

A personalized web cosmetic recommendation system based on skin type

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Abstract: Cosmetics Recommendation System is a web-based system which helps the user to decide to choose their skincare range based on their skin type by suggesting some product recommendation that matches their skin type. User will have a survey session which to know their skin type before choosing their skincare products. Many user experience difficulties to choose the product that match their skin due to varieties of choices available online. Furthermore, there are some factors that affect the decision of users such as the product packaging, price, product rating and product review. This system will help the user to analyze their skin type, assist on suggesting products that match the user's skin condition and also provide some skin tips to enhance their skincare knowledge and care. It can improve the efficiency and speed-up decision-making process for the user to choose their skincare product. The prototyping model is being used as the guideline and standard together with the process of system development. Fusion Charts used to visualize the decision result from data entered by the user based on the answered survey. Decision tree technique has been used to analyze the collected information. At the end of the project, testing was conducted to ensure this system acquires the needs and its functionality. It shows that the system has helped the user to make better choices for their skincare range based on their skin type.

Keywords: recommender system, recommendation system, web-based system

1. Introduction

Most of the users of skincare product experienced to be fortunate on buying skincare product but somehow it may turn to sour once the chosen product contributed a bad condition to your skin after using it for a while. These are the main problems that may be occurred to the user when they are searching the products that suitable for their skin type. Firstly, some user does not even know their skin type before buying skincare product, this may increase the chances of getting skin trouble after using the wrong product because each of the product has been formulated for different types of skin. Next, the user needs a lot of time to find and make research on each product that wants. Sometimes the user

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may accidentally skip the ingredient that they may allergic to it, thus they may buy products that not suitable for their skin type or allergic for certain substances. Moreover, some user does not know the sequences or the steps to use the product, so this system will guide the user on how to use it, how much the amount needed for each product instead of giving the recommendation products only like other existing cosmetics recommendation system.

The aim of this project is to develop web based Cosmetics Recommendation System. The goal of this project is basically to assist online users to choose the best skincare for them. This project will mainly focus on the following objectives:

1. To design the Cosmetics Recommendation System.
2. To develop the Cosmetics Recommendation System.
3. To test the Cosmetics Recommendation System.

2. Related Work

A recommender system or a recommendation system generally replacement system with an equivalent word like platform or engine may be a subclass of data filtering system that seeks to predict the rating or preference a user would provide to an item [1]. They represent a robust technique for sanctionative users to filter through massive info and products areas [2]. They are primarily utilized in commercial applications. an information filtering system is a system that removes redundant or unwanted information from an information stream using semi-automated or computerized ways before presentation to an individual's user [3]. Its main goal is the management of the data overload and increment of the semantic signal-to-noise ratio by comparing user's profile with reference characteristics. These characteristics might originate from the information item (the content-based approach) or the user's social surroundings the collaborative filtering approach [4].

2.1 Software and Hardware Requirement

Table 1 showed the software requirements for the system. XAMPP used to create a local web server for testing and deployment purposes, MySQL database is developed using XAMPP whereas Brackets is used as programming editor for PHP programming language.

Table 1: Software requirements for the system

Software	Description
Microsoft Windows	Operating system
XAMPP	Web server stack package
Brackets	Programming Editor

The hardware has been specified for developing the system as shown in Table 2 is used to develop the system in desktop platform and the requirements for the system. Table 3 show comparison for similar system and proposed system.

Table 2: Hardware requirements for the system

Hardware	Description
Personal Computer • Processor: Intel Core i5-5200U • installed memory (RAM): 4GB • System type: 64-bit Operating System. x64-based processor	It is used to develop the system.

Table 3: Comparison for similar system and proposed system

System	HiShop	Cult Beauty	Dermstore	Cosmetics Recommendation System (CRS)
Features				
X = NO √ = YES				
Design				
1. Responsive web	X	√	√	√
2. Different font size	√	√	√	√
3. Float navigation	√	X	X	√
Functionality				
1. Admin page	√	√	√	√
2. User registration	√	√	√	√
3. User profile management	√	√	√	√
4. Guide to know their skin type	X	X	X	√
5. General information about skin	X	X	X	√
6. Search product by ingredient	X	√	√	√
7. List out top 5 recommendation product based on skin types	√	X	X	√
8. Detail information on each product	√	√	√	√
9. Guide on how to use the product	√	√	√	√
10. common Q&A listing	X	X	X	√
11. Contact section for any inquiries	X	√	√	√
Access Technology				
1. Using PHP	√	√	√	√
2. Using HTML	√	√	√	√

3. Methodology/Framework

Figure 1 shows the System Prototyping methodology used in the system development. It consists of steps that exhibit highly iterative behaviour in order to allow maximum flexibility in making further refinements of system requirement whenever necessary. System Prototyping performs the analysis, design, and implementation phases concurrently in order to quickly develop a simplified version of the system, and give it to the users for evaluation and feedback. Following comments from users, the system will reanalysis, redesign, and re-implement a second prototype that corrects deficiencies and add more features. This cycle will continue until the users agree with the prototype provide enough functionality to be used [5]. So, the major benefit of this methodology is changes can be made to the prototype and allow the prototype to be evolved into a working system.

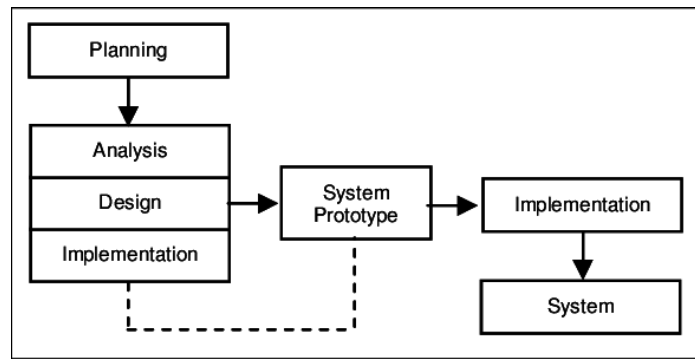


Figure 1: shows the illustration of the System Prototyping methodology used in the system development [6].

3.1 System Analysis

System requirement analysis is the most important phase in this project development because this process will increase the understanding of the system flow of this Cosmetic Recommendation System. The system requirement analysis consists of the user requirements as well as the system requirements and the functional requirement and non-functional requirement. The analysis will explain about the specifications for every requirement so that the objectives are achieved. The functional requirements will explain about the main module and the application’s functions which will be developed while the non-functional requirements will explain about the operational requirements.

3.1.1 Flowchart diagram for administrator

Figure 2 shows the Flowchart diagram for the administrator. Flowchart diagram for the administrator is starting from the login process. Administrator login with username and password. If the username and password are valid, the administrator allows access to the database. Then might prepare to manage the database with a certain function. If the administrator is log in with invalid username and password, thus the system will return to the login page and request administrator to re-enter username and password until it is valid. The administrator can add new data, update and delete that data which is outdated.

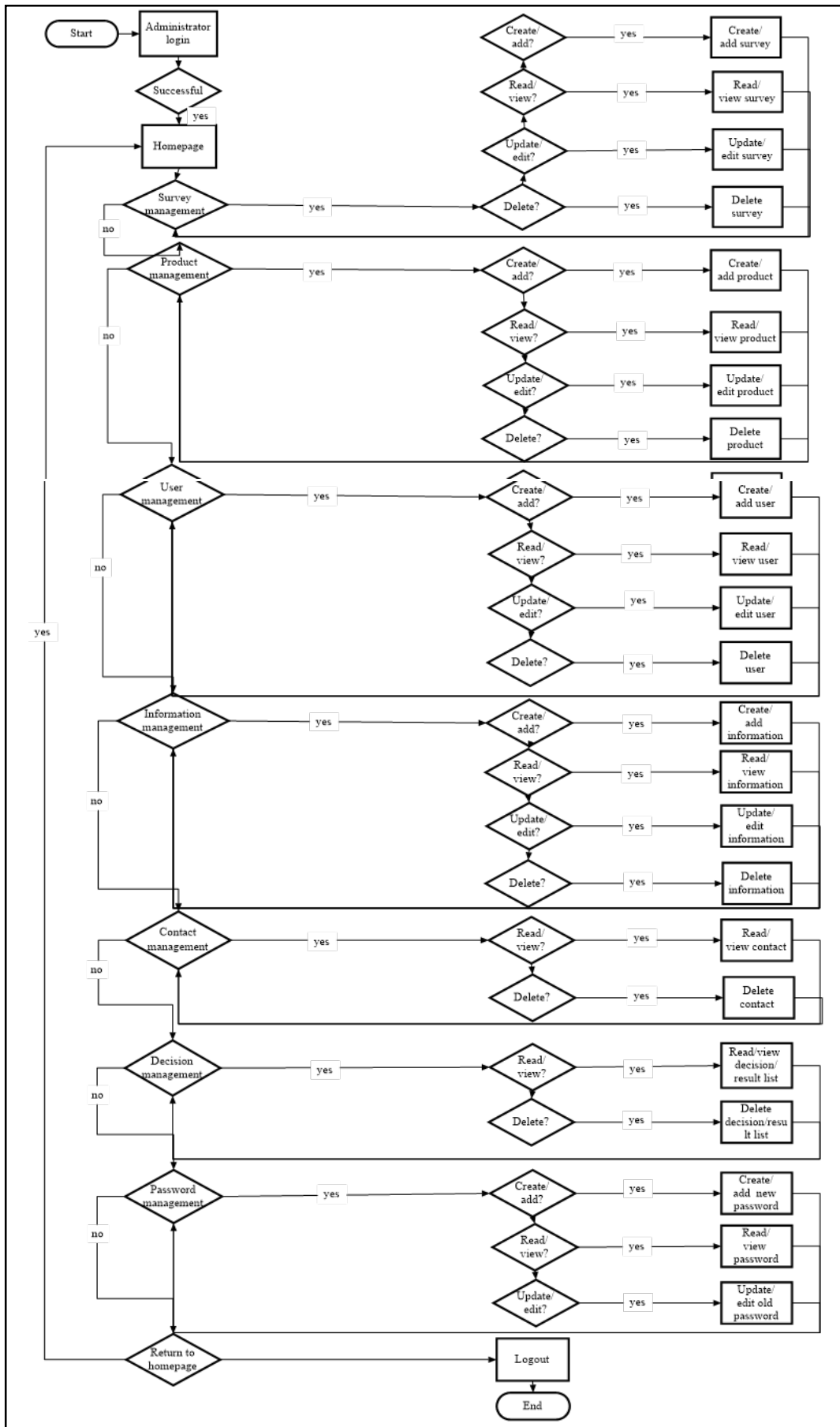


Figure 2: Flowchart diagram for administrator

3.1.2 Flowchart diagram for user

Figure 3 shows the flowchart diagram for the user. User will log in into the system with username and password. User can access the input interface after successful login into the system. User will need to answer every question that asked by the system, then it will be used to retrieve data from the database and generate suitable skincare product for the user. Then, the user can test again for an alternative decision or log out after they finish using the system.

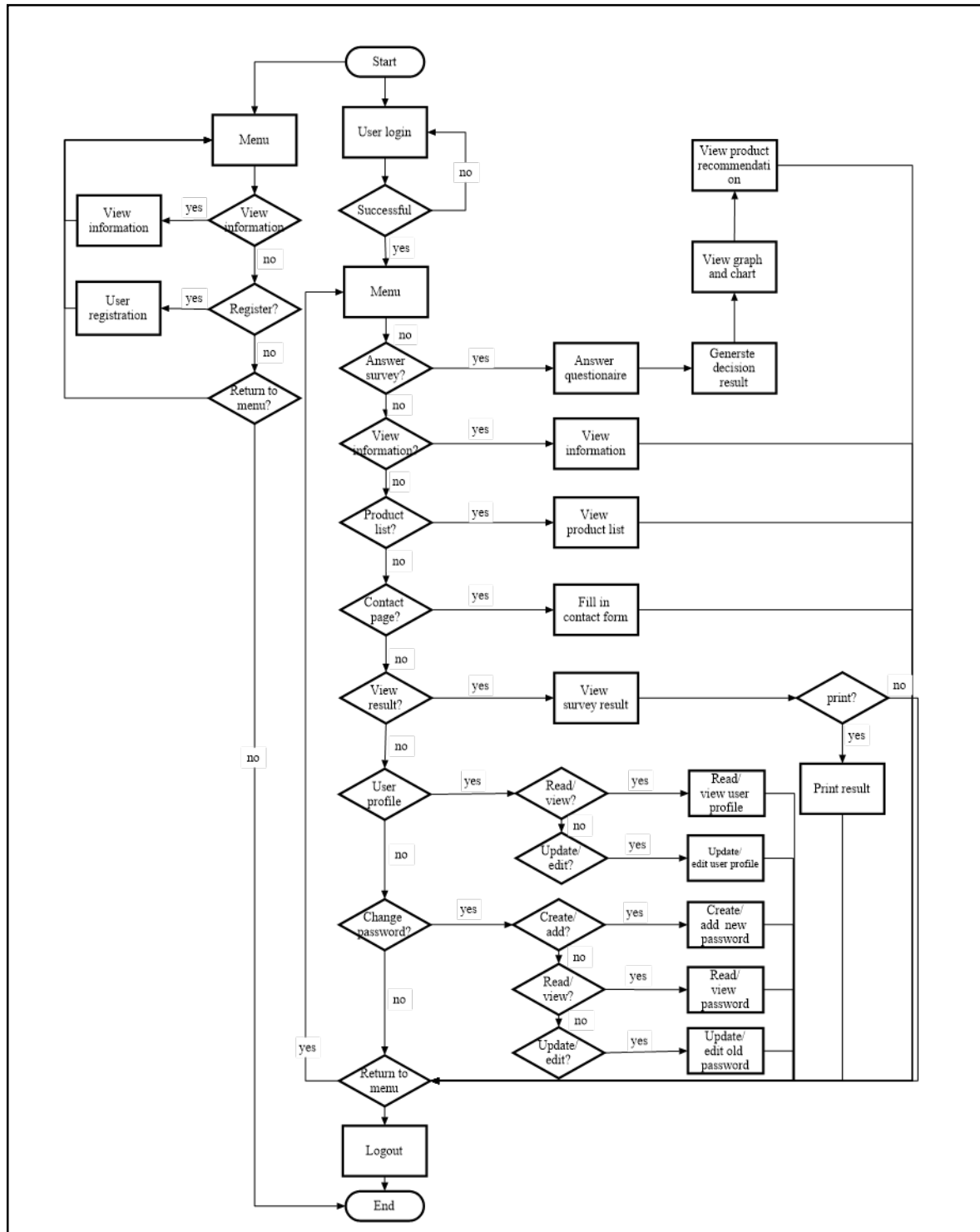


Figure 3: Flowchart diagram for user

3.1.3 Data flow diagram

Data Flow Diagram provides an overview of the data flows between the process in a system, transformations on the data, the files and the results flow. Figure 4 and Figure 5 shows the type of level in the Data Flow Diagram (DFD) which is Context Diagram and DFD Level 0 Diagram.

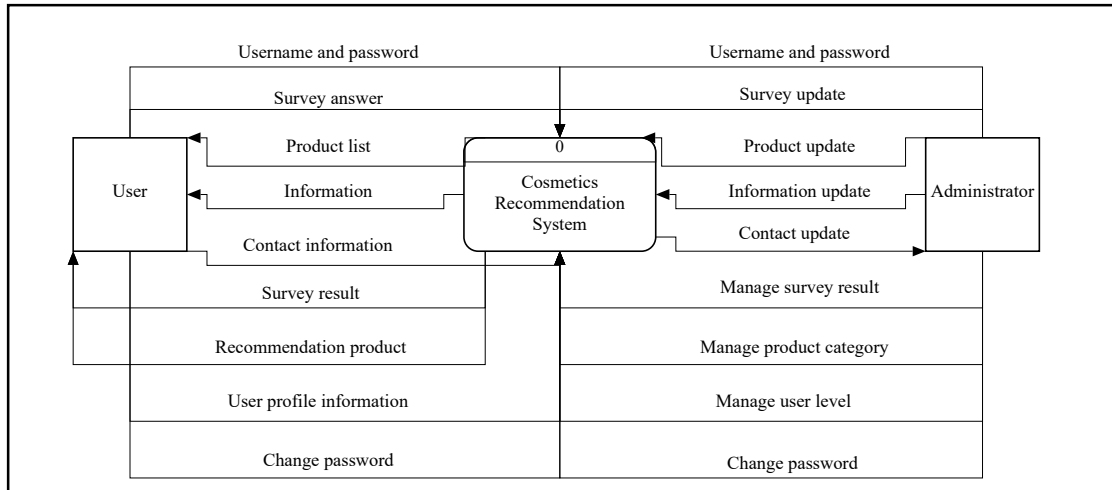


Figure 4: Context diagram for Cosmetics recommendation system

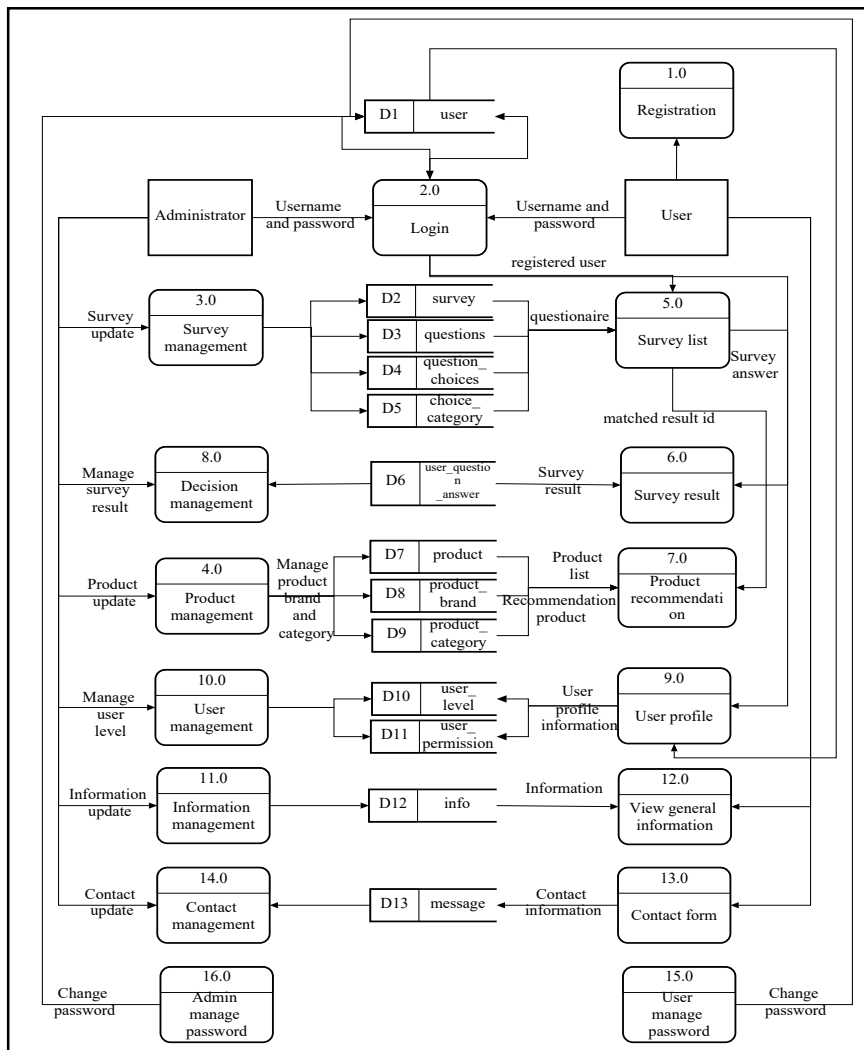


Figure 5: Data flow diagram-level 0 diagram

3.1.4 Decision tree

Figure 6 shows a sample of the decision tree in this proposed system. This system is dynamic. The list of survey, number of questions, answer choices, skin type category and set of product for each skin type can be modified or add up. The user only allowed to select an answer for each question, the result of the decision will be displayed after the user answers all questions. Figure 3.6 shows that decision box is the box that includes the event that starts the decision tree which is a set of question in the survey list used in this system. There is a branch for each outcome out of the decision box. Each outcome is the choice for each question, each choice is referring to a skin type category, thus the system will generate a result from the maximum value skin type category from user answer. Finally, the system will generate a set of the product as a result of the decision and the user also can view their result in a donut chart and bar chart. These charts are implemented by FusionCharts.

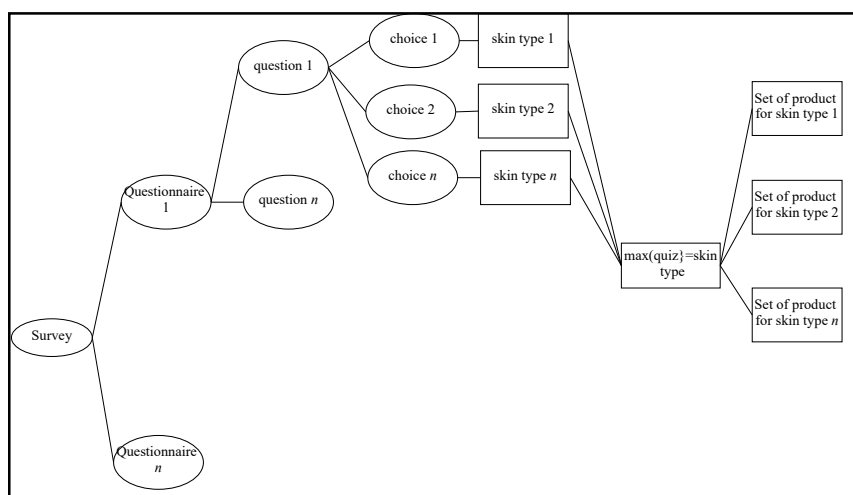


Figure 6: The decision tree for Cosmetics recommendation system

3.2 Interface Design

Interface design is concerned with understanding what users may need to do and ensuring that the interface has components that are simple to view, recognize, and use in order to make such behaviours easier. It combines interaction design, graphic design and information architecture principles. As depicted in Figure 7, a generic type of layout is used with breadcrumb type of listing top menu and major content link are presented in the form of links and graphic link.

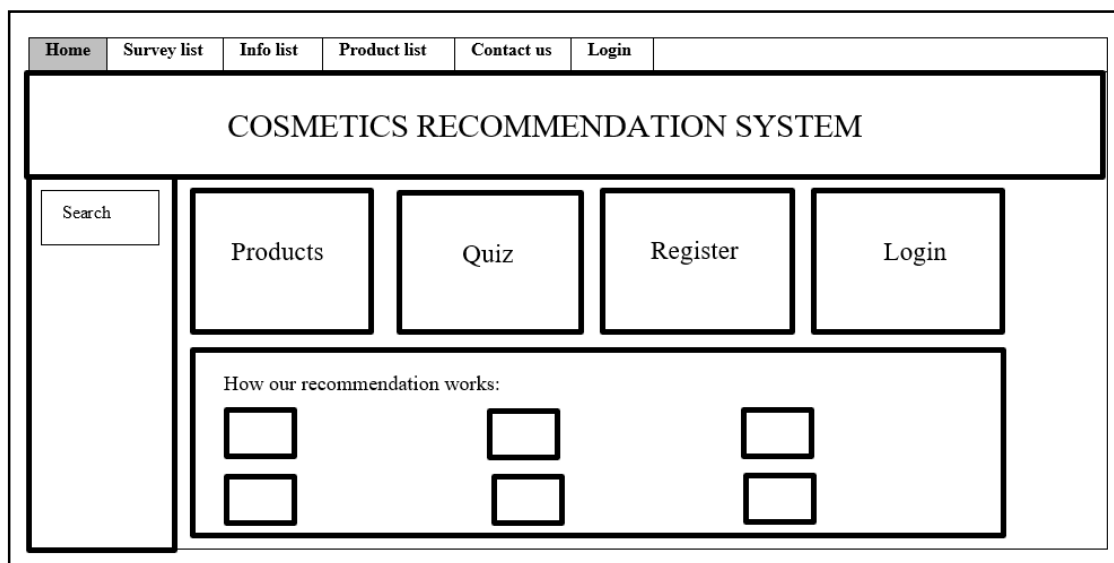


Figure 7: Interface Design

4. Prototype system

A prototype system can be any mock-up or demo of what a system will look like when it goes live. It can be anything from a paper sketch to a clickable HTML prototype. Figure 8 to Figure 11 are few interfaces from Cosmetics Recommendation System.

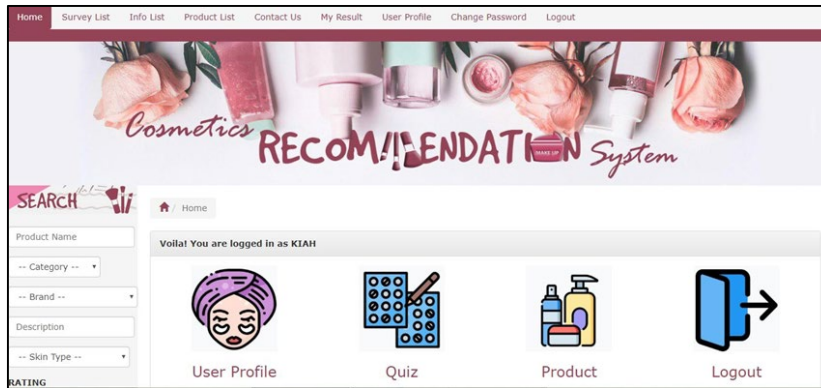


Figure 8: The registered user interface

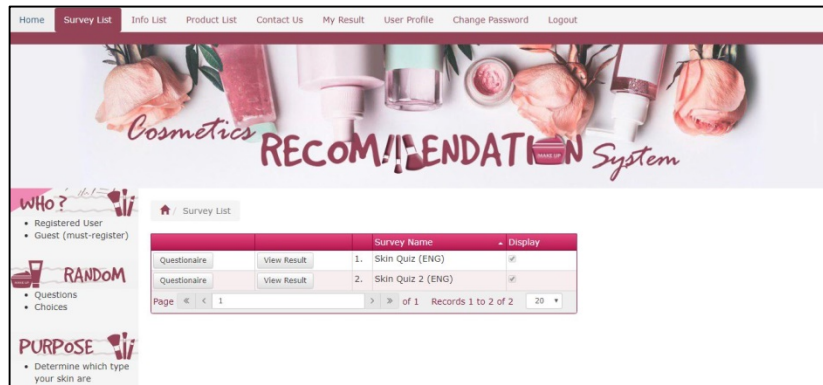


Figure 9: The survey list interface

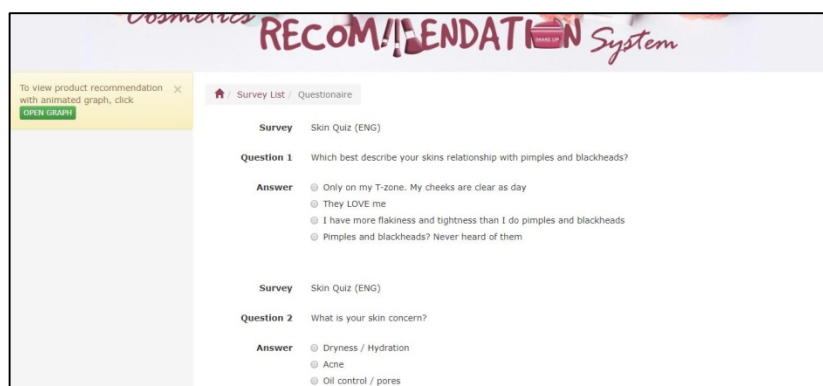


Figure 10: The questionnaire interface

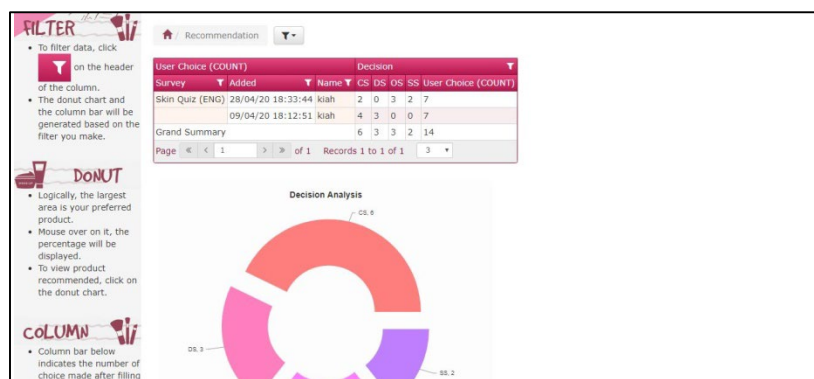


Figure 11: The result graph view interface

5. Conclusion

The Cosmetics Recommendation System will assist people on how to choose the best cure for their skin type problems. Recommendation based on product properties can be applied to any kinds of domains. It could be also applied to a book recommendation. We can make various maps with the product features. Visualizing products on the coordinate plane helps us to understand the relations between the items in an intuitive way. With this analysis, the system can go further toward more refined services. It could show the images and the reviews of the item or provide a direct link to the page for ordering. These kinds of application will offer a higher level of product analysis.

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