The 4th Egyptian Junior Researcher Competition

16TH UGRF: SPECIAL EDITION

RESEARCH OFFICE

NU RESEARCH FORUM 16TH UGRF SPECIAL EDITION

Obesity Prediction And Meals Recommendation Using Neural-Network

Deep Learning & mobile app

INTRODUCTION

Obesity is a significant global health issue, requiring effective strategies for prediction and prevention. We focused on leveraging AI techniques to predict obesity and provide personalized meal recommendations. By analyzing factors like age, gender, lifestyle habits, activity levels, and medical history, a robust predictive model will identify individuals at high risk of obesity. Integrated with nutritional database, the AI system will generate tailored meal plans to optimize nutrient intake and caloric balance.

OBJECTIVES

1-Develop a predictive model to identify individuals at high risk of obesity, aligning with **Sustainable Development** **Goal 3: Good Health and Well-being.**

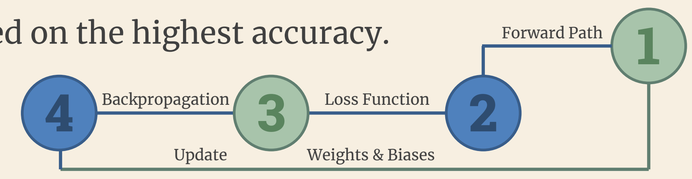
2- Provide personalized meal recommendations based on Individual characteristics and health goals, promoting healthy eating habits and supporting **Sustainable Development** **Goal 12: Responsible Consumption and Production.**

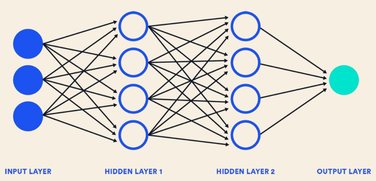
3- Optimize individual health outcomes by promoting healthier lifestyles and reducing the impact of obesity-related health problems.

METHODS

Classification Using PyTorch & NN

A simple Neural Network-based Classifier, It consists of a hidden layers with **ReLU** activation and an output layer. The model is trained using the **Adam** optimizer and **CrossEntropyLoss** function. The training process includes mini-batch iterations and evaluation on the test set. The best model weights are saved based on the highest accuracy.





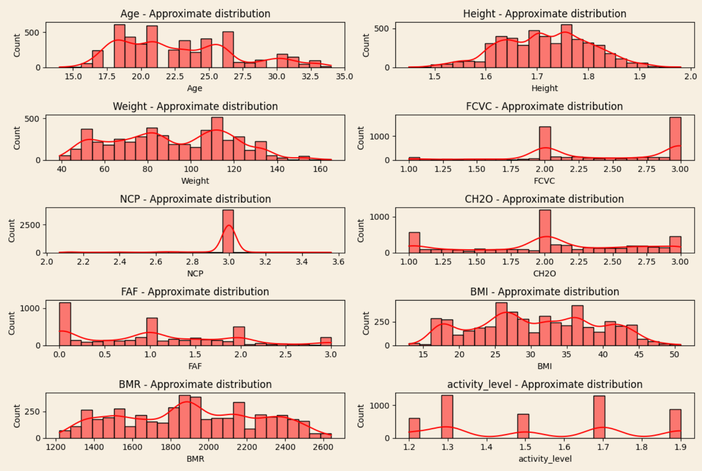
Mobile App With Flutter

1. The application enables users to input their personal information, including age, gender, lifestyle habits, activity levels, and typical dietary choices.
2. Using the provided data, the classification process begins by utilizing our own dataset. It then generates recommendations for the ideal calorie intake to either maintain or lose weight.
3. the application offers meal and exercise plans tailored to the previously generated calorie recommendations. These suggestions aim to assist users in adopting a healthier lifestyle.

VISUALS & RESULTS

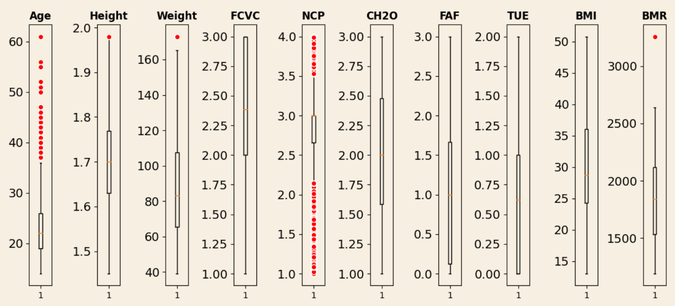
Distribution of features

We begin by visually examining the data distribution in order to determine suitable approaches for handling it.



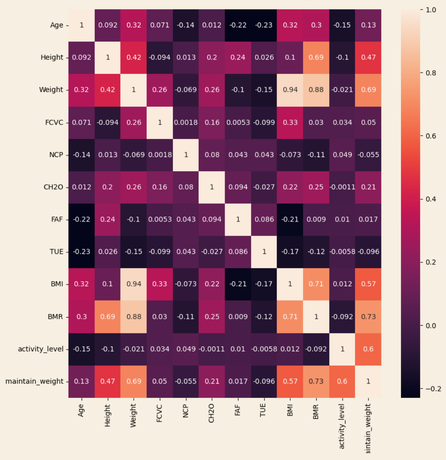
Outliers

Outliers are data points that significantly deviate from the majority of the dataset, and they can negatively impact the accuracy of classification models by introducing noise and bias in the training process. So, we removed them using Interquartile Range (IQR).



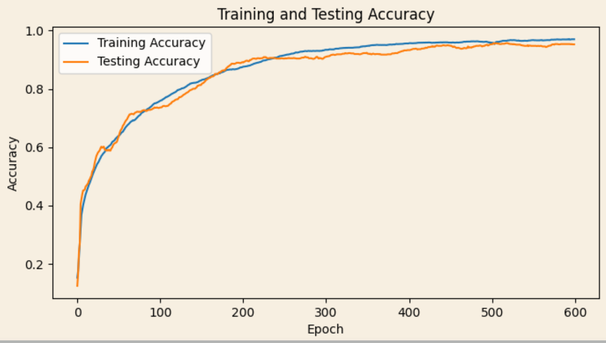
Correlation Between Data

The calculation of Pearson's Correlation Coefficient can significantly impact the examination of relationships and patterns among the data.



Model Accuracy & Convergence

Model accuracy refers to how well a trained model predicts the correct outcomes, while convergence refers to the state where the model's parameters stabilize, indicating that further training iterations may not significantly improve its performance. So, we reached an accuracy of about **94% - 96%**.



CONCLUSIONS

1. **DATA**
The data exhibits potential capabilities for classifying the required calorie intake for users t Moreover, it shows promise for future experimentation and development, allowing for further advancements in the field.

2. **CLASSIFICATION**
The simple neural network has made significant progress in handling the large dataset. However, further improvements are needed in the classification process to achieve consistent and reliable results.

3. **MODEL**
In future development, the model will require enhanced precision in handling the data and fine-tuning its parameters to further improve its performance and accuracy.

4. **APPLICATION**
The app provides users with convenient access to their data and offers a user-friendly interface. Additionally, there is potential for further enhance-ment by incorporating additional features to provide users with even more support and assistance

5. **FUTURE WORK**
we have made satisfactory progress, and there will be ongoing development to improve the model and add more features to the app for enhanced user control. the consideration of building a business plan is underway to further advance the project.