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CALORIES BURNT PREDICTION USING XGBOOST ALGORITHM

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ABSTRACT

This research introduces a thorough method for XGBoost algorithm-based daily calorie burn prediction. The project incorporates a number of functions, such as password recovery, user registration, login, and predictions based on user data, including height, weight, age, gender, work duration, body temperature, and heart rate. Furthermore, the Edamam and Wger APIs are used by the system to recommend meals and exercises, respectively. The exercise.csv and calories.csv datasets were obtained from Kaggle for this research.

Keywords: Calories Burnt Prediction, Xgboost, Machine Learning, Flask, Mysql, Edamam API, Wger API, Personalized Health Management.

I. INTRODUCTION

Tracking calories burned is essential for maintaining fitness and reaching certain health goals in today's health-conscious world. This project uses machine learning, namely the XGBoost algorithm, to forecast the number of calories burned each day. For user management, the system provides an intuitive web interface created with Flask and MySQL. Following the forecast, the program makes workout and food recommendations based on the user's fitness objectives.

II. LITERATURE SURVEY

Daniel Bubnis [1] asserts that there is a direct correlation between daily energy consumption and weight gain, decrease, or maintenance. When someone has to expend more calories than they consume, they are said to be in a calorie deficit. But they're interested in knowing how many calories they burn every day. Most individuals think that there is a direct correlation between calories consumed and weight loss. There are numerous ways to define calories as heat or energy. Regardless of whether they are trying to gain, lose, or maintain weight, it is imperative that men and women are aware of how many calories they consume each day.

Salvador Camacho [2] No country has been able to reverse the worldwide obesity issue, which has been getting worse every day. The primary cause of obesity, according to the World Health Organization, is an energy imbalance between calories consumed and calories burned. However, accumulating evidence suggests that the notion of calorie imbalance may not be sufficient to curb the obesity epidemic.

To highlight the need for an updated theory on the causes of obesity, this study will look at the calorie imbalance hypothesis, its components, and its applicability as a weight-management tool. It will also look at any potential downsides and implications for public health. This change could more effectively guide public health campaigns to combat obesity by discouraging weight gain and promoting weight loss.

World Health Organization. Obesity Study. [Online] (October 2011). [3] A person may be able to alter their diet or exercise regimen to get the desired effects by being aware of the variables that influence calorie burning. Numerous research have been published in the literature that use data mining and machine learning to diagnose these issues. Certain studies from two to three years ago are less accurate in predicting problems related to calories burned than the study conducted today.

People may receive more accurate and customized information if machine learning algorithms are developed to predict calorie consumption. XGBoost is a powerful machine learning algorithm that has been widely used for a range of predictive analytics jobs due to its excellent performance and efficiency [4]. Such complex models can be integrated into intuitive software to significantly enhance the personal health management process.

Furthermore, using APIs like the Wger API for exercise recommendations and the Edamam API for food ideas [5–6] can give consumers all the tools they need to properly manage their diet and exercise schedules. Whether

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the user's aim is to maintain general fitness, increase muscle, or lose weight, these APIs provide tailored recommendations that meet their needs.

III. METHODOLOGY

DATA COLLECTION AND PROCESSING

For this research, two Kaggle datasets were used:

- Exercise.csv: This file has seven columns: Work Duration, Body Temperature, User ID, Gender, Age, Weight, and Height.
- Calories and User ID can be found in calories.csv.

The User ID field served as the basis for the dataset merger. After that, the combined dataset underwent preprocessing, which included managing missing values and one-hot encoding of categorical variables like gender.

MODEL TRAINING

Because of the XGBoost algorithm's accuracy and efficiency in regression tasks, it was chosen. After dividing the data into training and testing sets, hyperparameter tuning was done using a GridSearchCV. Mean Absolute Error (MAE), R-squared (R2), and Mean Squared Error (MSE) were used to assess which model was the best.

The following steps are,

- The data will breaking in training and testing sets.
- Outlining the hyperparameter tuning parameter grid.
- To determine the ideal hyperparameters, use GridSearchCV.
- Using the ideal hyperparameters to train the XGBoost model.
- Assessing the model's effectiveness using the test set.

IV. IMPLEMENTATION

FLASK APPLICATION

MySQL was used as the database and Flask was used to build the web application. Among the important features are:

- User Registration
- Login
- Password Recovery.

Integration of APIs for Calorie Prediction

- **Edamam API:** Offers meal recommendations based on estimated caloric expenditure for gaining muscle, losing weight, and preserving fitness.
- **Wger API:** Provides workout recommendations based on the user's fitness objectives.

V. RESULT AND DISCUSSION

During the evaluation phase, the model's performance measures were calculated, including Mean Squared Error (MSE), R-squared (R2), and Mean Absolute Error (MAE). These metrics are accessible in the backend logs but are not shown in the user interface.

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User Registration

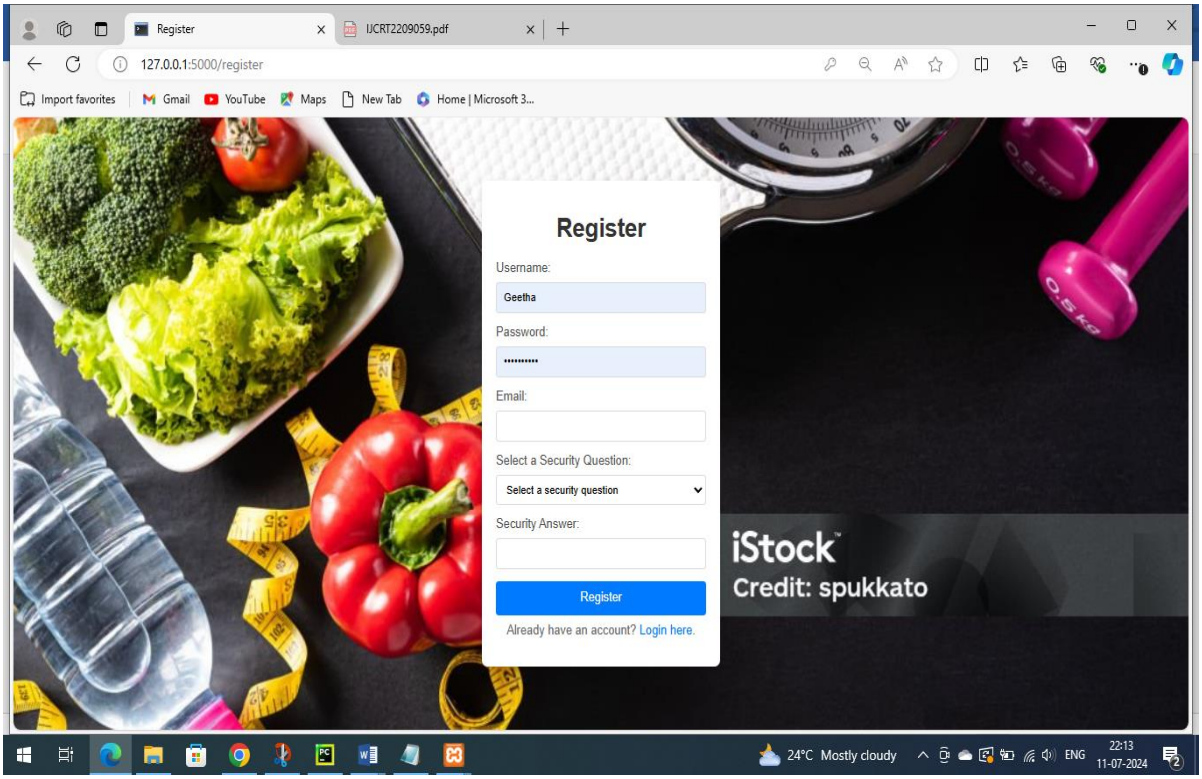

Figure 1: User Registration Page

User Login

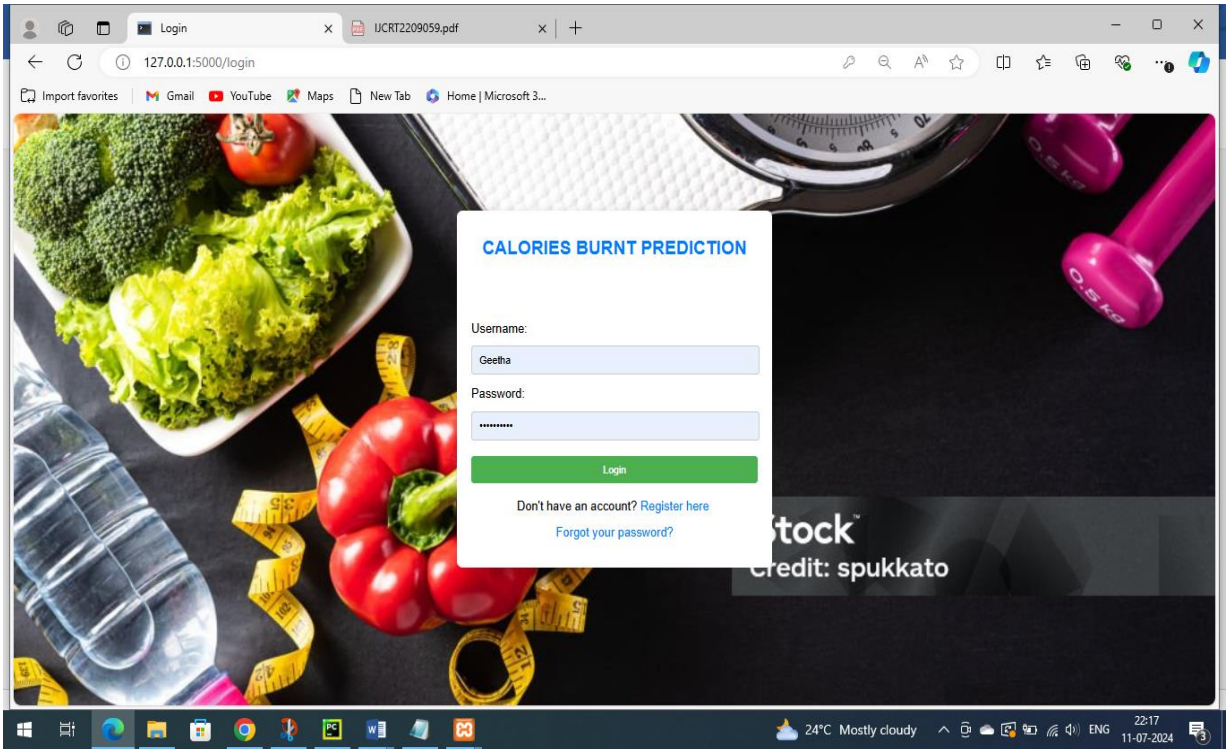

Figure 2: User Login Page

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Password Recovery

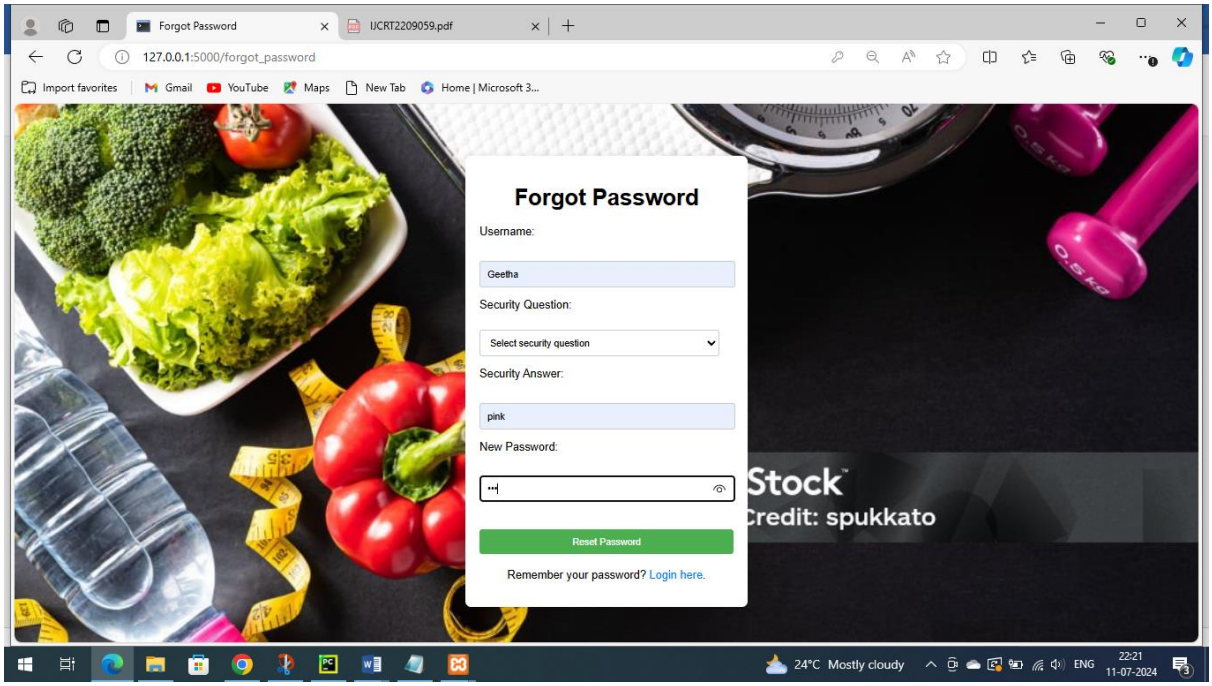

Figure 3: Forgot Password Page

Calories Prediction

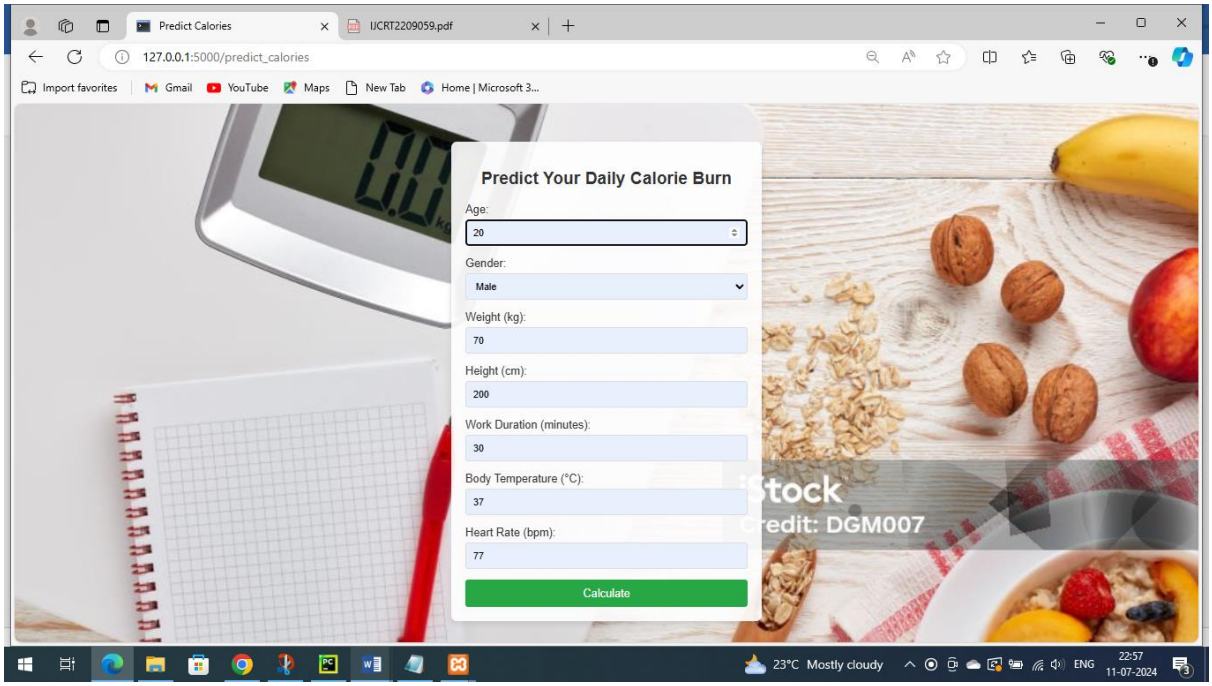

Figure 4: Predict Calories Page

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Prediction Results

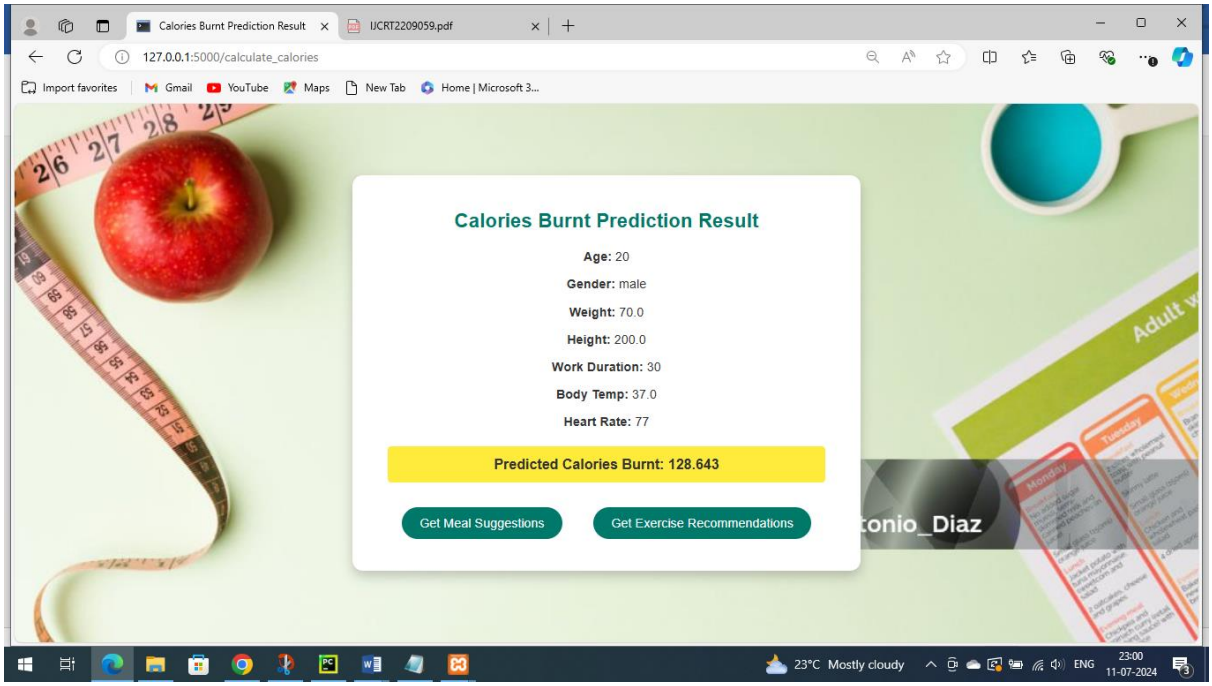

Figure 5: Prediction Results Page

Select Goal

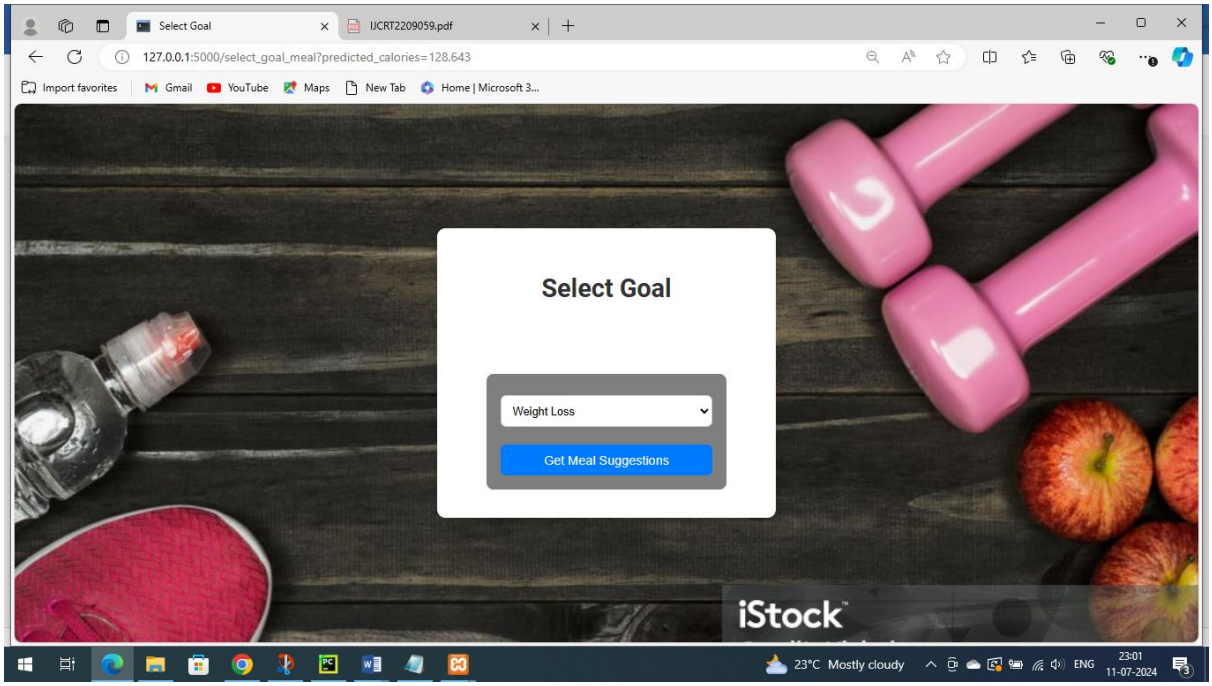

Figure 6: Select Goal Page

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Meal Suggestion

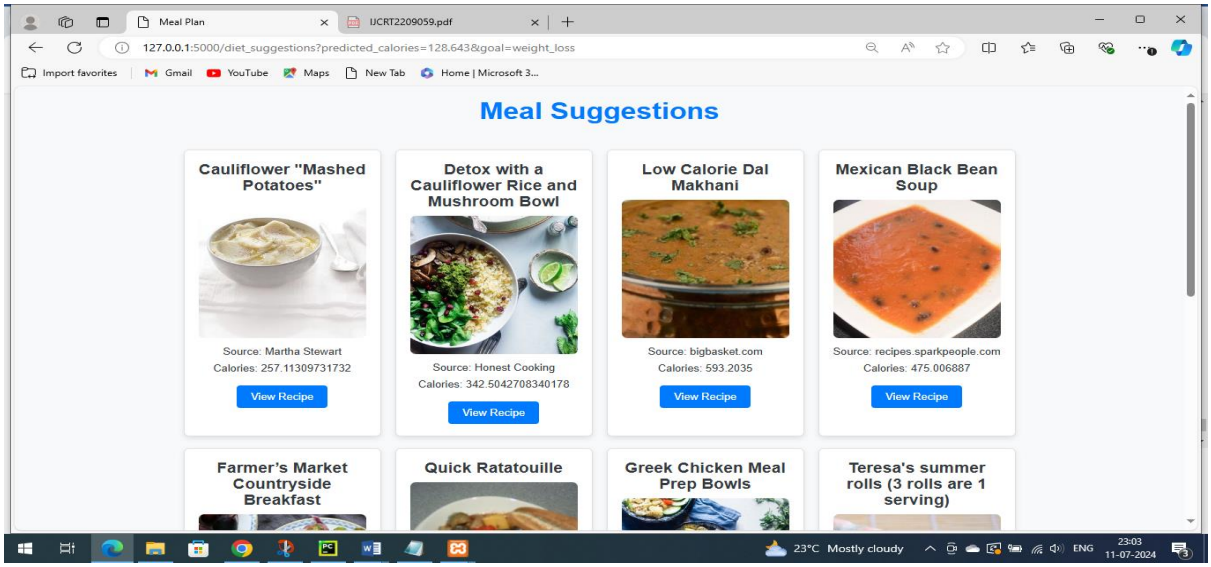

Figure 7: Meal Suggestion Page

Exercise Suggestion

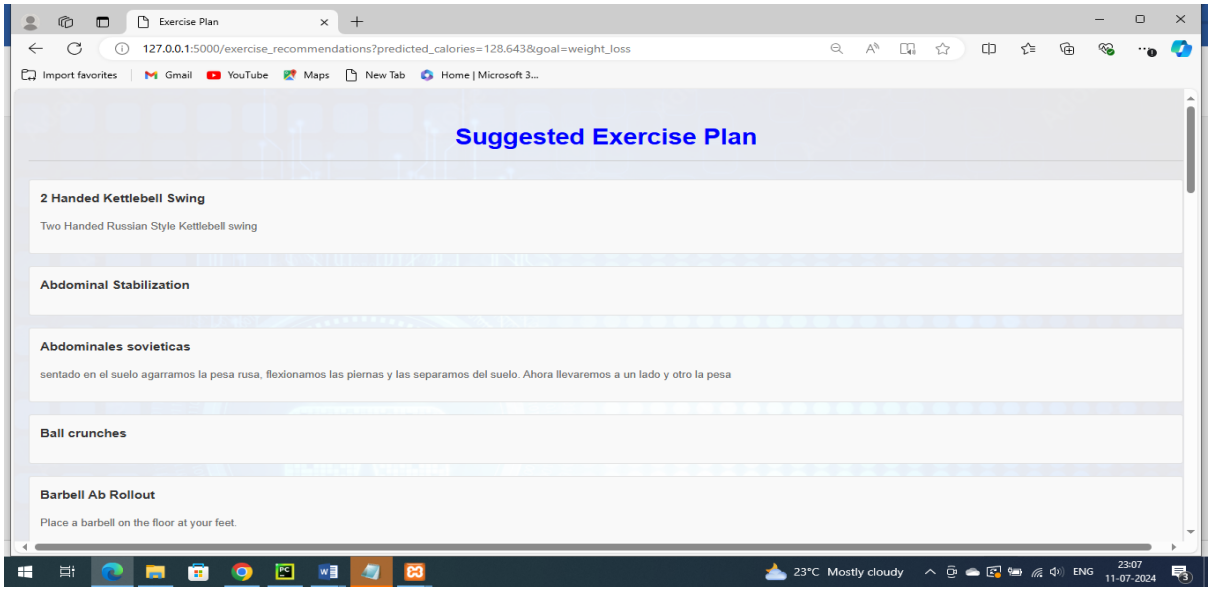

Figure 8: Exercise Suggestion Page

VI. CONCLUSION

This research shows how machine learning may be used to forecast daily calories burned and provide tailored recommendations for meals and exercise. The system's usability is improved by the incorporation of user-friendly web elements, which makes it a useful tool for users who want to reach their fitness objectives.

VII. REFERENCES

[1] https://www.medicalnewstoday.com/articles/319731#factors-influencing-daily-calorie-burn-and-weight-loss
[2] https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5496172
[3] https://www.jetpac.com/
[4] XGBoost Documentation, "XGBoost Documentation," https://xgboost.readthedocs.io/.
[5] Edamam API, "Edamam API," https://developer.edamam.com/.
[6] Wger API, "Wger API," https://wger.de/en/software/api.