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Developing A Nutrition Assistant Application Using Cloud Application Development

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ABSTRACT: Advancement in the modern technology provides us scope for analysing the nutrition present on a diet instantaneously. The main purpose of this project is to develop an application that provides nutritional information about various foods. Users can access nutritional information by taking a picture of food, uploading a picture from the gallery, or manually entering it. Goal tracking aids and engaging nutrition plans are available exclusively to users. Using Clarifai's AI-driven food recognition model for accurate food identification and food APIs to show the nutritional value of identified foods requires a relatively small investment of time. The model works by taking images of food as input, classifying them using a food pyramid, and calculating calorie and nutritional value. In the next step the entries are compared to available nutritional databases. The final step uses deep learning algorithms to provide the user with final results detailing the nutrients contained in a particular food item.

KEYWORDS: Clarifai's food detection, AI, Deep learning

I. INTRODUCTION

Titled "Nutrition Assistant Application", the project aims to provide a platform for users to make better nutritional choices and live healthier lives. This is achieved by creating a convenient and easy-to-use application that allows users to upload images of the foods they eat on a daily basis and learn about their nutritional value. This is especially useful for those with health concerns who need more of a particular nutrient in their diet. It is also an easy way to educate people about the different nutrients found in foods. With the ongoing health boom, people in the technological age need the right tools to understand nutrition in a convenient way. It is where our project comes into play. In this fast-paced world, people don't have time to focus on their health, and on-the-go dining and fast food are becoming more popular. This can harm the health of young people and affect our future generations. What we need now is to make nutrition available and help people understand which nutrients are in which foods.

II. OBJECTIVE

To measure and track nutritional value, calories, allergens, etc. in food and provide customized meal plans. To develop a mobile application that can track the calories in a food, create custom diet plans and training plans, recommend foods and supplements.

III. LITERATURE REVIEW

1. "Development of a Smartphone Application for Dietary Self-Monitoring"

Analyses the development of an application that is developed to assess and track dietary intake. It employs Diet Evaluation System (DES) algorithm and employs the Cloud computing, Machine Learning technologies. Precision measurement of nutrients could be made possible.

2. "Barriers and Enablers to Delegating Malnutrition Care Activities to Dietitian Assistants"

Identifies the barriers and enablers to delegating malnutrition care activities to dietitian assistants. NVIVO® software has been used as a key tool in developing the identification.

Technologies used are Cloud Computing and Artificial Intelligence.

3. "Co-designing nutrition interventions with consumers: a scoping review"

The study about the interventions which proposes to identify and synthesize the existing evidence on the current use and extent of consumer co-design in nutrition interventions. The tools used have adapted 2weekSR approach. Machine Learning and Cloud App Development are the technologies revolving around this.

4. “The delivery of patient centered dietetic care in subacute rehabilitation units: A scoping review”

Emphasises to demonstrate the delivery of PCC by qualified dietitians, through individual consultations with adult patients undertaking subacute rehabilitation. NVIVO® software has been made use of to process the data. Cloud computing and Artificial Intelligence are the two technologies which is used here.

5. “Mobile applications for the sport and exercise nutritionist: a narrative review”

The survey resorts to know the considerations that practitioners should make before they implement apps into their practice or recommend their use to coaches and athletes. The algorithm used is Diet Evaluation System (DES). It employs cloud computing and Machine Learning technologies.

6. “Characteristics of Smartphone Applications for Nutrition Improvement in Community Settings: A Scoping Review”

Gives insights to feature, the key content, theoretical approaches, and methods of consumer testing of applications intended for nutrition. ProQuest tool plays a crucial role in obtaining fairer results. The technologies used are Cloud Computing and Artificial Intelligence.

IV. PROPOSED SOLUTION

1. The smartphone application can be developed using Clarifai's AI-Driven Food Detection Model for getting accurate food identification and Food APIs to give the nutritional value of the identified food.

2. The app delivers timely notification to the user to encourage adherence to exercise and diet goals for a fit, happy and healthy lifestyle.

I.

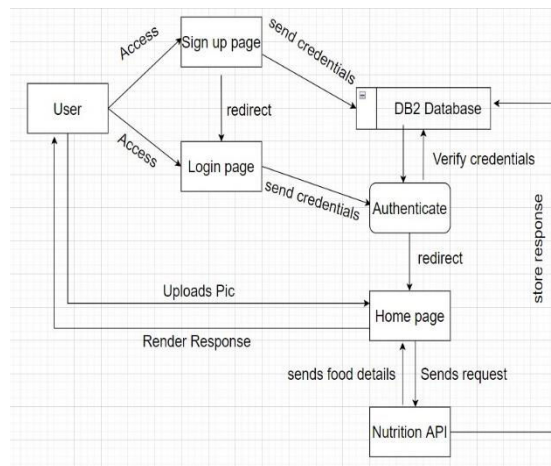


Fig 1: Data flow diagram

V. MODULE DESCRIPTION

- A. Input Acquisition Module
- B. Image Pre-Processing and Segmentation Module
- C. Features Extraction Module
- D. Dataset Training Module
- E. Nutrition level Estimation Module
- F. Suggestion Module

A. INPUT ACQUISITION MODULE

In this module the camera is used to capture photos which is converted into single frame and sent for further processing.

B. IMAGE PRE-PROCESSING AND SEGMENTATION MODULE

In this module the captured image is segmented for the purpose of detection which is necessary to identify the region of interest in the image. This module will convert the processed and segmented images by performing region-based

segmentation process. It uses key factors in the image like hue saturation value, descriptor points in order to analyse the complete content of the image.

C. FEATURES EXTRACTION MODULE

In this feature extraction module, the features like colour, size and shape can be extracted from the input food image.

D. DATASET TRAINING MODEL:

The nutrition level of the food dataset can be pre stored in the database. In this module, the system will use Clarifai's AI-Driven Food Detection Model for getting accurate food identification and Food APIs to give the nutritional value of the identified food.

E. NUTRITION LEVEL ESTIMATION MODULE:

The Clarifai's AI-Driven Food Detection Model will estimate the food nutrition level by comparing the dataset of the food nutritional level in the database after that estimates the nutrition level is good or poor nutrition are intake. The intake data can be stored in the text file.

F. SUGGESTION MODULE:

The collected dataset should be viewed after 7 days whatever the nutrition levels are good or poor nutrition. If the nutrition level is poor, suggest to try to eat more protein and fat and if fat level is more, suggest to do exercise.

VI. IMPLEMENTATION

A. DATA SET:

Data set includes the variety of images of food collected from the user and the pre-existing images of food in the cloud database.

D. SOFTWARE:

PyCharm may be a dedicated Python Integrated Development setting (IDE) which provides good amount essential tools for Python developers, tightly integrated to make a convenient setting for productive Python, web, and science development.

Other essential requirements are:

- Python (Anaconda navigator, PyCharm)
- Flask
- Docker
- IBM DB2
- IBM Cloud
- Kubernetes

VII. RESULTS

The Clarifai's AI driven food detection model has been employed to create a Nutrition Assisting Application which serves to analyse the nutrients present in a food. The application gets the input from the user and matches it with its cloud database. Finally, it provides the necessary information about the food as the output.

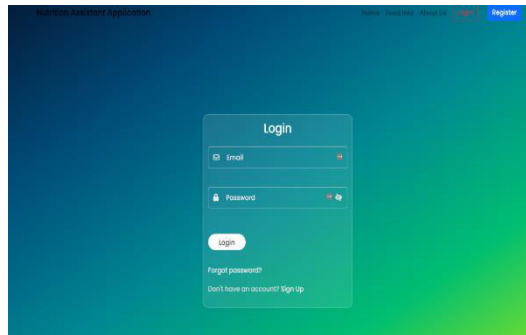


Fig 2: Screenshot of New User Sign Up Page

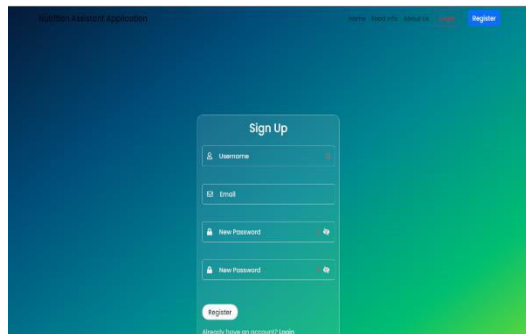


Fig 3: Screenshot of User Login Page

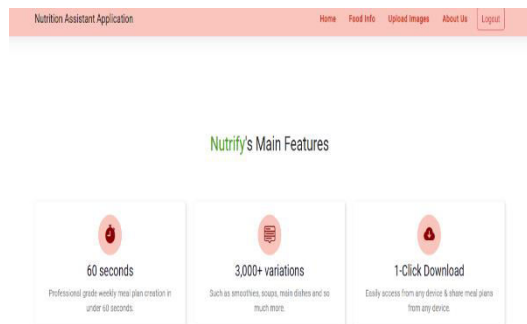


Fig 4: Home Page of the Application

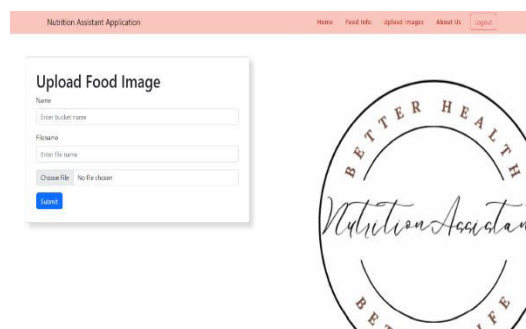


Fig 5: Image Uploading Page in the Application

VIII. CONCLUSION

The Nutrition Assistant Application using cloud computing is able to get images of the food recipes from the users and analyze them and show the nutritional breakdown of the given food item. It is able to do this in an efficient and cost-effective way. This application allows people to get to know the nutrients of foods at any time which makes it more convenient for the users. It also comprises of feedback mechanism.

This can be scaled to include APIs that have a larger variety of foods to have it cater to larger audiences of different backgrounds and ethnicities.

The Clarifai's AI driven food detection model gives precise analysis of the nutrition present in a given food by matching with the cloud database (data repository). Furthermore, it completely exploits deep learning algorithms to provide accurate results.

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