Personalized Diet Recommendation Approach: An Overview

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Abstract-To determine the applications services, a situation-based design approach was adopted. Through interviews and workshops with obese children, their parents and physicians, several requirements with a focus on diet behavior were identified: First, the app should recommend recipes based on ingredients available at home, prioritize desired ingredients of the patients, and foster a diverse meal plan based on the consumption history of previously chosen ingredients. Second, as the users navigate. In addition to encouraging people to do more physical exercises, other apps aim at helping people to optimize their nutrition intake. Obesity is a global issue and has a direct impact on the public and private healthcare system. In this section we present various examples of health applications that have the potential to support health-promoting behavior in teenagers (for a comprehensive list of prototypes and preliminary studies on IT-supported obesity intervention. For instance,In this work we describe the design and evaluation of a novel mobile health application that supports obese children and their parents to improve their diet intake. First results from quantitative app usage logs, questionnaires and interviews indicate that the mobile health app provides relevant information to attain a balanced nutrition. A discussion of the results and an outline of future work conclude this work.

I. INTRODUCTION

The growing popularity of mobile smartphones has given rise to new methods of interaction between consumers, businesses and in general the world around us. For the end user, the smartphone provides the benefit of having a wealth of knowledge, information and services, literally at your fingertips. Conversely, as a platform for mobile applications of all kinds, it is now possible for a single application to connect, communicate and deliver content to millions of users as they go about their daily lives. For most companies and organizations that currently have mobile application offerings, the potential to reach a large market represents an opportunity for profit and smartphone users are viewed as their customers. However, in this project, we view the users as members of a community and rather than view them as customers, we attempt to leverage our users as a resource that can provide data and information that without the mobility and access of smartphones would otherwise be unavailable.

In India, the numbers of mobile phone users are increasing at an enormous rate. As Android became popular, there is a radical shift in the mobile phone market. On the other hand, users have become more health-conscious and dieticians or nutrition experts are gaining prominence. Nevertheless, people care about their family's health. So, to converge all these paths into one, it seemed that if a user can get information about a food product that the user comes across in a supermarket, a suggestion that can help to make decision whether to buy the product and use it or not. This can be done using a mobile phone supported with Android. This paper describes the process and result of such an application "Healthwise" which has been named so to signify main intentions

(a) Application helps to protect user's health wisely

(b) Application in terms of health.

II. LITERATURE SURVEY

Though there exist numerous commercial offerings of applications targeting dietary improvement and personal health tracking, data regarding the effectiveness of certain approaches are better documented in academic studies, which will therefore form a foundation upon which our product ideas are developed. Academic research in this area is very broad and often spans multiple disciplines with research being published in the fields of pervasive and ubiquitous computing, human computer interaction, nutrition and dietetics. The literature reviewed for this project can be divided into 3 groups: the use of gaming to promote healthy eating, dietary assessment using mobile aids and journaling methods incorporating phone cameras.

Gaming and Health

Research relating gaming to health has involved using various gaming mechanics to improve user interaction and engagement in monitoring and improving their health. One method found to educate people on nutrition is to allow them to challenge each other based on nutrition facts in a casual social game setting. The advantage of casual social games is the ability to spur on critical thinking outside of gameplay and although the game simplistic in nature, it shows the notion of competition is a key driver that can be utilized to encourage continuous usage.

Building on the notion of casual social gaming, daily healthy water intake is shown to increase by using a visual representation of the need to drink water in the form of a withering tree. How healthy your tree is dependent on the amount of water consumed and results show improvement with the visual aid both with and without other players.

This suggests the power of a visual representation to something normally that cannot be seen such as the need for water. Although we may know we need to drink water and we may feel thirsty, a visual cue and an external need (to save the tree from withering) is a stronger motivational tool that can push us to perform actions.

This concept is fully developed and tested through a virtual-pet based game targeted at a younger audience. In this application, data entry is performed through images and users will receive feedback on a -2 to 2-point scale with comments narrated by the pet. It was found that during the trial, "children playing the game ate a healthy breakfast 52 percent of the time; kids who didn't play it ate a healthy breakfast approximately only 20 percent of the time". Furthermore, both positive and negative feedback from the pet invokes a responsive action suggesting that the motivational ability of the game comes from the emotional connection with the pet and the ability to see the effects of their actions on the pet. The gaming mechanic from this study was similar to the initial proposal for Food Fight which also revolves around the concepts of virtual pets. However, the applications created for academic studies were not designed for prolonged use and thus did not consider user retention. For Food Fight, we proposed to incorporate further gaming elements such as competition in the form of challenges for the virtual pet to complete against friends.

Mobile Health

Tools Aside from research merging games and health, there are also a large number of studies on using mobile devices for various uses in health and fitness. The growth of mobile phones in recent years has allowed new methods for health-related applications to reach out to and assist users.

Saponites and Hyper fit are both studies involving a mobile application & applications serving as a reminder tool, meal planner and calorie tracker. Both of these applications contain a large number of tools useful to the user and provide a portable and relatively easy method to enable users to perform personal health tracking and diet management. Although user feedback is positive, these types of applications are geared towards health conscientious users, as a significant amount of effort is required for input with no reward other than potential health gains. In particular, the need to calculate portion sizes to enable calorie counting is a potential source of high error to the resulting statistics shown by the application and studies have shown that calorie counting/portion estimation improves if users are trained and use developed techniques. The average user who does not have the initial motivation would unlikely to be willing to perform these tasks and thus an application like Food Fight which is intended for all audiences must be easy to use and require minimal effort form the user.

Camera based journal systems

One way to minimize user effort is to use the availability of camera in modern smart phones to enable visual recording through food photography. However, the problem of food recognition and portion estimation remains and attempts have been made to solve this via different methods. Using computer vision, researchers have shown that it is possible to segment and classify foods with high accuracy under certain conditions. Furthermore, it is also possible to perform volume estimation enabling the calculation of portion sizes and thus an estimation of calories consumed. Although the research in this area is promising, and accuracy rates are shown to be high, it is important to note that most experiments are performed under controlled environments with a limited number of test data. In the real world, a mobile application using these algorithms could be faced with an extremely wide variety of food in different combinations. A key issue is the ability to segment or separate the image into different parts containing different foods and this is clearly not possible with some meals such as seafood pasta. For these algorithms to be used in publicly distributed application, there must be contingencies in place when the computer vision algorithms fail.

An alternative to computer vision is using crowdsourcing to perform the nutritional analysis on the food images. In this study, a method of dividing the crowdsourcing tasks on Amazon Mechanical Turk is outlined which improves the accuracy of the analysis performed by the crowd-sourced workers. Thus, given an average user, the crowd-sourced solution would provide a greater accuracy than if the user were to perform the portion estimation themselves. However, a major drawback to this method is the inherent time delay between the user taking the photo and the completion of the crowd-sourced tasks. Again, for users that are already motivated to achieve their health goals, this would not be a major problem but for an average user without a strong motivation, this delay would detract from their experience of the application and would outweigh any efforts to inject interest or create engagement through game mechanics.

III. RESEARCH METHODOLOGY

To design and implement a system which can recommend the food and diet for users according to given input parameters.

Eating a balanced diet is vital for good health and wellbeing.

Good nutrition is an important part of leading a healthy lifestyle. Combined with physical activity, your diet can help you to reach and maintain a healthy weight, reduce your risk of chronic diseases (like heart disease and cancer), and promote your overall health.

We will be using the K-means algorithm for clustering of the diet plan.

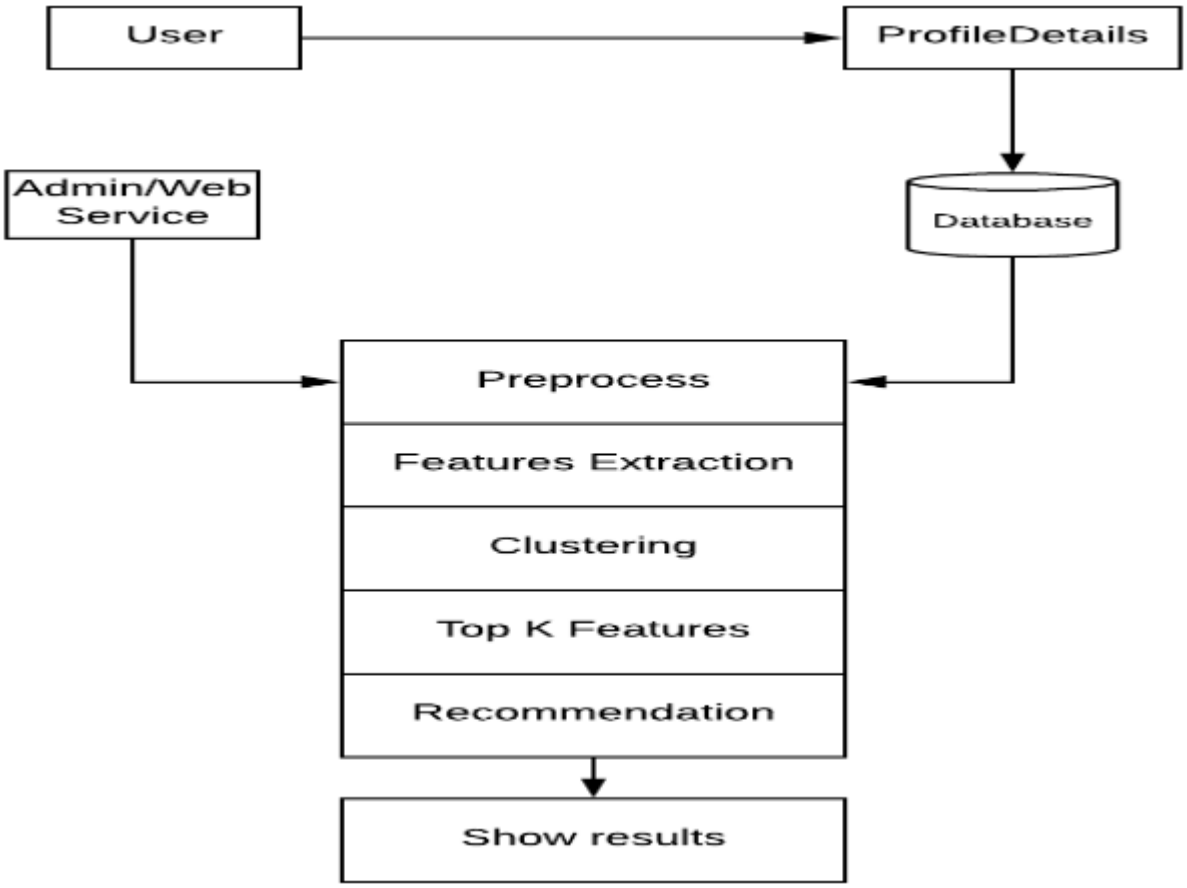

Fig.1: System Architecture

Hardware components and software components.

A. SQLite Database:To design and implement a system which can recommend the food and diet for users according to given input parameters.

1) Eating a balanced diet is vital for good health and wellbeing.

2) Good nutrition is an important part of leading a healthy lifestyle. Combined with physical activity, your diet can help you to reach and maintain a healthy weight, reduce your risk of chronic diseases (like heart disease and cancer), and promote your overall health.

3) We will be using the K-means algorithm for clustering of the diet plan.

B. Web service: A web service is a standard for exchanging information between different types of applications irrespective of language and platform. For example, an android application can interact with java or .net application using web services

C. Front End

1) Android SDK 4.5

2) Internet Explorer 6.0/above

3) Tool: Eclipse or net beans
4) Android, java
D. Back-End
1) SQLite
E. Hardware Requirements
1) Processor: - Intel Pentium 4 or above
2) Memory: - 2 GB or above
3) Hard Disk: - 500gb

IV. CONCLUSION

The high number of installs indicates that there is a clear interest and opportunity for diet monitoring and recommendation using mobile apps. All the apps collecting dietary intake used the same nutrition assessment method (i.e., food diary record) and technologies for data input (i.e., text search and barcode scanner). Emerging technologies, such as image recognition, natural language processing, and artificial intelligence, were not identified. None of the apps had a decision engine capable of providing personalized diet advice.

V. FUTURE WORK

To implement a system in different platform like iPhone, web applications as well as various technologies.

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