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A Web-based Application for Food Recommendation

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Abstract: People are putting greater emphasis on living a healthy lifestyle, and the food they consume is getting healthier. On the other hand, an unhealthy person needs nutrients to heal more quickly. In this study, a food recommendation system is proposed. The main goals of this project are to define the specifications for a food recommender system, create a prototype for that system, and assess how well it works. The suggested system can gather user information and provide food recommendations to the user depending on their needs. The findings of the usability study indicated that the proposed system is easy to learn. The output produced by the system was likewise well received by the respondents. Furthermore, the system can assist people, especially those who are unhealthy, in managing their food intake.

Keywords: Healthy life, Nutrition, Body needs, Food recommendation, Managing food

1. Introduction

People that are unwell go through periods of having a weak physique. Women who have recently given birth, for instance, need to eat to regulate their bodies since they are in a very fragile state, and those who have recently had surgery also require appropriate nutrition. Their bodies are malnourished on all fronts. In addition to medicine, their bodies also require nutrients from meals to help them recover faster.

Existing resources or references for recommending food offer little guidance on choosing healthy foods. There is some information; however, it is merely plain text instructions. The difficulty of having few references for the ideal foods affects unhealthy people as well. Most of the references are printed, static materials like articles and books.

One of the smart method for assisting people in managing and planning their food intake is the use of food recommendation systems [1]. The biggest issue that the recommendation system frequently runs into is taking user preferences and requirements into account [2,3]. This is because everyone has unique

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physical conditions or varied demands. For instance, some individuals might only be vegetarians or have dietary allergies. These unique circumstances require appropriate handling by the system.

The purpose of this study was to create a system for advising healthy foods to people who are unsure on how to choose foods that are good for their health. This system may provide suitable meal recommendations based on user preferences and needs. This technique can help people fully understand their food intake and the nutrients it includes. The system may be utilized by others as a reference since it stores information about other people's experiences selecting healthy foods to eat.

2. Method, Design and Development

Rapid Application Development (RAD) approach was employed in the study. The reason RAD was chosen for this research is because it can speed up the development of software prototypes and enable frequent updates based on ongoing user input. Four main phases in the RAD model are the requirement planning, design, construction and cutover phase.

In the requirement planning, the system requirements are determined (**Table 1**). Unstructured interviews were done with a group of individuals at this phase to gather input on the system requirements. In the design phase, diagrams were constructed to give a general overview of the logical and functional aspects of the system. **Figure 1** is the use case diagram that illustrates the relationship between the actor of the system and the system's functionalities. There are seven main use cases, which are: register an account, login, manage info, manage users, manage food, manage food consumption, and view recommendation.

To create the prototype, the system design and construction phases are run concurrently. Users are allowed to give comments on the design and construction stage to ensure that the system requirements are met. The system's usability is then measured in a final evaluation. **Figures 2 and 3** are example of the system's interfaces.

Table 1: System's Requirements

ID	Requirements Description	Priority
01	**Register**	
01_01	New admin and user need to click on "Register" button	Mandatory
01_02	System will display a screen that allow admin and user to fill in their username, email and password and click the "Submit" button to complete registration.	Mandatory
01_03	System will verify the account by sending an email to new admin and user.	Mandatory
02	**Login**	
02_01	Admin and user need to click "Login" button.	Mandatory
02_02	Admin and user need to insert the correct email and password.	Mandatory
02_03	Admin and user can reset the password through a registered email if they forgot password	Optional

03	**Manage Info**	
03_01	Admin and user can view their information.	Mandatory
03_02	Admin and user can edit their information.	Mandatory
04	**Manage User**	
04_01	Admin can view user list.	Mandatory
04_02	Admin can view user food consumption.	Mandatory
04_03	Admin can delete user.	Mandatory
05	**Manage Food**	
05_01	Admin can add information about food.	Mandatory
05_02	Admin can view the information about food.	Mandatory
05_03	Admin can update information about food.	Mandatory
05_04	Admin can delete information about food.	Mandatory
06	**Manage Food Consume**	
06_01	User can select food.	Mandatory
06_02	User can view the food that they selected.	Mandatory
06_03	User can remove the food that they selected.	Mandatory
07	**View Recommendation**	
07_01	User can get recommendation from the system.	Mandatory
07_02	User can select recommendation that recommend from the system.	Mandatory

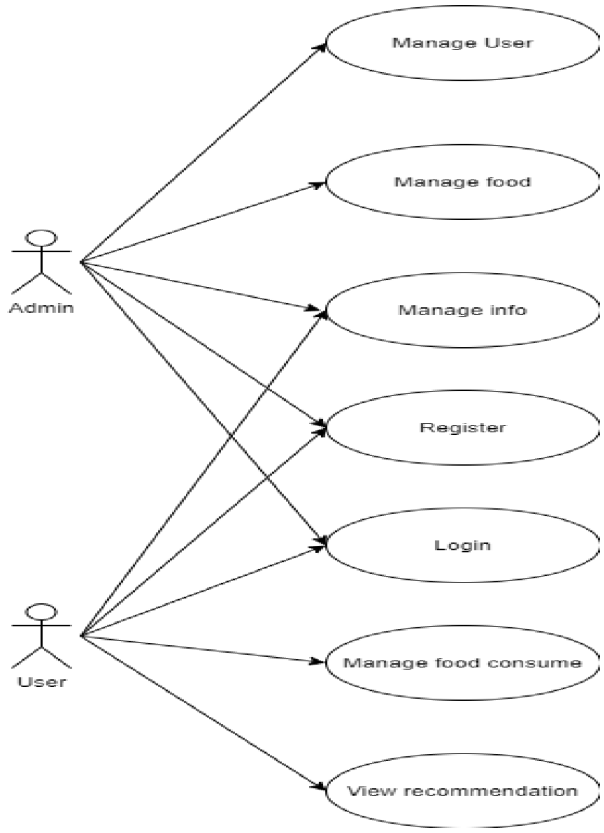

Figure 1: Use Case Diagram

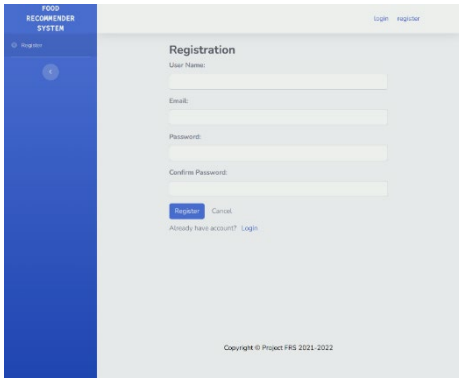

Figure 2: User Registration

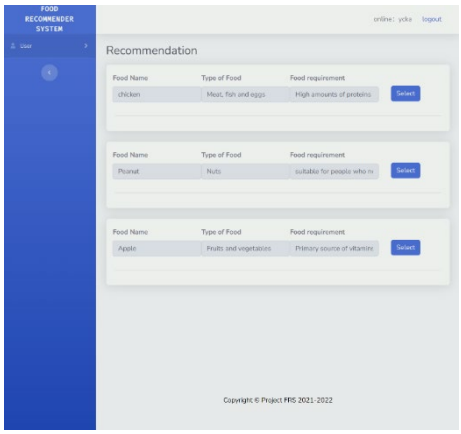

Figure 3: Food recommendation selection

3. Results and Discussion

To evaluate the food recommender system (FRS), 30 responders were recruited. The respondents were chosen at random, and after completing the task, they were invited to provide feedback using a Google form. The form is divided into two sections. Section A is about respondents' demographic and background information, and Section B contains questions related to respondents' experience when using the system. The question was adapted from [4].

The procedure is laid out for the respondents, who complete the task step-by-step for evaluation: (1) reading the information sheet to understand the task at hand, (2) reading and signing a consent form, (3) completing the task assigned to test the system, and (4) responding to the questionnaire via Google Form.

Based on the respondents' satisfaction with the system and its usability, which is measured in the questionnaire's Section B, an analysis was conducted. The average response rate and number of responders are shown in **Tables 2 and 3**, respectively. The majority of respondents selected concurring usability-related factors. Few participants said that they agreed or were neutral.

Table 2: The Ease of Use

Questions	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Average
FRS is easy to use	0 (0.00%)	0 (0.00%)	3 (10.00%)	23 (76.67%)	4 (13.33%)	4.03
FRS is user friendly	0 (0.00%)	0 (0.00%)	4 (13.33%)	22 (73.33%)	4 (13.33%)	4.00
FRS is easy to learn how to use it	0 (0.00%)	0 (0.00%)	2 (6.67%)	22 (73.33%)	6 (20.00%)	4.13
The interface of FRS is pleasant	0 (0.00%)	1 (3.33%)	7 (23.33%)	22 (73.33%)	0 (0.00%)	3.70
I do not notice any inconsistencies as I use FRS	0 (0.00%)	0 (0.00%)	4 (13.33%)	21 (70.00%)	5 (16.67%)	4.03

Table 3: The Satisfaction

Questions	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Average
I am satisfied with output that given by FRS	0 (0.00%)	0 (0.00%)	6 (20.00%)	22 (73.33%)	2 (6.67%)	3.87
I feel comfortable using FRS	0 (0.00%)	1 (3.33%)	7 (23.33%)	20 (66.67%)	2 (6.67%)	3.77
Overall, I am satisfied with FRS	0 (0.00)	0 (0.00)	8 (26.67%)	21 (70.00%)	1 (3.33%)	3.77

4. Conclusion

This article describes the implementation and evaluation of a web based system for food recommendation. The respondents generally agree that the system is acceptable and easy to use. In terms of recommendation quality, the system can be further improved by incorporating artificial intelligence (AI) techniques such as artificial neural network and expert system [5]. AI can be utilized to learn people's eating patterns, as some people have healthy eating habits, that have a positive effect on their lives. They have useful experience that others may use as a reliable reference. This information can be gathered by the system to create a database that will be used to provide more accurate recommendations in the future.

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