Calorie Checker: An Image-Analysis App for Caloric Estimation in Real Time

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Introduction

Abstract

The purpose of this app is twofold. First, the app will generate a correlative database of foods captured using an iOS smartphone's camera, its known caloric value, and specific user-input metatags. Second, after training using a machine learning algorithm, users will be able to capture images of food with no known correlative caloric values where the app will connect an iOS smartphone using C# to a Python-based machine learning image recognition server with 5G connection to enable a faster image process than conventional methods.

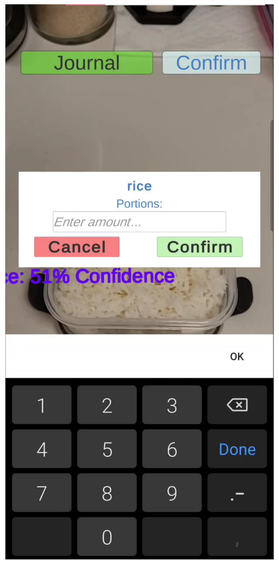
Background

Currently, there is no way for users who want to keep track of their diet to monitor their nutritional intake quickly. The user would have to know what serving portion they are consuming and how many calories are in each product. This may seem straightforward if they are next to the Nutritional Info label on the packaging; however, this is only sometimes the case. The user may join different food products together or buy the food from stores on the go, so the nutritional info is not always readily available. The app's goal is to allow anyone to quickly scan the food they will be eating with their smartphone camera, and through image analysis determine what the nutritional information is, and what the serving size is.

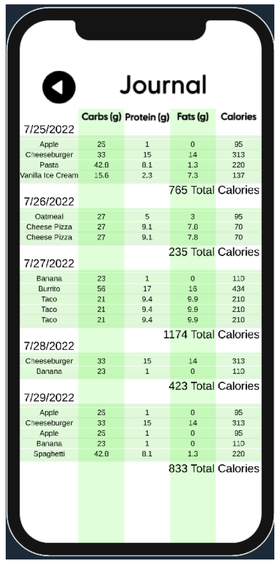
Results

Demonstration Images

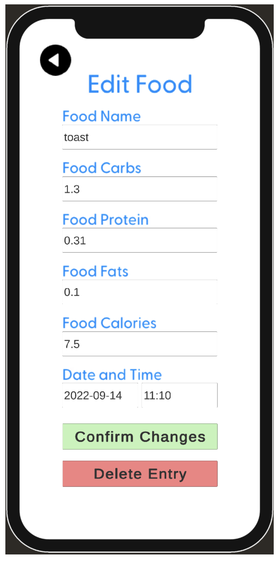
Main screen for computer vision using YOLOv8 object detection using FoodX-251 database



User is prompted to enter the portion size to provide accurate macronutrient data



Log of all data scanned in a human-readable format with data saved between sessions



Journal allows for complete user customization of previously scanned food items and their default values

Conclusions

Summary

- Current version of app is positioned to be of great value to those needing or wanting a more precise view of their diet.
- Advancement of smartphone camera technology and computational efficiencies allows for a novel app utilizing state-of-the-art image analysis in the palm of anyone's hand.

Future Work

- App can be expanded to include more food groups, allowing for a more diverse selection to include local cuisine.
- Will allow users to input new foods to continue training and adapting the model, with focus into zero-shot learning techniques.
- Will allow for open-sourcing of AI training data via automatic uploads to a cloud database.

References

Jocher, G., Chaurasia, A., & Qiu, J. (2023). YOLO by Ultralytics (Version 8.0.0) [Computer software]. https://github.com/ultralytics/ultralytics

Kaur, P., Sikka, K., Wang, W., Belongie, S., & Divakaran, A. (2019). *FoodX-251: A Dataset for Fine-grained Food Classification*.

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