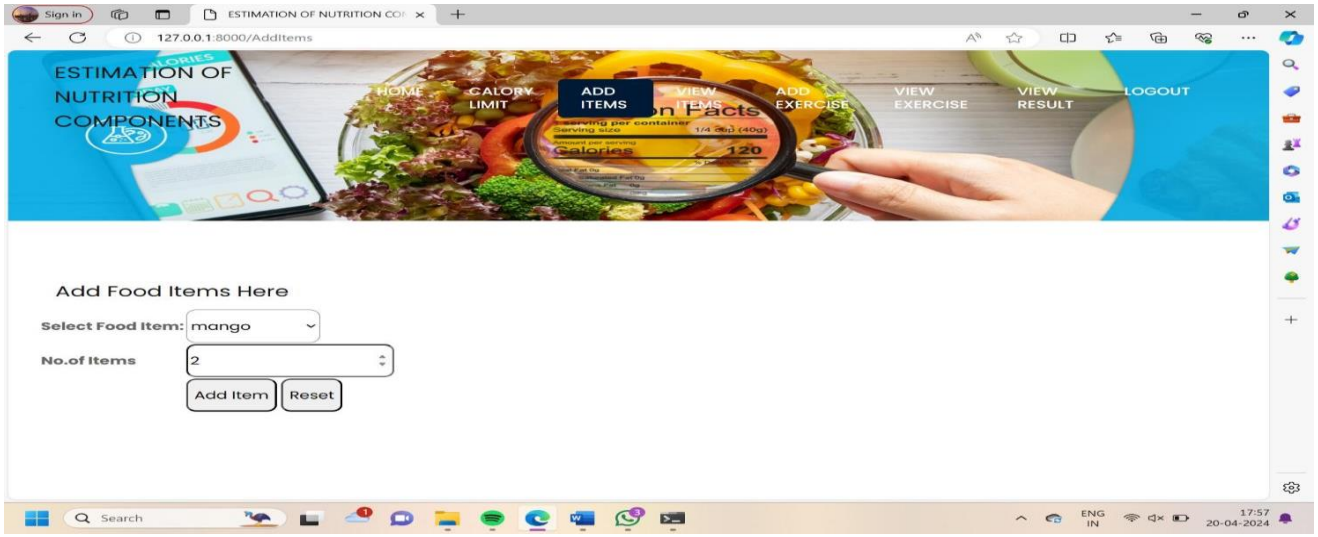


CALORIE LIMIT CONFIRMATION

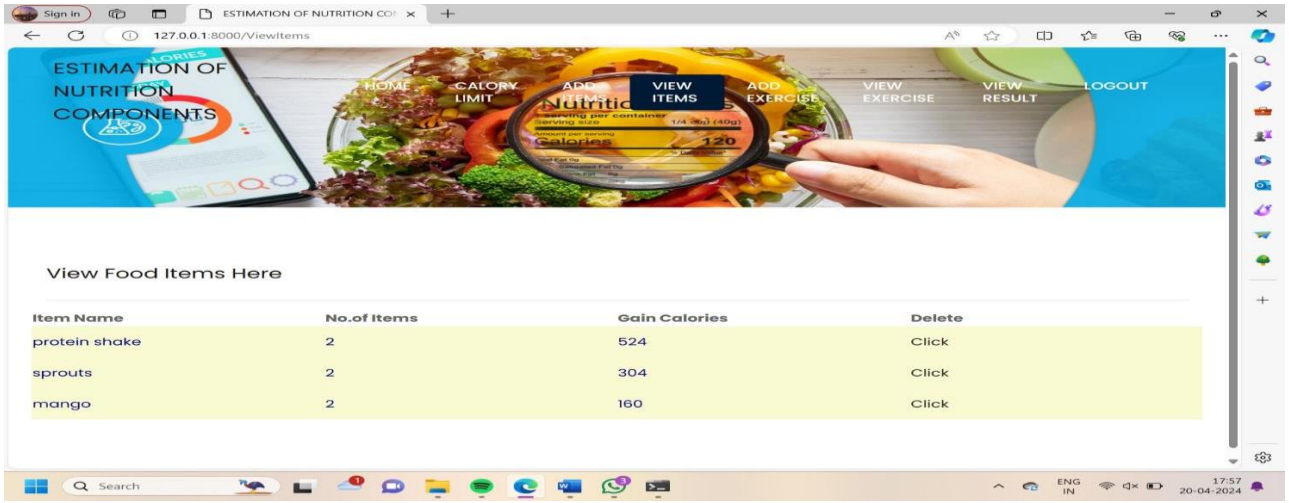


ADD FOOD ITEMS

Industrial Engineering Journal
ISSN: 0970-2555
Volume : 53, Issue 5, May : 2024



VIEW FOOD ITEMS

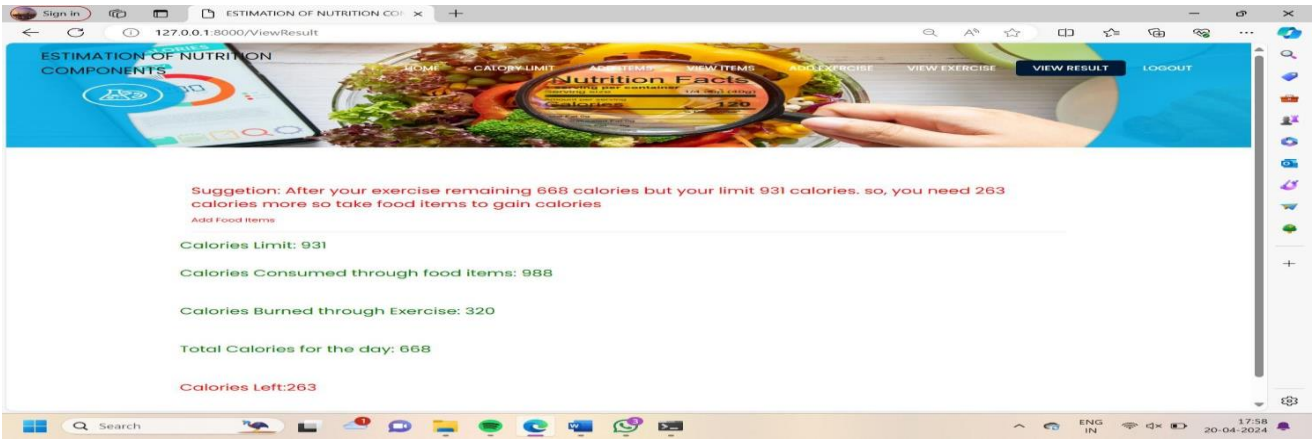


ADD EXERCISE

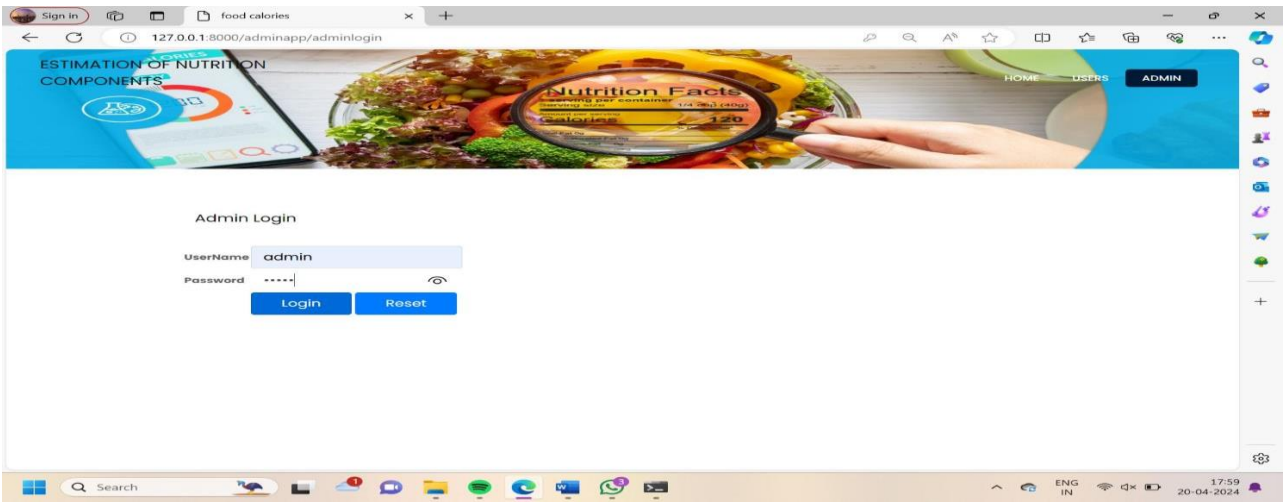
VIEW EXERCISE

Industrial Engineering Journal
ISSN: 0970-2555
Volume : 53, Issue 5, May : 2024

VEIW RESULT



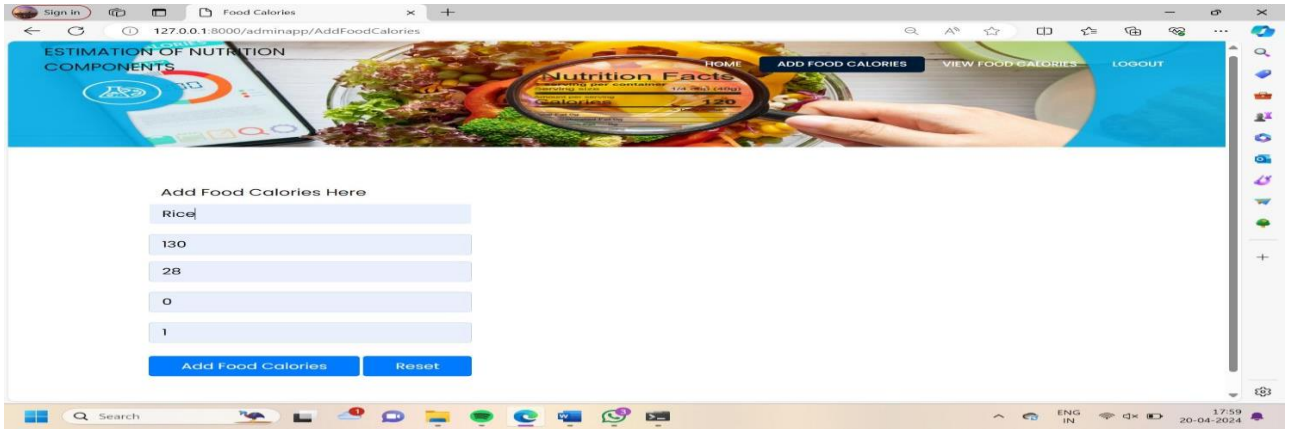
ADMIN LOGIN



WELCOME TO ADMIN

Industrial Engineering Journal
ISSN: 0970-2555
Volume : 53, Issue 5, May : 2024

ADD FOOD ITEMS



VIEW FOOD ITEMS

Food Item Name	Calories	Carbohydrates	Facts	Proteins
banana	98	23	0	1
apple	56	14	0	0
sprouts	152	13	8	7
protein shake	262	12	6	40
mango	80	0	0	12
Rice	130	28	0	1

6. CONCLUSION

A web application for every individual who concentrates or want to keep track on their health daily is discussed in this paper by researching many articles about the health conditions in the internet, which

made us easy to implement and collect various data from different platforms. The main idea is to give an application for every individual to keep track on their activity related to their health. With sufficient data about them every individual can use this application and also whenever more users started using application it becomes more easy to bring accurate results to users as well. Comparison of our application is done with other apps to strengthen our case of using Django. Though many variations observed in the procedure, the results are similar, precise and notable. Bringing of awareness regarding maintaining good health in the last decade has been noted by many scholars and many improvements had taken place. The most promising sector for these types of applications would be medical as it tells all about maintaining healthy lifestyle. Also, to increase the accuracy of the application would involve only making more observation in different scenarios and other verifying systems.

FUTURE SCOPE

In addition to its current capabilities, the calorie counter system has the potential to evolve into a comprehensive platform for promoting holistic wellness and fitness. Future scope considerations include enhancing the system to provide advanced nutritional analysis beyond calorie counting, tracking macronutrients, micronutrients, and other dietary components to offer users a deeper understanding of their nutritional intake. Integration with wearable devices such as fitness trackers and smartwatches could automatically sync activity data with the calorie counter system, providing users with real-time feedback on their calorie expenditure and enabling more accurate goal setting and progress tracking. Implementing machine learning algorithms to analyze user data and provide personalized recommendations for diet and exercise based on individual preferences, goals, and lifestyle factors could further enhance user experience. Additionally, introducing social networking features like discussion forums, challenges, and sharing features could foster community engagement and support among users, facilitating peer support, motivation, and accountability. Exploring partnerships with healthcare providers and professionals to integrate the calorie counter system into clinical settings could enable remote monitoring and support for patients' progress, as well as inform personalized treatment plans and interventions. Incorporating gamification elements such as challenges, badges, and rewards could further incentivize and motivate users to adhere to their health and fitness goals, encouraging sustained engagement with the system and promoting positive behavior change over the long term

7. REFERENCES

[1]Boreham, C., Robson, P.J., Gallagher, A.M., Cran, G.W., Savage, J.M. and Murray, L.J., 2004. Tracking of physical activity, fitness, body composition and diet from adolescence to young adulthood: The Young Hearts Project, Northern Ireland. International Journal of Behavioral Nutrition and Physical Activity, 1(1), p.14.

[2]Coughlin, S.S., Whitehead, M., Sheats, J.Q., Mastromonico, J., Hardy, D. and Smith, S.A., 2015. Smartphone applications for promoting healthy diet and nutrition: a literature review. Jacobs journal of food and nutrition, 2(3), p.021.

[3]de Zambotti, M., Claudatos, S., Inkelis, S., Colrain, I. and Baker, F. (2015). Evaluation of a consumer fitness-tracking device to assess sleep in adults. Chronobiology International, [online] 32(7), pp.1024-1028. Available at:
*http://europepmc.org/backend/ptpmcrender.fcgi?accid=PM C4780439&blobtype=pdf .

[4]Frimming, R., Polsgrove, M. and Bower, G. (2011). Evaluation of a Health and Fitness Social Media Experience. American Journal of Health Education, 42(4), pp.222-227.

[5]Gowin, M., Cheney, M., Gwin, S. and Franklin Wann, T., 2015. Health and fitness app use in college students: A qualitative study. American Journal of Health Education, 46(4), pp.223-230.

[6]Rejeski, W. and Kenney, E. (1989). Fitness motivation. 1st ed. Leeds: Human Kinetics, p.3 – 7. [7]

Robinson, L., Segal Ph.D., J. and Segal, R. (2017). Healthy Eating: Tips for Planning, Enjoying, and Sticking to a utritious Diet. [online] Helpguide.org. Available at: https://www.helpguide.org/articles/healthy- eating/healthyeating.html.
[8]Daily burn, http://dailyburn.com/. [3]Dietary Reference Intakes (DRIs): Recommended Intakes for Individuals, National Academies, 2004.
[9]A. Kahraman et al., Healthy Daily Meal Planner, pp. 390– 393, GECCO 2005.
[10] Shaobo Kuang et al, Nutrition / diet control system, US patent, 2008.
[11] Kim, Jong-Hun, et al. "Design of diet recommendation system for healthcare service based on user information." 2009 Fourth International Conference on Computer Sciences and Convergence Information Technology. IEEE, 2009.
[12] Hsiao, Jen-Hao, and Henry Chang. "SmartDiet: A personal diet consultant for healthy meal planning."2010 IEEE 23rd International Symposium on Computer-Based Medical Systems (CBMS).IEEE, 2010.
[13] T.Longvah,R.Ananthan “Indian Food Composition Tables” National Institute of Nutrition(Indian Council of Medical Research),2017.
[14] B. A. Shawar, and E. Atwell, “Different measurements metrics to evaluate a chatbot system,” Proceedings of the Workshop on Bridging the Gap: Academic and Industrial Research in Dialog Technologies, 2007.
[15] Microsoft. Microsoft Cognitive Services: LUIS. 2015 [cited 24/04/2018; Available from: https://www.luis.ai/home. [25]Google. Dialogflow 2010 23/04/2018]; Available from: https://dialogflow.com/.
[16] Amazon Web Services, I. Amazon Lex – Build Conversation Bots. 2017 23/04/2018]; Available from: https://docs.aws.amazon.com/lex/latest/dg/what- is.html.
[17] World Health Organization: Obesity: preventing and managing the global epidemic. Report of a WHO Consultation. World Health Organ Tech Rep Ser894(2000)