AI-POWERED NUTRITION ANALYZER FOR FITNESS ENTHUSIASTS

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LITERATURE SURVEY

The existing systems help us with the basic knowledge of how to implement the Diet and Nutrition Expert System. We learn from the various elaborate explanations and intend to improvise the existing system and hence come up with our proposed system. Following are the various insights gathered from different papers which have proved helpful for our literature survey.

The eating habits of Costa Rican society are alarming. Obesity rates have increased making our country one of the most obese populations in the Latin American region. Six in ten people suffer a disproportionate increase in their weight because their poor nutritional habits (CACIA 2012). The prevalence of obesity, BMI > 30, is 59 percent (Rosero2009). Studies estimates Costa Rica will be one of the ten most obese populations in the world by 2020 (Euromonitor2011). This reality makes it essential to raise public awareness about the need for a much-needed dietary improvement and encourage preventive care.

Many people ,and particularly students, cannot afford to consult a private nutritional expert (Morales 2012). Hence, public health agencies such as the Office of Welfare and Health of the University of Costa Rica face the challenge of finding alternative methods for educating the population in incorporating healthy eating habits into their daily. One problem in healthcare is the lack of availability for frequently health monitoring. Health software offers less expensive solutions reducing the physician-patient physical relation and provides monitoring solutions. Mobile Internet and the use of Web for medicine

have a strong impact on health-care models that are based on the concept of anytime and anywhere connections.

The expert system is implemented using the JESS, Java Expert System Shell ,libraries (Laboratories 2012) and the Java programming language running as a Web Service on a Linux Web Server. The prototype calculates the BMI, Body Mass Index, as in Eq. 1 (OMS 2012), the ideal weight and physical contexture ,frame size (Rivas 1991) and uses dietary information from(Bermudez 2012). Developing the expert system as a standalone application on the mobile phone has the advantage of being available at any time, and any place but it has many disadvantages.

First : the application will be bounded by the hardware capabilities of the mobile device which needs special care for knowledge representation, inference engine, and interface design.

Second : updating the knowledgebase or the database will require reinstalling the application on the mobile device.

Third : A special version should be released for each mobile platform since standalone applications are platform-dependent.

Most people gain knowledge nowadays using technology including artificial intelligence technologies. Artificial Intelligence (AI) aims to develop systems which exhibit 'intelligent' human-like behavior (Anjane, 1998; Becerra-Fernandez et al., 2004). Expert systems, a type of AI technologies, encode human expertise in specific domains by using If-Then rules, and accordingly advise and provide solutions to different problems (Becerra-Fernandez et al.,2004).The five components of expert system are user interface, working memory, knowledge base, inference engine and explanation system.

Neumark-Szteiner (2009) presented five main proposals for preventing obesity and related eating disorders among girls ,which include eating healthily rather than following diets ,adopting a positive body image, having meals with their families instead of their friends, taking part in physical activities, and involving the families of overweight teenagers when addressing weight related problems. Usually, a dietitian evaluates a client's dietary conditions and enters those into a computer-based diet construction system.

Often the diet constructed by the system requires modification by the dietitian or nutritionist to meet certain integrity constraints, such as ensuring a meat portion in each lunch, juice for breakfast, etc. or simply milk when a cereal is planned for breakfast. Since menu integrity requirements are very difficult to comprehensively formalize, the currently available diet construction systems

violate at times such restrictions which are rather obvious for the human user. Over the years various mathematical models, such as linear programming, have been proposed and applied to diet construction with little success to completely automate the diet construction process

Study of Existing System

There are several nutrition expert systems reported in the literature

1.“The Nutrition Diet Program” (NDP):

It is developed to help the rural population who can't find dietician or the medical doctor near them. This system provides a customized diet plan for patients; the system prepares this plan based on the many details provided by the user (Ramachandran et al., 1992).

2.“Nutrition Counseling and Menu Management”:

This program makes menu planning and manages the eating habit (Hong and Kim, 2005).

3.“Nutrition Diagnosis Expert System”:

It utilizes “Nutritional Care Process and Model (NCPM)”,which is “defined by American Dietetic Association (ADA) in 2008 and integrate the nutrition diagnosis knowledge from dietetics professionals to establish the basics of building the rule based expert system with its knowledge base” (Chen et al., 2012, p. 2132). The system is built using Microsoft Visual Studio 2008.

Kahraman and Seven (2005) presented a computer system that utilized the branch-and-bound method to minimize a diet in terms of cost, while attempting to include most of a certain individual’s food preferences.

Frega et al (2012) developed a program that could be used to evaluate the average dietary needs in a typical Mozambi can household and present a healthy diet for such a family.Although the system provided feasible solutions regarding dietary constraints and requirements, the resulting diets were not generally very affordable.

Vienna expert system for parenteral nutrition of neonates(VIE-PNN) is designed to perform specific task of calculating the daily changing composition of parenteral nutrition for small new-born infants.