Food recognition system

Foodimage recognition has gained much popularity with the excessive use of electronic media where countless apps and devices concentrate on fitness and appearance andhealth. The main contribution of the proposed work in real-world is to determine any food item from a given image.

Once a food item is identified several apps in smart phones exist which can then list the number of calories it contains, the percentage of major food groups (e. g.: carbohydrates, fats, proteins, dietry fibre, minerals, vitamins etc). Calorie counting and keeping track of the food one eats is of great significance to patients ofdiabetes, blood pressure, liver and gall bladder problems and also for athletes who need to keep track of specially their protein and carbohydrates intake.

A lot of people suffer from low body weight or are obese; both of them can mitigate this issue by keeping track of the daily calories. If such a food recognition system is employed in conjunction with the calories tracking apps it would be a lot of help to anyone who is conscious of their health and want to make better food choices.

This is particularly helpful because it's quite a tedious task to input food item manually and if it's a dish with many ingredients it gets even more time consuming to track the calories and the percentages of the major food groups in a given food item as compared to when one can automatically recognize the food item and retrieve it from the dataset provided.

INTRODUCTION

When food is categorized according to nutrition, it has five main groups i. e.

1. Carbohydrates

2. Protein.

3. Milk and dairy products.

4. Fruit and vegetables.

5. Fats and sugars.

While according to the food guide pyramid introduced by the United States Department of Agriculture in 1992 food is classified into six major groups: protein, dairy, grains, oils, fruits and vegetables. However, in this paper we have used the FOOD11 dataset in which food is classified into 11 categories with each category containing different number of images. The food is categorized as follows:

1. Bread(includes Bread, burger, pizza, pancakes)

2. Dairy product(includes Milk, yogurt, cheese, butter)

3. Dessert(includes ice cream, cookies, chocolates)

4. Egg(includes Boiled and fried eggs, and omelette)

5. Fried food(includes French fries, spring rolls, fried calamari)

6. Meat(includes Raw/cooked beef, pork, chicken, duck)

7. Noodles/Pasta(includes Flour/rice noodle, ramen, and spaghetti pasta)

8. Rice(includes Boiled and fried rice)

9. Seafood(includes raw/cooked Fish, shell fish, and shrimp)

10.   Soup(includes different kinds of soup)

11.   Vegetable/Fruit(includes Fresh/cooked vegetables, fruits and salads)

The FOOD11 dataset is collected from other existing food datasets like UEC-FOOD-100, UEC-FOOD-256, FOOD-101 and images fromsocial medialike

instagram and twitter. This dataset is divided into three subsets of training, evaluation and validation. The total number of images in food11 dataset is 16643.

CATEGORY TRAINING VALIDATION EVALUATION

Bread 994 362 368

Dairy Products 429 144 148

Desserts 1500 500 500

Egg 986 327 335

Fried Food 848 326 287

Meat 1325 449 432

Noodles/Pasta 440 147 147

Rice 280 96 96

Seafood 855 347 303

Soup 1500 500 500

Vegetable/Fruit 709 232 231