



**毕业设计外文资料翻译**

**（译文）**

**题目名称：**基于微信小程序的膳食营养管理系统的设计与实现

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**译文题目：**基于案例的Web饮食信息系统

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# Abstract

Encouraging socio-economic development in developing countries has resulted in many changes in the lifestyle of communities. Changes in dietary patterns are one of the main outcomes from the rapid socio-economics advancement, for example excessive intake of fat, high-protein diet (animal protein), salt and preservatives. Chronic diseases such as diabetes, coronary artery disease, hypertension and cancer are mostly related to diet. With the community becoming more nutrition and health conscious, one of the challenges faced is to make sure that the information and knowledge on diet and healthy lifestyle gets across to the community. This paper presents a model of web-based diet system (WebDIET) that attempts to make diet information and menu plans that are customised to local preference more accessible via the use of Internet. The system is to be used by dieticians who serve as administrators and the public who are the end users. The dietary standard adapted in developing the system is Recommended Dietary Allowances (RDA) for Malaysia. The Malaysian Dietary Guidelines was also referred as it emphasises on Malaysian diet. The system consists of six modules namely Authentication Module, Menu Plan Module, Diabetic Menu Plan Module, Food Selection Module, Disease Info Module and Feedback Module. Diabetic menu plan module models the reasoning process employed by dieticians in suggesting menu plans. The planning task is solved using an artificial intelligence technique through the case-based reasoning (CBR) approach. CBR, generally describes, the process of solving the current problem based on the proposed solution of similar problems in the past. Nearest Neighbour Algorithm was used to compute the similarities in weighted average. Tools used for the development of the system are Microsoft Visual Interdev, Microsoft FrontPage 2000, while HTML, VBScript and JavaScript are the scripting languages used to develop the system.

**Key words：**Case-Based Reasoning (CBR)；diet； menu plan； Recommended Dietary Allowances (RDA)； web systems

In the past two decades, developing countries have gone through rapid socio-economics advancements that resulted in significant changes in communities. Like many other developing countries, Malaysians are shifting towards the “westernised” dietary pattern such as fast food, snacks and preserved food. These changes in Malaysian’s diet are the result of busy schedules as people are seeking for fast meals. More people neglect their health by not eating well-balanced food that can prevent chronic diseases such as diabetes, coronary artery disease and cancer. In order to prevent these diseases from occurring, emphasis should be placed on observing the right diet.

Well balanced diet can be defined as intake of appropriate type and amount of food to supply nutrition and energy for maintenance of body and to support normal growth and development. Recommended Dietary Allowances (RDA) and Food Pyramid are often used to measure whether our daily diet is balanced. RDA for each category of individual is different. For example RDA for a boy aged between 10 years and 12 years is different from a girl aged between 10 years and 12 years. Most of the countries in the world use United States RDA (USRDA) and there are countries that have created RDAs based on the local needs through much research.

With the community becoming more nutrition and health conscious, one of the challenges faced is to make sure the information and knowledge on diet and healthy lifestyle gets across to the community efficiently. According to Nielsen/Netratings, Internet is a source of information for nearly 580 million people worldwide. One of the services provided by Internet is health information including information and advice on nutrition and diet [8], which is the focus of this study. In a study conducted by a group of researchers from the Centre for Information Behaviour and the Evaluation of Research, London, health web users have rated general health information and diet as the most important.

This paper presents a model of web-based diet system (WebDIET) that attempts to make diet information and menu plans that are customised towards local preference more accessible via the use of Internet. This model is mainly used to aid healthy individuals to calculate their calorie intake and help to generate a menu plan based on the calorie calculated. However, it also caters for the diabetic patients to generate menu of their choice while considering their age, gender and glucose levels. Although there are many existing systems that offer menu plan services, these systems are mainly developed by and for western countries. The generated menu plan is relatable to people living in these countries as it is customised to suit their lifestyle and types of food and beverages available. Besides, the type and amount of food needed by each individual varies according to the place they live since the level of nutrition and energy needed is influenced by factors such as weather and common activities undertaken.

A survey was conducted using questionnaires to get feedback from Malaysians representing the developing countries about methods used in obtaining information on diet and also to understand its effectiveness. A total of 230 respondents participated in this survey consisting of various ethnic groups, career background, states and marital status. Out of the 230 respondents, 94.0% are Malays and 50.5% are males. All the respondents consider themselves as computer literate with 37.0% of them spend 35 hours a week surfing the Internet. The survey shows that 80.0% of the respondents are concerned about their diet mainly because they wanted to avoid obesity and stay healthy. 52.0% of the respondents surf the Internet to obtain information on diet and most of the website visited by them are not local. These respondents stated that such websites do not provide enough information about diet that considers the Malaysian delicacies. On the other hand, the survey shows that 9% of the total respondents still prefer to consult a doctor regarding their diet instead of getting the same information from the websites. From the survey we can conclude that the community is becoming more concerned about their health and Internet has become one of their resources for health information. There is also a group of people who prefer to consult a doctor or dietician instead of surfing the Internet. This scenario may arise due to the communication limitation set by the Internet. However, this mostly applies to those who are with health condition and need continuous monitoring by the doctors or dieticians.

Most of the web-based diet systems have been developed for healthy individuals and it is not meant for individuals with health conditions such as diabetes and cancer. For example, many factors has to be considered for a diabetic patient before generating a menu plan, unlike for healthy individuals, the system calculates the calorie intake and then generates a menu plan based on the calorie value. A study was conducted to explore the existing web based diet systems. Several web-based diet systems were chosen as the sample but in this paper only five of them were chosen to be discussed.

1) Web-based Diet System 1: It is an online dietary assessment tool that provides information on diet quality, related nutrition messages and links to nutrient information. Recently, a new feature was added to this system called The Physical Activity Tool, which assesses the physical activity status and provides related energy expenditure information and educational messages. This program is based on the Healthy Eating Index developed by the U.S. Department of Agriculture’s Centre for Nutrition Policy and Promotion. The Healthy Eating Index measures how well the American Diet complies with the recommendations of the Dietary Guidelines for Americans and The Food Guide Pyramid .

2) Web-based Diet System 2 It is a new tool to help individuals to achieve nutrition, weight loss, diet and fitness goals. It is a one stop centre for food journal, calorie counter, exercise log, weight loss tracker, and nutrition facts book. It also provides analysis and graphical reports on calories, fat, carbohydrates, protein intakes, nutritional analysis, exercise and metabolism calorie expenditure, weight loss progress, personal goals, long-term diet and fitness trends. Some of the other services offered by WDS 2 are daily custom notes and diary, custom nutrition goals, custom food and optional metric unit for measurements.

3) Web-based Diet System 3 It is an online diet planner that focuses on weight loss. Services provided by this system are meal planning, healthy recipes, online food log, latest nutrition information, weight loss tip, exercise plans, activity calculator and online exercise journal. The user of this system must choose their food intake for the day and must log their exercise then go to the daily calorie balance to see if more calories were burned than what was taken.

4) Web-based Diet System 4: It is an interactive menu planner which was designed to guide daily food and meal choices based on one day’s calorie allowance. User has to choose the total number of calories for the day, and then choose a meal. The choices of meal provided are grouped according to the American Dietetic Association exchange list such as fruits, milk, vegetables, grains and starches, meat and protein, beverages and fats. The menu planner will automatically adjust the meal selection as well as calories used, calories remaining and total fat and carbohydrate.

5) Web-based Diet System 5: It is a tool that analyses the user’s personal diet list to determine the percentages of the nutrients such as water, protein, fibre, cholesterol, vitamin C, iron and many more. This system provides the definition and functions of each nutrient within the human body. Users can add daily food intake into their personalised diet list by choosing the food from the list provided .

Food Composition Programme in Malaysia was initiated in 1980 and through many years of hard work, the Malaysian Food Composition Database was produced. A comprehensive Food Composition Table for use in Malaysia, with data generated entirely by researchers in the country was published in 1988. In this database there are a total of 783 types of food with complete nutrient composition. Out of this total, nearly 74.1% are listed for raw and processed food, and another 25.9% on cooked food . The indexes of food are organised according to the common names in Malay language as well their scientific names. It is used to assist user in searching for a particular food. Besides that, a stand alone system called NUTRICAL was developed through the cooperation between Malaysian Neura Media Technologies and Institute of Medical Research . It calculates nutrients based on the Nutrient Composition of Malaysian Food. It is actually designed for the use of dieticians and medical doctors in health institutes and it comes with a cost.

Nowadays, many web-based and traditional diet and nutrition information system are available. However, the methods used in Malaysia to promote healthy lifestyle have not changed tremendously or in other words have not shifted totally to ’digital health’. In Malaysia, policies, programmes and interventions to improve the diet and nutritional status are being implemented aggressively [16]. Since more are becoming responsible for their own health, the demand for health information is increasing. As mentioned previously, from the study conducted, there are not many web-based diet systems that customise its features to suit the developing country’s lifestyle and food preference. The main contribution of WebDIET is it attempts to make diet information and menu plans that are customised towards local delicacies, accessible via the Internet. WebDIET has the potential to promote healthy lifestyle because of the growing number of Internet users. According to IDC, currently there are 8.6 million Internet users in 2003, representing 35% of the total population in Malaysia and a growth of 60.5% from 2002. This resulted in the decline in the prices of PC and Internet access in Malaysia which will allow more people to own a PC and have Internet access. Traditional methods of health promotion will still continue and with the arrival of web-based diet systems such as WebDIET, information and knowledge on diet and nutrition will be able to reach more people including in rural areas.

However, the content of diet systems such as WebDIET should be carefully monitored by the dieticians to make sure no wrong information is delivered to the public. WebDIET is just a prototype, thus it has to be evaluated by the target users before the actual data is inserted. Dieticians were consulted during the development of this system as they function as the content experts.

# 基于案例的Web饮食信息系统

摘要

鼓励发展中国家的社会经济发展导致了社区生活方式的许多变化。饮食模式的变化是社会经济快速发展的主要结果之一，例如脂肪摄入过多、高蛋白饮食（动物蛋白）、盐和防腐剂。糖尿病、冠心病、高血压和癌症等慢性病大多与饮食有关。随着社区越来越重视营养和健康，面临的挑战之一是确保有关饮食和健康生活方式的信息和知识能够传达给社区。本文提出了一个基于网络的饮食系统（WebDIET）模型，该模型试图通过互联网使根据当地偏好定制的饮食信息和菜单计划更易于访问。该系统将由作为管理员的营养师和作为最终用户的公众使用。在开发该系统时采用的膳食标准是马来西亚的推荐膳食津贴（RDA）。马来西亚饮食指南也被称为马来西亚饮食指南，因为它强调马来西亚的饮食。该系统由六个模块组成，即认证模块、菜单计划模块、糖尿病菜单计划模块、食物选择模块、疾病信息模块和反馈模块。糖尿病菜单计划模块对营养师在建议菜单计划时使用的推理过程进行建模。通过基于案例的推理（CBR）方法，使用人工智能技术解决规划任务。CBR，一般描述了在过去提出的类似问题解决方案的基础上，解决当前问题的过程。采用最近邻算法计算加权平均相似度。用于开发系统的工具有Microsoft Visual Interdev、Microsoft FrontPage 2000，而HTML、VBScript和JavaScript是用于开发系统的脚本语言。

**关键字：**基于案例推理；饮食菜单；平面图推荐膳食津贴；web系统

在过去二十年中，发展中国家经历了快速的社会经济进步，导致社区发生了重大变化。与许多其他发展中国家一样，马来西亚人正在转向“西化”饮食模式，如快餐、零食和腌制食品。马来西亚人饮食的这些变化是由于人们都在寻找快餐，所以日程安排很忙。越来越多的人忽视了自己的健康，因为他们没有吃到能够预防糖尿病、冠心病和癌症等慢性病的均衡的食物。为了防止这些疾病的发生，应强调遵守正确的饮食。

均衡饮食可以定义为摄入适当类型和数量的食物，以提供维持身体的营养和能量，并支持正常的生长和发育。推荐膳食津贴（RDA）和食物金字塔通常用于衡量我们的日常饮食是否平衡。每类个体的RDA不同。例如，10岁至12岁男孩的RDA与10岁至12岁女孩的RDA不同。世界上大多数国家都使用美国RDA（USRDA），也有一些国家通过大量研究根据当地需求创建了RDA。

随着社区越来越重视营养和健康，面临的挑战之一是确保有关饮食和健康生活方式的信息和知识有效地传达给社区。根据尼尔森/网络评级公司（Nielsen/Netratings），互联网是全世界近5.8亿人的信息来源。互联网提供的服务之一是健康信息，包括营养和饮食方面的信息和建议，这是本研究的重点。在伦敦信息行为和研究评价中心的一组研究人员进行的一项研究中，健康网络用户将一般健康信息和饮食评为最重要的。

本文提出了一个基于网络的饮食系统（WebDIET）模型，该模型试图通过互联网使针对当地偏好定制的饮食信息和菜单计划更易于访问。该模型主要用于帮助健康人计算其卡路里摄入量，并帮助根据计算的卡路里生成菜单计划。然而，它也迎合了糖尿病患者在考虑其年龄、性别和血糖水平的同时，生成他们选择的菜单。虽然有许多现有的系统提供菜单计划服务，但这些系统主要是由西方国家开发的。生成的菜单计划适合生活在这些国家的人们，因为它是定制的，以适应他们的生活方式和可用的食物和饮料类型。此外，每个人所需的食物类型和数量因其生活地点而异，因为所需的营养和能量水平受天气和开展的常见活动等因素的影响。

使用问卷进行了一项调查，以获得代表发展中国家的马来西亚人对获取饮食信息所用方法的反馈，并了解其有效性。共有230名受访者参加了这项调查，包括不同的种族群体、职业背景、州和婚姻状况。在230名受访者中，94.0%为马来人，50.5%为男性。所有受访者都认为自己懂电脑，其中37.0%的人每周花35小时上网。调查显示，80.0%的受访者关注自己的饮食，主要是因为他们想避免肥胖和保持健康。52.0%的受访者上网获取饮食信息，他们访问的网站大多不是本地网站。这些受访者表示，这些网站没有提供足够的关于马来西亚美食的饮食信息。另一方面，调查显示，9%的受访者仍然倾向于就饮食问题咨询医生，而不是从网站上获取相同的信息。从调查中我们可以得出结论，社区越来越关注他们的健康，互联网已成为他们获取健康信息的资源之一。还有一群人宁愿咨询医生或营养师，也不愿上网。由于互联网设置的通信限制，可能会出现这种情况。然而，这主要适用于那些健康状况良好，需要医生或营养师持续监测的人。

大多数基于网络的饮食系统都是为健康人开发的，而不是为患有糖尿病和癌症等健康状况的人开发的。例如，在生成菜单计划之前，糖尿病患者必须考虑许多因素，与健康人不同的是，系统计算卡路里摄入量，然后根据卡路里值生成菜单计划。本研究旨在探索现有的基于网络的饮食系统。选择了几个基于网络的饮食系统作为样本，但本文仅选择其中五个进行讨论。

1） 基于网络的饮食系统1：它是一个在线饮食评估工具，提供有关饮食质量、相关营养信息和营养信息链接的信息。最近，该系统增加了一个称为体力活动工具的新功能，它可以评估体力活动状态，并提供相关的能量消耗信息和教育信息。该计划基于美国农业部营养政策和促进中心制定的健康饮食指数。健康饮食指数衡量美国人的饮食是否符合《美国人饮食指南》和《食物指南金字塔》的建议。

2） 基于网络的饮食系统2：这是一个新的工具，帮助个人实现营养、减肥、饮食和健身目标。这是一个一站式的中心，提供食品杂志、卡路里计数器、运动日志、减肥跟踪和营养事实书。它还提供有关卡路里、脂肪、碳水化合物、蛋白质摄入、营养分析、运动和代谢卡路里消耗、减肥进展、个人目标、长期饮食和健身趋势的分析和图形报告。WDS 2提供的其他一些服务包括每日自定义笔记和日记、自定义营养目标、自定义食物和可选的度量单位。

3） 基于Web的饮食系统3：它是一个在线饮食计划器，专注于减肥。该系统提供的服务包括膳食计划、健康食谱、在线食物日志、最新营养信息、减肥提示、运动计划、活动计算器和在线运动日志。该系统的用户必须选择当天的食物摄入量，并记录他们的运动，然后查看每日热量平衡，查看消耗的热量是否比摄入的热量多。

4） 基于Web的饮食系统4：这是一个交互式菜单规划器，旨在根据一天的卡路里限额指导日常食物和膳食选择。用户必须选择一天的卡路里总量，然后选择一顿饭。提供的膳食选择根据美国饮食协会交换清单进行分组，如水果、牛奶、蔬菜、谷物和淀粉、肉类和蛋白质、饮料和脂肪。菜单计划者将自动调整膳食选择以及所用热量、剩余热量、总脂肪和碳水化合物。

5） 基于Web的饮食系统5：它是一种分析用户个人饮食列表的工具，用于确定营养素的百分比，如水、蛋白质、纤维、胆固醇、维生素C、铁等。该系统提供人体内每种营养素的定义和功能。用户可以通过。

目前，有许多基于web的传统饮食和营养信息系统可用。然而，马来西亚推广健康生活方式的方法并没有发生巨大变化，换句话说，也没有完全转向“数字健康”。在马来西亚，改善饮食和营养状况的政策、方案和干预措施正在积极实施。由于越来越多的人开始对自己的健康负责，对健康信息的需求正在增加。如前所述，根据所进行的研究，没有多少基于网络的饮食系统能够根据发展中国家的生活方式和饮食偏好定制其特征。WebDIET的主要贡献是它试图通过互联网提供针对当地美食定制的饮食信息和菜单计划。由于互联网用户数量不断增加，网络饮食有可能促进健康的生活方式。据IDC统计，2003年，目前有860万互联网用户，占马来西亚总人口的35%，比2002年增长了60.5%。这导致马来西亚的个人电脑和互联网接入价格下降，这将允许更多的人拥有个人电脑和互联网接入[15]。传统的健康促进方法仍将继续，随着网络饮食等基于网络的饮食系统的到来，有关饮食和营养的信息和知识将能够惠及更多的人，包括农村地区的人。

然而，营养师应仔细监控饮食系统（如网络饮食）的内容，以确保不会向公众提供错误信息。WebDIET只是一个原型，因此在插入实际数据之前，必须由目标用户对其进行评估。在这个系统的开发过程中，营养师作为内容专家进行了咨询。