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Nutrition Assistant Application:

App-based nutrient dashboard systems which can analyze images of a meal for its nutritional content.

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Abstract

The purpose of this application is to know about nutrition in the food. This app helps the people to control their daily calorie intake by eating healthier foods and it will avoid obesity. The goal of this app is to analyze real-time images of a meal and analyze it for nutritional content which can be very handy and improves the dietary habits and therefore, helps in maintaining a healthy lifestyle.

Due to the ignorance of healthy food habits, obesity rates are increasing at an alarming speed, and this is reflective of the risks to people's health.

People need to control their daily calorie intake by eating healthier foods, which is the most basic method to avoid obesity. However, although food packaging comes with nutrition (and calorie) labels, it's still not very convenient for people to refer to App-based nutrient dashboard systems which can analyze real-time images of a meal and analyze it for nutritional content which can be very handy and improves the dietary habits, and therefore, helps in maintaining a healthy lifestyle.

This project aims at building a web App that automatically estimates food Attributes such as ingredients and nutritional value by classifying the input image of food. Our method employs **Clarifai's AI-Driven Food Detection Model** for accurate food identification and Food APIs to give the nutritional value of the identified food.

Review of Literature

Food is one of the most basic requirements of human life. It is often regarded as much more than a means of survival, and proper food intake is essential for human health and fitness. Our health is closely dependent on the 4 types or amount of food we intake (Min et al., 2019). There are numerous fields such as sociology, psychology, nutrition sciences, and medicine in which healthy food consumption is explored (Mai & Hoffmann, 2017). Food choices are negatively influenced by a busy lifestyle, bad habits, and low self-control (Brug et al., 1995; Koenigstorfer et al., 2014). However, excessively unhealthy lifestyles and bad dietary habits, such as increased food intake with high energy and high fat, lead to various health issues (Ng et al., 2014). According to the World Health Organization (WHO), more than 1.9 billion adults (aged over 18) are overweight, and more than 650 million people suffer from obesity (Chu et al., 2018). Many chronic diseases such as hypertension, type 2 diabetes mellitus, cardiovascular disease, and stroke are linked to obesity and excess weight (Speiser et al., 2005). This problem is becoming a significant health concern. One of the main reasons for the obesity problem is that many people follow a very unhealthy lifestyle. Their dietary habits are also unhealthy, such as increased food intake with high energy and high fat.

The intake of highly caloric, inexpensive, larger portion sizes and nutrient-dense foods promoted by environmental changes, coupled with decreased physical activity, and increased sedentary behaviors, is a significant causative factor for obesity (Beal et al., 2013). In recent years, the use of smartphones to track food consumption or compute the nutritional value of foods have expanded due to the increasing number of food consumption tracking and recommendation apps in the app stores, and the great potential of smartphone's to be a useful tool (Kalinowska et al., 2021). Nowadays in app stores, many apps are focused on health and fitness. In the major app stores, there were 32500 mobile health apps available in 2017 and this number is continuing to rise (Ferrara et al., 2019). Apps can play an important role in simplifying the tracking of health-related behaviors and weight management (Chen et al., 2015). Moreover, the usage of smartphones and rapid development of artificial intelligence (AI) technologies have enabled new food identification systems for dietary assessment, which are significant for the prevention and treatment of chronic diseases such as type 2 diabetes mellitus, cardiovascular disease, and overcoming health issues such as obesity (Min et al., 2019).

Furthermore, food intake behaviour (e.g., assessment of calorie intake, nutritional analysis, and eating habits) can be analyzed if food items or categories are recognized. Recently, AI and machine learning based mobile food recognition methods are also being implemented. For example, He et al. (2014) used AI techniques for identifying food from an Image. The bag of visual words model (BoW) has been used for representing food images as visual words distributions and the support vector machine (SVM) model has been used to classify (Farinella et al., 2014). Furthermore, Andriopoulos et al. (2014) used SVM, artificial Neural Network and random forest classifications on 5000 food images organized into 11 classes described in terms of different bag-of-features. The convolutional neural network (CNN) is also used in some studies (Christodoulidis et al., 2015; Kawano & Yanai, 2014). Ming et al. (2018) proposed a photo-based dietary tracking system that employed deep-based image recognition algorithms to recognize food and analyze nutrition. For estimating an individual's food and calorie intake, the calculation of food portion size or volume is necessary. In several studies, different types of methods (i.e., single image-based or multiple image-based) have been used for estimating food volume from food images (Kong & Tan, 2012; Sun et al., 2010; Dehais et al., 2016; Fang et al., 2018; Meyers et al., 2015).

To achieve quantitative food intake estimation, researchers combined visual recognition and 3D reconstruction in a study (Puri et al., 2009). Both Android smartphone and web-based applications are implemented to recognize food and estimate the calorific and nutritional content of foods automatically without any user input (Zhang et al., 2015). Food recommendation is a significant domain for people as well as society (Min et al., 2019). Incorporating health into recommendations is mostly a recent concern (Rokicki et al., 2018; Nag et al., 2017; Yang et al., 2017). Mokdara et al. (2018) proposed integrating deep neural network with a recommendation system focusing on Thai food. It not only considers users' food choices but also pays attention to users' health. Based on individual customer behaviors, tastes, and eating history, the system will assist consumers in making food selection decisions. Besides, a food recommendation system has been built to recommend food to diabetic patients based on nutrition and food characteristics (Phanich et al., 2010). Reviews on various health-related apps have been conducted in many different studies. A prior study reviewed diet tracking apps common in the Apple App Store and Google Play Store (Ferrara et al., 2019). Franco et al. (2016) analyzed the main features of the most popular nutrition apps and compared their strategies and technologies for dietary assessment and user feedback. Another study reviewed nutritional tracking

mobile applications specifically for diabetes patients (Darby et al., 2016). Rivera et al. (2016) characterized the use of evidence-based methods, the participation of health care experts, and the clinical assessment of commercial smartphone applications for weight loss or weight control. In this study, we evaluated the apps from three commercial app stores – Google Play, Apple App Store, and the Microsoft Store – to evaluate food consumption tracking and recommendation apps for all users, not just diabetes patients, pregnant women, or children. To the best of our knowledge, no research has thoroughly examined the current commercial mobile app market landscape to analyze and scientifically evaluate apps linked to food consumption tracking and recommendations. The speedy growth of such apps in the app stores, - and the fast acceptance of these apps by the general population necessitates an assessment of this rapidly expanding market.

Method

If I were to conduct this study, I think the best way to do so would be by asking to people what are the methods to be done in nutrition. I would choose to use survey research as well as focus on nutrition in order to study this food. By using survey research, I would be able to uncover whether or not people are actually understanding how the nutrition is important and the people would be beneficial in for the upcoming future. By using the two different types of research it also will allow for the study to be more diverse and look at different angles of nutrition, which will result in having a better understanding of this phenomenon.

Sample Selection

For my sample I would choose to use a convenience sample. The age I want to study would be 15 to 23 year old. I would reach out to the local high schools as well as the local universities and use the students who were willing to participate in the study. Based on the number of students in India between high school and college aged students I would like to have five thousand survey responses and two thousand five hundred volunteers for focus groups. I would allow students to participate in both aspects of the study if they were interested in doing so.

Procedure

For my study it will be important to base a 10-15 question survey on more than simply if a student is a “do you think eat healthy or how to u maintain the diet”. The survey would be completely anonymous and would ask questions about whether they have any issues in nutrition or diet, followed up with questions about gender, body size, and the gender and the diet details. For the focus groups I would split the participants up in groups of 6-8 based on age and gender. I would focus on questions about “how many fruits or vegetables do you have a day?” or “what about the diet plan?”. I would then combine the data I collected and use it in order to answer my research question.