

NUTRIEXPERT: A HEALTHY DIET RECOMMENDER SYSTEM

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ABSTRACT

In today's busy life, people tend to neglect their eating patterns and habits. Fast food consumption rate is alarmingly high. This results in various health issues such as obesity, diabetes. Individuals have different needs. Hence it is essential to study their patterns individually and suggest which food would be beneficial to them on the basis of the research. NutriExpert has the potential to help individuals prevent or manage health conditions such as diabetes and obesity. Balanced diet means that the intake of each necessary nutrient meets its adequate demand and actual caloric intake balances with calories burned. Additionally, making a diversity of choices from various types of food is also essential to reduce the risk of developing chronic diseases. Different people have a different goals and it is hard to measure how healthy a meal is for those who are not experts in the diet domain. The diet recommender system focuses on every individual based on their eating habits. Recommender Systems (RSs) are software tools and techniques that provide suggestions for items to be of use to a user. A typical recommendation system tries to match one person's interests based on his preferences. Content based filtering, also referred to as Cognitive filtering, generate recommendations for items based on comparisons between content of item and the user profile.

Keywords:- Recommendation system, Content based filtering, Collaborative filtering, Data mining, Ionic Framework, Healthy diet.

1. INTRODUCTION

With the pace of life gradually accelerated nowadays, people seem too busy to pay attention to their eating habits. Fast-food has become more popular in daily life. We propose a healthy diet recommender system based on data mining, which would track your health conditions, working life style and recommend the types of food that improve your health and avoid the types of food that increase risk for illnesses. Medical researchers have shown that by consuming healthy food, people stand a greater chance of countering free radicals and warding off diseases. The paper introduces a web application which takes a user's information, analyzes, compares the data and recommends a healthy diet.

In our proposal, there are three correlative procedures: health condition and work lifestyle data acquisition, data mining process and healthy diet recommendation. We suppose that there would be a mobile app through which people could directly input their health conditions and working lifestyle into the database. To construct a recommender system, two information filtering methods for providing the recommended information arc

considered: (1) by analyzing the information content, i.e., content-based filtering, and (2) by referencing previous diet chart, i.e., collaborative filtering. However, most of the existing approaches consider only one of the filtering techniques in their recommending processes. Our healthy eating recommender system enhances the functionality of a typical query-based information retrieval system (e.g., search engine) by applying the information filtering techniques to automatically generate a recommended list of pages which personalize each individual's preferences.

2. CHALLENGES IN A RECOMMENDATION SYSTEM

Giving good recommendations about nutrition does not only rely on the algorithm used to calculate the recommendations. It also depends on the knowledge about a user's eating habits. Therefore it is advisable to record what foods and the amount of foods a user consumes. The information gathered can not only be used to identify the problems with the user's diet, but also be used in the algorithm to improve the recommendations.

The two main challenges are:

1. Challenges with regard to the user
2. Challenges with regard to the algorithm

There are two types of recipe recommender systems. The first use similarity measures to recommend recipes which are most similar to meals the user likes, while being a healthier option. These are either calculated according to ingredients or user ratings. The second type of food recommender systems does not recommend whole meals, but rather suggests which foods to replace with which healthier option.

3. HIGH LEVEL ARCHITECTURE OF HEALTHY DIET RECOMMENDATION SYSTEM

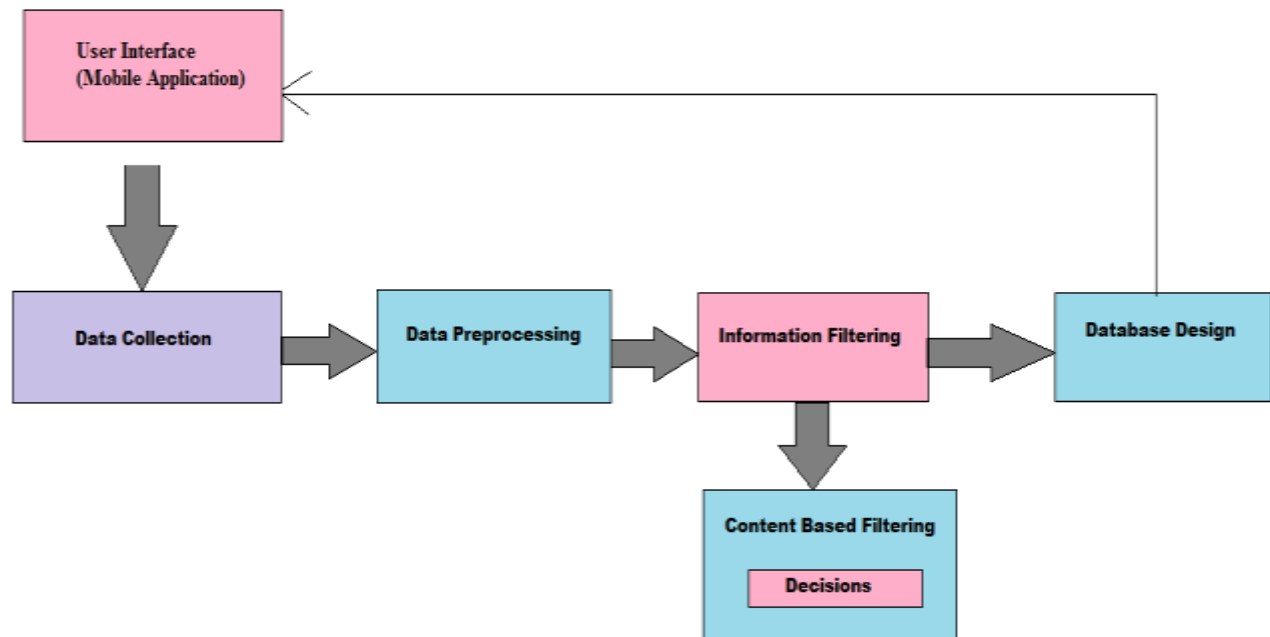


Figure.1 System Workflow

3.1 ARCHITECTURE DISCRPTION

The overall process of developing Healthy Diet Recommender System involves mainly Six steps namely Designing and implementing mobile application, Database Design and Implementation, Data acquisition, Data Preprocessing, Information Filtering and Recommending Healthy Diet.

A. Design and implementation of web application:

The mobile application which will be the hybrid app acts as interface between the users and the recommender system. This step involves the design and implementation of a hybrid app which receives the user's information such as health conditions, store this information into the database, analyze and process the information. Finally recommend the healthy diet to the user. The user interface provides a recommendation function with the user personalization technique by requiring each user to log into the system in order to keep track of the preferences.

For developing web applications JavaScript is the programming language. HTML5 is required to define the content of web pages. CSS is to specify the layout of web pages. JavaScript is to program the behavior of web pages.

B. Database Design and Implementation:

To improve the efficiency of data and information access and retrieval, the database for the healthy diet recommender system is designed and implemented for all related data sets. The proposed system will use MySQL for efficient data storage and retrieval.

MySQL is offered under two different editions: the open source MySQL Community Server and the proprietary Enterprise Server. MySQL Enterprise Server is differentiated by a series of proprietary extensions which install as server plug-ins, but otherwise shares the version numbering system and is built from the same code base.

Major features as available in MySQL 5.6:

- A broad subset of ANSI SQL 99, as well as extensions
- Cross-platform support
- Stored procedures, using a procedural language that closely adheres to SQL/PSM
- Triggers
- Cursors
- Updatable views
- Online DDL when using the InnoDB Storage Engine.
- Information schema
- Performance Schema that collects and aggregates statistics about server execution and query performance for monitoring purposes.
- A set of SQL Mode options to control runtime behavior, including a strict mode to better adhere to SQL standards.

Node.js is a platform built on Chrome's JavaScript runtime for easily building fast, scalable network applications. Node.js uses an event-driven, non-blocking I/O model that makes it lightweight and efficient, perfect for data-intensive real-time applications that run across distributed devices.

C. Data Acquisition and Collection:

We suppose that there is a mobile application where people could directly enter their health related information and working lifestyle into database. We acquire this information which would track people's health conditions in regular basis. The health information acquired through the mobile application is the firsthand material for this system, e.g. the height, weight, diseases, allergy conditions etc. Generally speaking, in terms of functionality, data acquisition module selectively obtains data from the outside web environment to provide material and resources for the latter data mining. This module is composed by three relatively independent processes which are data search, data selection and data collection.

D. Data preprocessing

Data preprocessing mainly processes and reconstructs the source data acquired in data acquisition phase and builds the data warehouse of related themes to create basic platform for data mining process. Data preprocessing is

preparation for data mining and it mainly includes data scrubbing, data integration, data conversion, data reduction, etc.

E. Information filtering

This step is the core process of the recommender system framework, where the data sets are analyzed and the data mining algorithms are applied as the information filtering tools to generate and discover any useful and interesting recommended outputs. We use data mining algorithms like classification, clustering, association rules, etc. in the data mining process to extract the useful information of people's eating habit. First, we analyze the nutritive structure of each kind of food and calculate how much fat, energy, vitamin you would required in your daily diet. Then we use the content based mining algorithm to process the composition data and give out the healthy diet reports.

F. Recommending healthy diet

After the data mining process in last step, we could get much useful information. For example what you lack, what you have too much, the potential disease, etc.. Then we could recommend the healthy diet plan according to the personal condition. The recommendations by our recommender system would improve your trophic structure and raise your health standards. On the other hand, we also track user's individual preferences. This system could recommend the related diet plan to fulfill personalized need by using association rules mining. Therefore it would provide better service and experience for users.

4. IMPLEMENTATION

Ionic is a complete open-source SDK for hybrid mobile app development. Built on top of AngularJS and Apache Cordova, Ionic provides tools and services for developing hybrid mobile apps using Web technologies like CSS, HTML5, and Sass. Apps can be built with these Web technologies and then distributed through native app stores to be installed on devices by leveraging Cordova. Ionic was created by Max Lynch, Ben Sperry, and Adam Bradley of Drifty Co. in 2013.

Ionic is also a new powerful framework built upon the awesomeness of AngularJS, This framework has UI widgets that leverage the directive feature of Angular thus things like scope inheritance etc are directly taken care of.

Ionic is wrapped around Angular-UI and hence state maintenance and navigation patterns are not a thing to bother about.

Ionic bundles around cordova hence the initial seed project itself will give cordova library and files.

Commands like Ionic build ios are present.

Ionic CSS is based on SASS tech and hence customizing themes and styles is not much of an overhead. An ionic project provides to the developer all the bare minimum tools and framework to start building a mobile app.

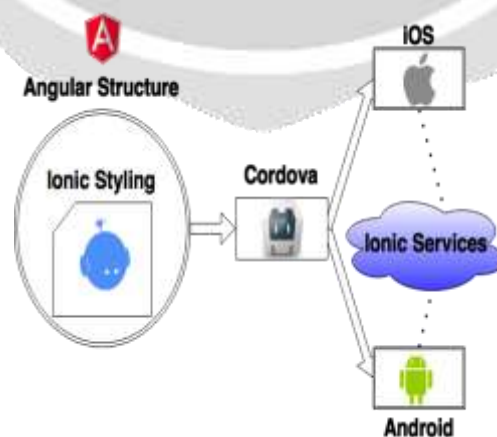


Figure.2 Hybrid App Development

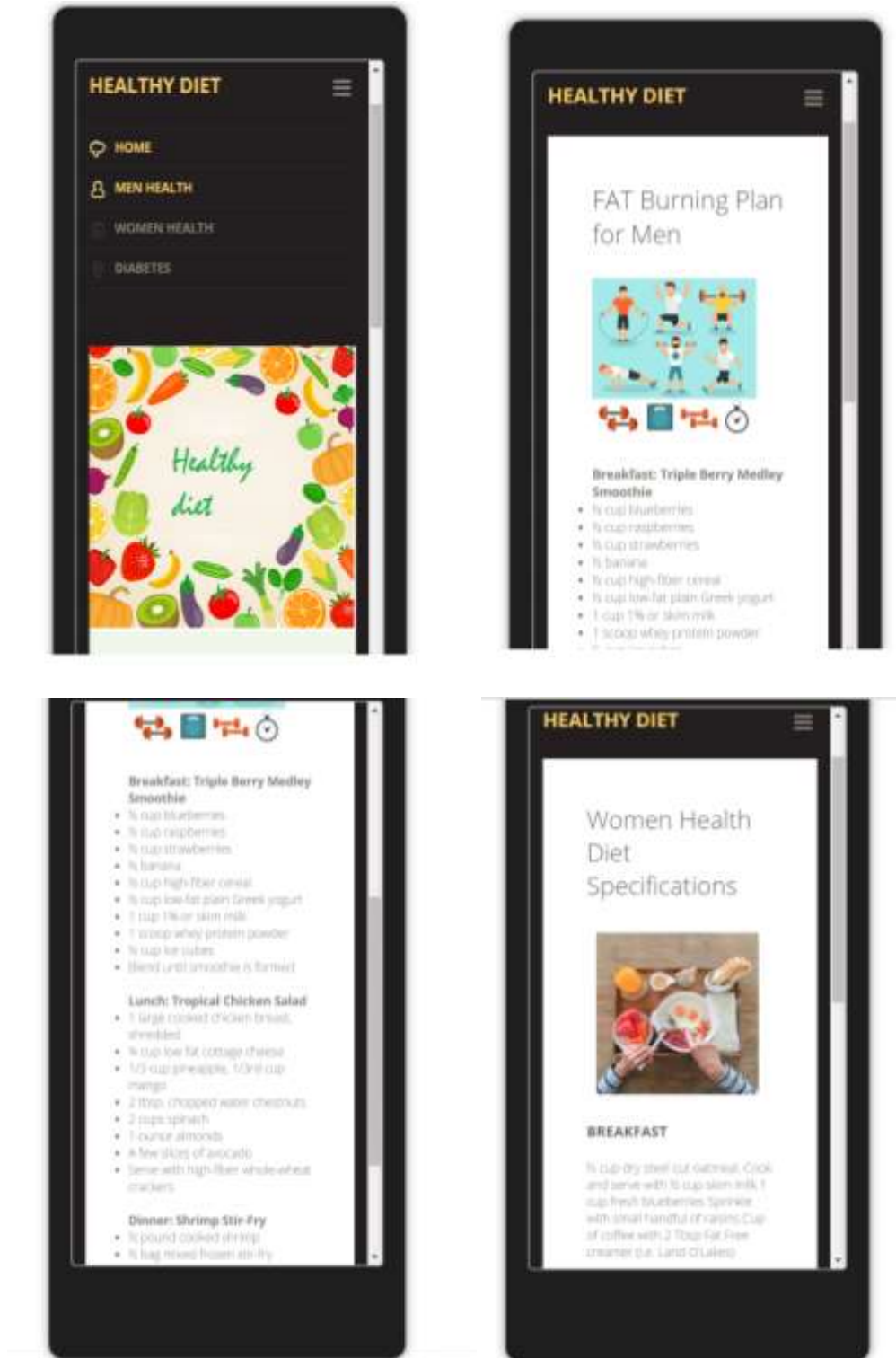


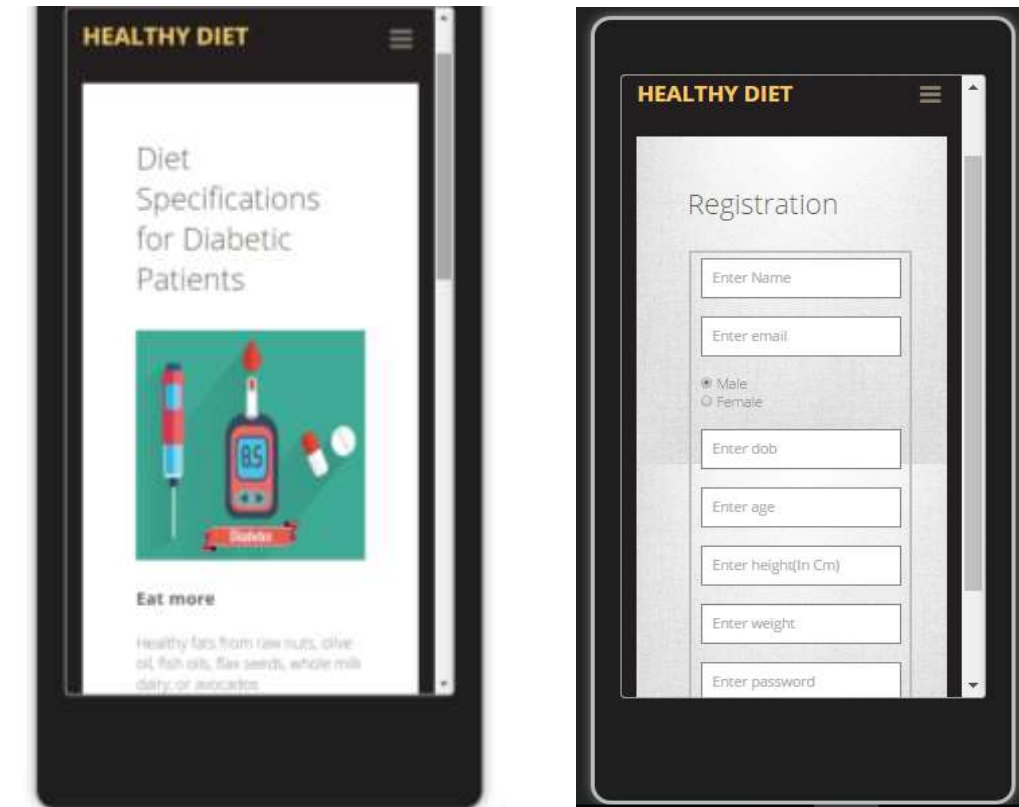
Figure.3 Ionic Environment

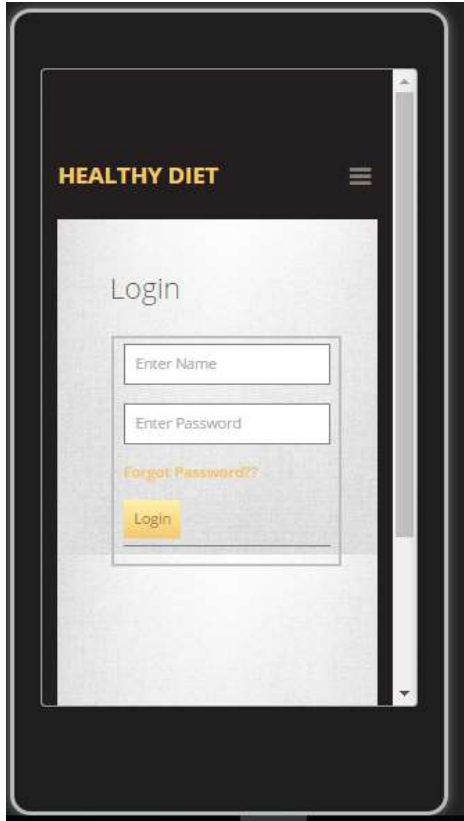
5. INSTALLATION:

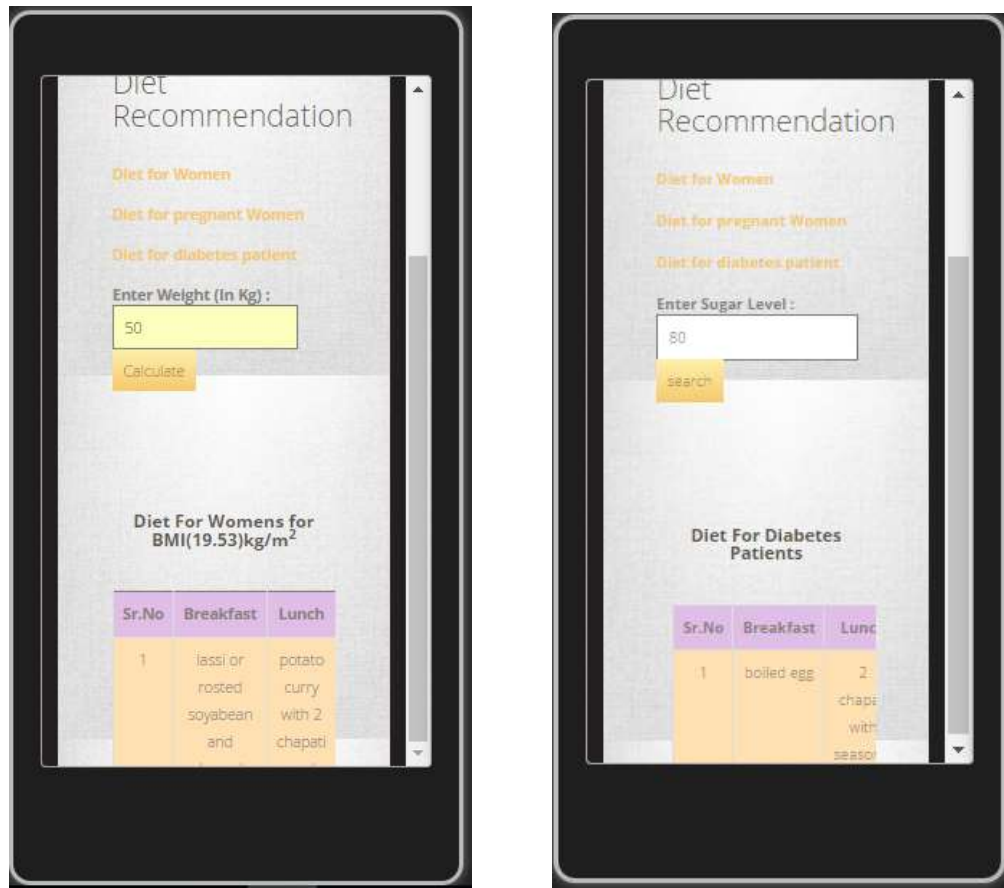
Install node.js from <https://nodejs.org>.
Run following commands on node.js command prompt.
npm install -g cordova
npm install -g ionic.
Install Visual Studio Community 2015.

6. RESULTS









7. CONCLUSION

In this paper, a new framework based on data mining techniques is proposed to improve your health and avoid the types of food that raise your risk for illnesses. The proposed framework is designed to enhance this interaction by analyzing user access behaviors on the system. In addition to the content analysis (i.e., content-based filtering) information is also retrieved according to each individual's preferences (i.e., user personalization) and by recommendation from other users (i.e., collaborative filtering). We suppose that there is a web application where people could enter their health information over the internet. We acquire this information in the database which could track people's health conditions, allergy conditions, working lifestyle etc. Finally we give out personalized recommendations of healthy diet for every person.

8. REFERENCES

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