A mobile application for food dietary assessment

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Abstract

Obesity is a public health problem. In 2015, approximately 36% of adults and 17% of children and adolescents are obese in U.S. It is still challenging to follow a healthy diet for most of people that present obesity traces or just want to lose weight. Keeping log of meals is time consuming, boring and within few weeks, a person quits the program. To prevent these issues and also because of the advent of growth of smartphone use, several mobile applications have been developed to help people to keep log of their meals, getting some insights from it for finally, lose weight.

Mobile applications indeed make easier to record meals, once the information is in one local repository of easy access, well organized and sometimes, also giving insights. Even with this step forward, there are challenges. Users still have to input all the information about what they are eating and try to guess its amount. They have to do it for all meals and week after week, they get bored and stop logging. It is hard to predict how is the total amount of food being consumed during a meal. User also complain that the insights and recommendation that the apps provide are too superficial and sometimes, useless, for example: eat more protein or eat less fast food. These food dietary assessment apps only show significant results when a person highly motivated (about weight loss) or is engaged in a physical activity and cares about food habits, the dietary assessments apps bring benefits, such as weight loss.

There is a gap between users and such mobile apps. Our proposal is to develop a mobile application for food dietary assessment which users do not have the burden to input data and can finally receive helpful and interesting recommendations about healthier food habits. By just taking a pictures from a meal, our app has this unique feature that automatically provide a measure of food and nutrients intake by its food recognition and analysis module. The mobile application is also integrated with smart bands technology. If the user has one, it will be a new source of input, indicating the total calories spent during the day. These information makes available the creation of user’s metabolic pathway, that will be crucial to generate significant insights and recommendations about healthier foods by our social network.

Goals

This project has the goal to prevent obesity by accomplishing these sub goals:

- Build user’s metabolic pathway.
- Keep the record of user’s meals.
- Accurate estimation of quantity intake on each meal by accurate food detection and analysis.
- Integration with activity tracker/smart bands.
- Social network based on users utilizing the app.
- Generate automatic recommendations for healthier meals from similar users.

Automatic food recognition and analysis

Differently from face recognition, food detection is still an open and challenging research problem in Computer Science because of its complexity. For example, it is complicated to distinguish when foods are mixed on a plate and to calculate its amount.

To estimate the amount of each food in a meal is a challenging problem and few progress has been made so far.

To log a meal, the user will only take a picture of it. The automatic food recognition and analysis module will identify all the foods on the picture and calculate the amount of each item, outputting the total of calories intake and a nutrition facts from meal.

This is an unique feature that is not present on others food dietary assessment apps.

Metabolic pathway

In order to give an accurate dietary assessment, it is crucial to know how much ATP a person can produce per day. To build the metabolic pathway, it is necessary to have a record about how many calories a person intakes per day and also, how many he/she spends.

Knowing user’s metabolic pathway is decisive for a interesting insights and recommendations, based another users with similar pathway.

Social network

This social network is a interaction that a user can have with another person utilizing our app. For example, user and his/her parents use the app and have similar food habits but the parents have obesity. Based on this fact, the app can alert the user about his food habits and therefore, recommend healthier foods and personalized insights.

Recommendations are possible due to user’s metabolic pathway. The app searches among all its users, the ones with similar pathways to the given one. From this set, the users with healthier food habits will be selected. Within this group, the algorithm will select the foods that fits the most to given user.

Workflow

After gathering the data from the user, from its meals and the activity tracker, the system will be able to build user’s metabolic pathway. Once done, the user can receive insights about its food habits, therefore, preventing obesity.

References & Acknowledgement