A Personalized Framework for HealthCare Recommendation

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Abstract:
In this world, for any kind of information, people depend on internet. They use search engines like Google to search information over internet. The queries that are written on the web must be accurate which would give the relevant information related to user's Health Care. But there is huge amount of information on the internet and so it's difficult to get the relevant information easily. In case of searches on right food exercise, people usually have their own preferences. Also people who suffers from some medical conditions they are restricted to some foods and exercises so they are attracted towards other food and exercises. So there is need for easy to use framework for food and exercise recommendation. We propose ontology based semantic framework Health Care recommendation system which will provide precise information based on users requirements and constraints. This framework will use semantic web technology to analyze user's preferences and will build a nourished and health associated user's profile and will use the profile to categorize the associated knowledge so that users can make delicious food and exercise inquiries. We will also use the Decision Tree algorithm for retrieving related information from the database.

Keywords: Personalization food and nutrition, exercise, Health Care, ontology, decision tree.

I. INTRODUCTION

This is the age of Computers where internet is used in world wide. In which web information grows tremendously as the amount of information available on the internet has risen significantly and this makes getting the relevant information is more challenging as its get difficult to search correct information on the internet. Many people are interested in the appropriate and meaningful information from the web. The web search engines have some constraint which provide adequate information to many people and some are not satisfied because they do not find the search results relevant information to their need [1]. A person searches the information from the trusted sources such as Google, Yahoo from which they gathered relevant and precise information on the food, Health and nutrition. Many people searches on popular social sites where the results of that search engine are ranked by the keywords and this does not satisfy the users need. The search engine needs to understand also some information about the user in order to return the relevant result to the user's needs. This is critical in health and nutrition domain when some foods are restricted to users because of their health conditions [1]. As people need some amount of nutrition to preserve the Healthiness even though people are careless about their daily nutrition. Now a day's the working styles and the development of unhealthy life habits have been reduced perceived importance of exercise, and experts increasingly suggest that physical inactivity will be the most important health problem of the twenty-first century [4].

Health care policies are driving an increased focus on costs, quality and transparency of care [10]. This new focus on improving the quality and efficiency on health care. In this paper, we will use framework for food and exercise recommendation. We propose ontology based semantic Health Care recommendation system which will provide precise information based on users requirement and constraints. This framework will use semantic web technology to analyze user's preference and will build a nourished and health associated

II. MOTIVATION AND CHALLENGES

The information on the internet has become challenging issue for users. The user needs to be clear about their needs to get correct information. The amount of web-base information available on the internet has become the most challenging job today's scenario. People are interested in relevant and interested information from the web. There is huge amount of information on the internet so it's difficult to get relevant information related to users Health Care and for this user needs more intelligent system (agents) to gather the useful information. In case of searches on right food and exercise, people usually have their own preferences. Also people are restricted to some medical conditions so some foods and exercises are avoided so they are attracted towards other food and exercises. Also the civilization where people reside will have impact on the number of choices and varieties of food. So there is need for easy to use framework for food and
exercise recommendation. We propose ontology based semantic framework Health care recommendation system which will give relevant information to the user's needs and constraints. This framework is to analyze user's preference and will and will build a nourished and health associated user's profile and will use the profile to categorize the associated knowledge so that users can make delicious food and exercise inquiries [1].

A. Objective
1. To develop a personalized healthcare search engine application.
2. To recommend food and exercises according to user's profile and health history.
3. To create an environment that promotes high quality patient care.
4. To provide a network for resources for clinical expertise, collaboration, research based practice, peer review and consultation for members of the healthcare team.

III. FRAMEWORK FOR SEMANTIC QUERY MANIPULATION AND PERSONALIZED INFORMATION

The proposed framework represents one component of a bigger framework which aims to help users to semantically find relevant information that fits their needs. The architecture of the main framework is composed of three major components. The first component is the Semantic Query Manipulation and Personalization Component, the focus of this report, which takes care of representing the user's preferences, understating the user's queries semantically and personalizing the retrieved information. The second component is the Ontology management Component which takes care of representing and managing the domain ontologies. The third component is the Data Acquisition and Semantic Annotation Component which takes care of determining the trusted Web sources and annotating the information based on the predefined domain ontologies. Agents are software entities that have specific objectives, function autonomously in a particular environment and communicates with other agents [7]. Agent-based modeling was selected for number of reasons. The agent can sense the surrounding environment which helps in learning the user's preferences dynamically. The proposed framework has three functionalities. First, it helps in semantically understanding the context of the health and food related questions based on the pre-defined domain ontologies. Ontology could be defined as a formal representation of knowledge “set of concepts within a domain, using a shared vocabulary to denote the types, properties and interrelationships of those concepts” [10]. The proposed framework consists of four agents: (1) Interface Agent which is responsible for all interactions with the user, (2) User's Profile Agent which captures and maintains the user's preferences, (3) Semantic Query Manipulation Agent which manipulates the user's query, and (4) Results Personalization Agent which personalizes the retrieved results. Figure 1 shows the proposed framework. The detailed explanation for each agent in the framework will be presented in the next Sub-Sections.

A. Interface Agent
The Interface Agent is needed to interact with the user to get his/her input and display the retrieved results. The input could be the preferences entered explicitly by the user. These preferences will be forwarded to the User's Profile Agent to update the user's profile. The input could be also the user's
queries which will be forwarded to the Semantic Query Manipulation Agent for semantic manipulation. The Semantic Query Manipulation Agent will communicate back to the user if there is a need to revise the user’s queries, get any missing information or correct the spelling. Moreover, the Interface Agent displays the user’s profile and formulates the personalized results to the user. It also monitors the user’s interactions on the results and forwards these interactions to the User’s Profile Agent to infer new preferences.

B. User’s Profile Agent
The User’s Profile Agent is needed to manage the user’s profile. Section 4 explains how we construct the user’s profile. The user is asked to fill a form that reflects his/her preferences. However, many users are not acknowledging the time they spend in filling such forms [11]. So, the User’s Profile Agent logs the user’s interaction with the results and then infers new preferences. It also helps Semantic Query Manipulation and Enrichment Agent to enrich the user’s queries with more information about the user’s preferences. User’s Profile Agent can also get feeds from external profile-related embedded systems, sensors and Web services. One major function of the User’s Profile Agent is to learn and infer new preferences based on the user’s interactions and behaviors. The preferences can be learned by analyzing the User’s Interactions Log which contains the user’s interactions. For example, it measures the frequency of certain terms in the user’s queries to help in personalizing and enriching the query when the query is revised.

C. Semantic Query Manipulation Agent
The Semantic Query Manipulation Agent is needed to semantically manipulate, enrich and process the user’s queries. After getting the user’s query, it identifies the language since each language has its own syntax and way of processing. Then, it tokenizes the query into tokens (words) and then checks the correct spelling of the query using the Spell Checker and Synonyms Manager services. Spell Checker and Synonyms Manager provides two main services: checking the spelling and providing synonyms for any term. After that, the query is classified into the appropriate question type using the Lookup Words Dictionary services. Lookup Words Dictionary is a repository for the pre-defined terms that helps in recognizing the stop-words, the question types and the relations between terms. The agent also gets the synonyms of the terms from the Spell Checker and Synonyms Manager to match them with the terms of the user’s query. Then, we match the identified terms with the best query template using the Query & Result Templates Repository services.

D. Results Personalization Agent
The Results Personalization Agent is needed to personalize the retrieve results. First, it receives the annotated query from Semantic Query Manipulation Agent and then it determines the appropriate results template that matches the annotated query. The results template determines the semantic queries need to be reasoned in order to get all the expected results. After that, the semantic results are post-processed determining if there are any conflicts, aggregating similar results, ranking and sorting them after getting the user’s preferences got from the User’s Profile Agent. Finally, the results are personalized and sent to the Portal Agent to formulate and show them to the end user.

IV. SYSTEM ARCHITECTURE
In Fig.2, an application of users profile which contain the HealthCare preferences and the likes and dislikes of the food as it is needed for personalizing recommendations such as food, exercises, health condition. From users profile the application the information into the database. Whenever user will search Fig.2, A Personalized Framework for HealthCare Recommendation relevant data related to health the preferred will maintain the history of the users and keeps the record of food and exercise would be recommended to the user would recommend to the user by searching the health condition from the database that the user has previous any health related problems.

Figure 2. A Personalized Framework for Healthcare Recommendation
A. Algorithm
The tremendous rise in the technological development in the healthcare systems has to be maintaining history through variety of methods. The Decision tree algorithm is one of the methods used in healthcare systems. Decision tree is an interactive application, which is developed to support physicians, and healthcare professionals for decision making [8]. To analyze the characteristics of users the decision tree can provide the relevant information to users by recommendation, follow-up, and monitoring. Here, we propose a simple algorithm steps for Healthcare recommendation

1. Start the process
2. Input User/Patient Name and his current medical condition
3. Search for the User/patient for his history.
   i. If Found, get his all major medical conditions stored in the history tables.
4. Calculate the food recommendation using a decision tree based on:
   i. Subset of Allowed food items for all of the medical conditions.
   ii. Daily requirement of the Nutrition based on the age of the patient.
   iii. Allergies
   iv. Preferences
   v. Life style
5. Calculate the exercise recommendations using decision tree based on:
   i. Medical condition
   ii. Age/ weight
6. Display the result of Food recommendation and Exercise recommendations calculate above.
7. Update the patient history with the current medical conditions and the recommendations provided.
8. Stop process.

B. Advantages
1. Shift the emphasis in medicine from reaction to prevention
2. Predict susceptibility to disease
3. Improve disease detection
4. Preempt disease progression
6. Reduce the time, cost, and failure rate of pharmaceutical clinical trials
7. Eliminate trial-and-error inefficiencies that inflate health care costs and undermine patient care

C. Limitation
If the parameters entered by the user are incorrect, then output will be not accurate.

V. CONCLUSION
In this work, we propose a framework which recommends food and exercise based on user’s requirement and constraints. This framework will use semantic web technology to analyze user's preferences. This system will found to be helpful to build a healthy and well nourished society. Our proposed system will use the profile to categorize the associated knowledge so that users can make delicious food and exercise inquiries. As the framework is fully automated which gives relevant information to users profile with less intervention from domain experts. The application and techniques will be efficient, feasible and user friendly that would be less time consuming. In future work, we will work on enhancements and gather more feedback from users and also we can connect to the healthcare centers, which will allow healthcare providers that will assist the users who have medical problem.

VI. REFERENCES


