A Literature Survey on AI-powered Nutrition Analyzer for Fitness Enthusiasts

Abstract

Literature has indicated that accurate dietary assessment is very important for assessing the effectiveness of weight loss interventions. However, most of the existing dietary assessment methods rely on memory. With the help of pervasive mobile devices and rich cloud services, it is now possible to develop new computer-aided food recognition system for accurate dietary assessment. However, enabling this future Internet of Things-based dietary assessment imposes several fundamental challenges on algorithm development and system design.

1.INTRODUCTION

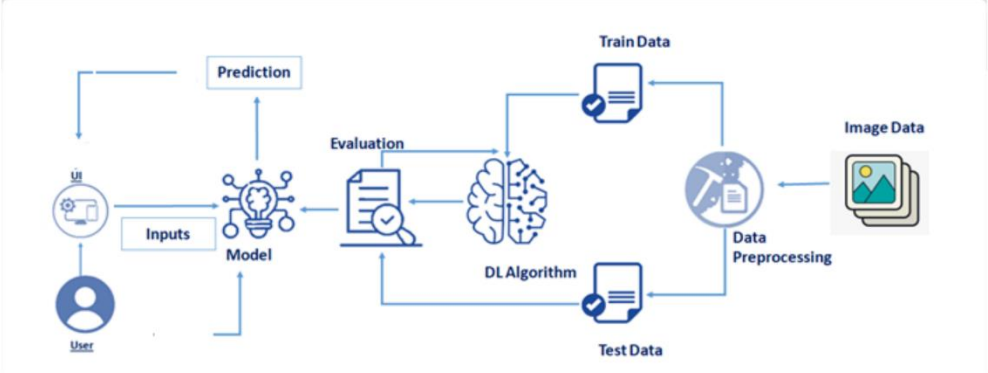
Due to the ubiquitous nature of mobile and wearable devices, it is now possible to use these devices to develop pervasive, automated solutions for dietary assessment. One example of such solutions is to use mobile devices as a pervasive food journal collection tool and to employ cloud service as a data analysis platform. The combination of mobile device and cloud service could contribute to improving the accuracy of dietary assessment. As a result, in the last few years, we have seen several mobile cloud software solutions to improve the accuracy of dietary intake estimation. One common issue among these solutions is that the users of the software must enter what they have eaten manually. To address this issue, visualbased food recognition algorithms and systems have been proposed. A recent review by Martin et al. also indicated that using digital imaging techniques for food recognition is superior to many other methods of dietary assessment techniques. Some advantages of visual-based food recognition systems include: reduced burden for users to recall the food, improved accuracy and efficiency of dietary recall.

While promising, one of the major barriers of adopting automatic dietary assessment system into practice is how to design and develop effective and efficient algorithms and system to derive the food information (e.g., food type) from food images. Considering the limited computation resources and low battery life on mobile device, it is more challenging to develop such a system within the mobile cloud computing paradigm.

2.AIM

The main aim of the project is to building a model which is used for classifying the fruit depends on the different characteristics like colour, shape, texture etc. Here the user can capture the images of different fruits and then the image will be sent the trained model. The model analyses the image and detect the nutrition based on the fruits like (Sugar, Fibre, Protein, Calories, etc.).

3.TECHNICAL ARCHITECTURE:



4.PROJECT FLOW:

- Data Collection.
  - Collect the dataset or create the dataset
- Data Pre-processing.
  - Import the ImageDataGenerator library
  - Configure ImageDataGenerator class
  - ApplyImageDataGenerator functionality to Trainset and Test set
- Model Building
  - Import the model building Libraries
  - Initializing the model
  - Adding Input Layer
  - Adding Hidden Layer
  - Adding Output Layer
  - Configure the Learning Process
  - Training and testing the model
  - Save the Model
- Application Building
  - Create an HTML file
  - Build Python Code

5.CONCLUSION

In this paper, we aimed to develop a practical deep learning-based food recognition system for dietary assessment within the edge computing service infrastructure. The key technique innovation in this paper includes: the new deep learning-based food image recognition algorithms and the proposed real-time food recognition system employing edge computing service paradigm. Our experimental results on two challenging data sets using our proposed approach have demonstrated that our system has achieved the three major objectives: (1) it outperforms the results from all existing approaches in terms of recognition accuracy; (2) it develops a real-time system whose response time is close to the minimal of existing techniques; and (3) it saves the energy by keep the energy consumption equivalent to the minimum of the existing approaches. In the future, we plan to continue improving performance of the algorithms (in terms of detection accuracy) and system (in terms of response time and energy consumption). We also plan to integrate our system into a real-world mobile devices and edge/cloud computing-based system to enhance the accuracy of current measurements of dietary caloric intake estimate. As our research is related to the biomedical field, much larger data sets are needed to provide convincing evidence to verify the efficacy and effectiveness of our proposed system. Backed by several major federal grants from NSF and NIH, we are in the process of collaborating with UMass Medical School and the University of Tennessee, College of Medicine to deploy our system in the real-world clinical practice.

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