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To cite this article: Hartatik *et al* 2020 *IOP Conf. Ser.: Mater. Sci. Eng.* **858** 012051

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Decision Support System for Detection of Skin Diseases in Smart Health development planning

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Abstract. Skin disease is a disease that is quite dangerous and is often found in tropical countries like Indonesia. Lack of knowledge about the types of skin diseases and do not know how to prevent them can cause a person suffering from acute skin disease. Detection of skin diseases is usually done by a dermatologist but actually the detection of skin diseases can be done alone or with the help of others by observing the diagnoses that arise. The expert system is a solution for using computers to help in the early detection of possible skin diseases. Dipen-ku is a expert system which designed to detect naive skin diseases with Bayes. System output is a type of skin disease which is a diagnosis of this type of disease. This expert system is a new innovation in innovation in drug materials that combines treatment technology and bigdata technology to support the design of smart city development

1. Introduction

The skin is one of the five human senses and the first part that can receive external stimuli. Therefore skin health is something are very important to be maintained, so that the skin does not experience various diseases. Various skin diseases can be caused by several factors such as a less clean environment, viruses, bacteria, immune system, and others. Determination of skin diseases must be done by skin experts or skin specialists, because skin diseases can be something serious if an error occurs. From the writer's observations, public awareness of the dangers of skin disease is currently considered lacking. Machine learning plays an important role in the medical field for the automation of many processes[1] in a previous study developed detection of skin diseases [2].

From the problems that the authors found, the creation of an expert system of skin disease detection using the Naive Bayes method was felt to be very necessary to help all people who want to know about skin diseases that are being experienced or need information about skin diseases. Algorithm The Naive Bayes method is one of the algorithms can be use for found in classification problem[3]. The Naive Bayes algorithm is a technique for classification with use probability concept and statistical methods. The Naive Bayes algorithm is considered a result to be suitable for the manufacture of a skin disease expert system that will be created because of the workings of the Naive Bayes Algorithm which can classify large amounts of data so that the results of the diagnosis are



correct[4,5]. With the existence of this information system for skin diseases, it is expected to help patients with skin diseases in general who need it.

For this application is called dipen-ku , a patient can be ceck and detect about skin disease and alternative drug as a one of solution about their disease. So dipenku can be called as a drug technology in healty especially skin disease.

2. Experimental

Skin Disease Detection Expert System Using the Web-Based Naive Bayes Method is an expert system that can be used by the community to detect diseases based on perceived indications[6]. The user makes a diagnosis by accessing the system and conducting consultations illness by choosing a feeling that is felt without using the system login[7]. The methos of the research can be seen in Figure 1 .

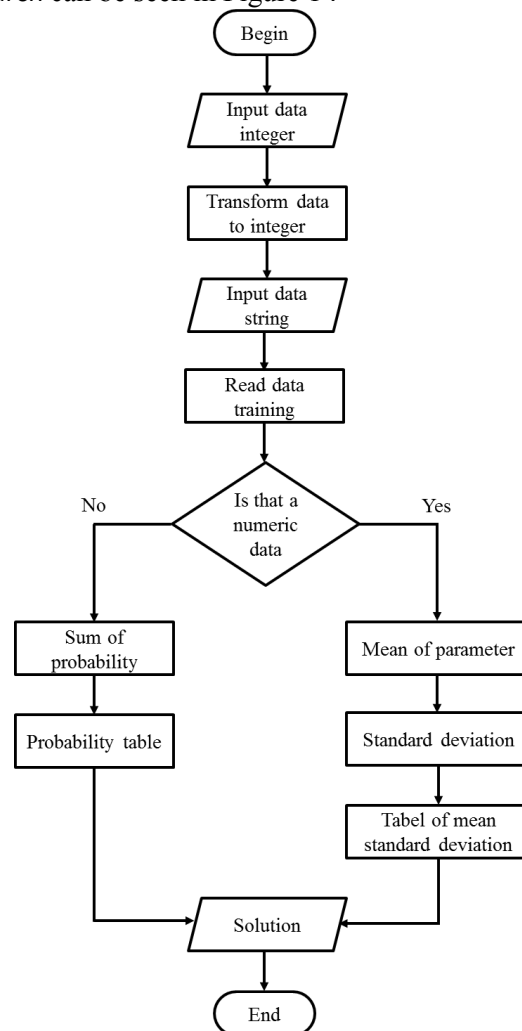


Figure 1. Flowchart of business process

3. Result and Discussion

The development of a decision support system for skin diseases in this study was based on an expert (expert) one of the skin doctors in Solo. Based on the results of interviews with Narasuber, a health information system was developed, a decision support system for skin disease detection. Business process of dicesion support system can be seen in Figure 2. The system are related to the process functionality of the system carried out by actors who have access to the system process.



Figure 2. business proses in Dipen-ku

System functional requirements for decision support system that describe the database of system can be seen in Table 1.

Tabel 1. Functional requirements.

Code	Description	Actor
FS-01	The system can display disease data from Admin disease table	Admin
FS-02	The system can manage data (add, change, and delete) diseases in the disease table	Admin
FS-03	The system can display all symptom data from the Admin symptom table	Admin
FS-04	The system can manage data (add, change, and delete) all indications in the Admin symptom table	Admin
FS-05	The system can manage Admin patient data	Admin, user
FS-06	The system can display Admin expert profiles	Admin, user
FS-07	The system can display the results of processing data entered by the Admin, user,	Admin, user

Non-functional needs are requirements related to user interaction with the system created. Non-functional system needs can be seen in Table 2.

Table 2. Non-functional requirements.

Code	Description
NF-01	Use a web browser to access the system
NF-02	To manage data in the system using login
NF-03	Password on the system using MD5 technology

The making of an expert system to diagnose skin diseases begins with system design including the design of knowledge base (Knowledge Base), Use Case, Activity Diagram, Sequence Diagram, Class Diagram and ERD .

At the prosses of making expert systems, facts and knowledge are the important factor which related with Indications of skin diseases. This indications will be used in making a conclusion. These facts and knowledge are obtained from interviews with experts or other sources such as books, journals, internet pages and others. The facts and knowledge that have been obtained will be translated by the system maker into a knowledge base stored in the expert system that will be created [9,10] , can be seen in figure 3.

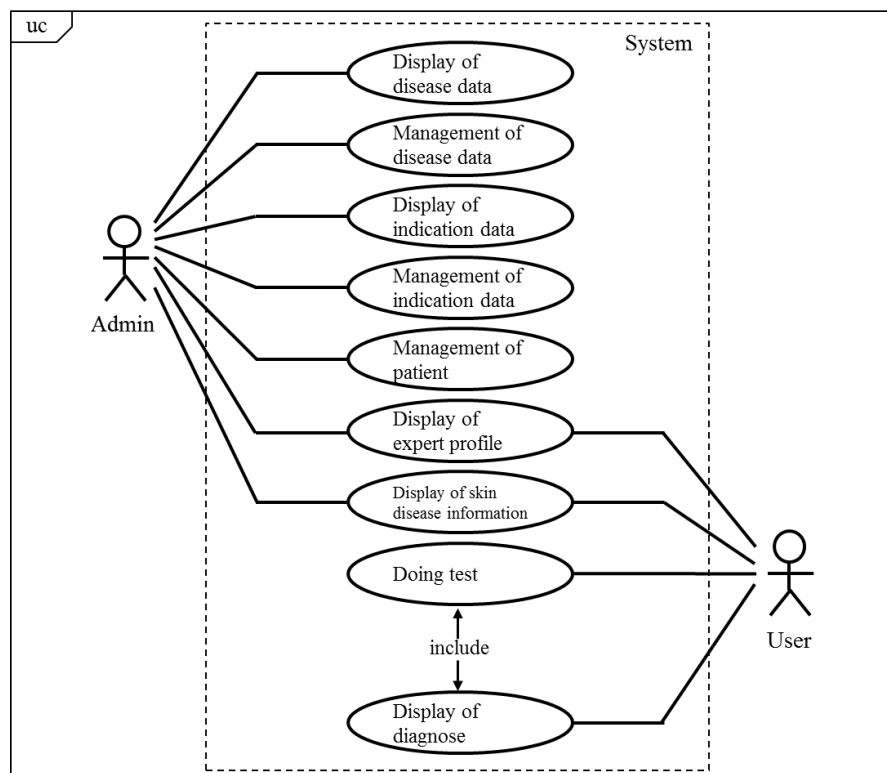


Figure 3. Use case diagram.

The home page is the initial page that will appear after the admin has successfully logged into the system. On the left there are menus available on the system. The picture of the admin home page can be seen in Figure 4 and Figure 5. The process of sequencing the system rules using Naïve Bayes for classify the indications of disease in the system and then decide the results of the system classification in figure 6.

If there is an addition of disease data by the admin, the disease data entered can affect the results of the tracing if the admin has entered the indications data. Sometimes not all indications of a disease are met, so if 60% of the indications entered by the user are in accordance with the indications of one disease, then the patient can be categorized into skin diseases according to the indications entered. If the user inputs symptom data randomly or regardless of the child's condition, the system is very possible to make errors in the tracing or bring up the default value because there is no disease data that matches the indications entered by the user.

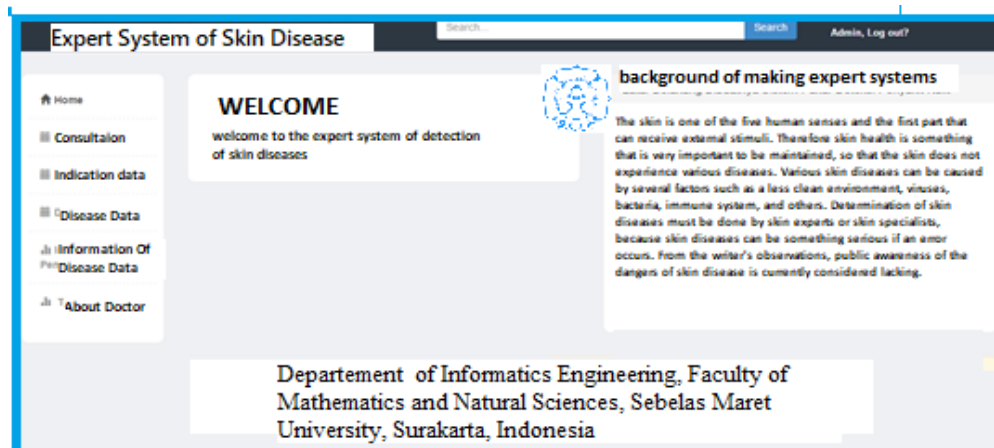


Figure 4. Implementation of home page Dipenku.

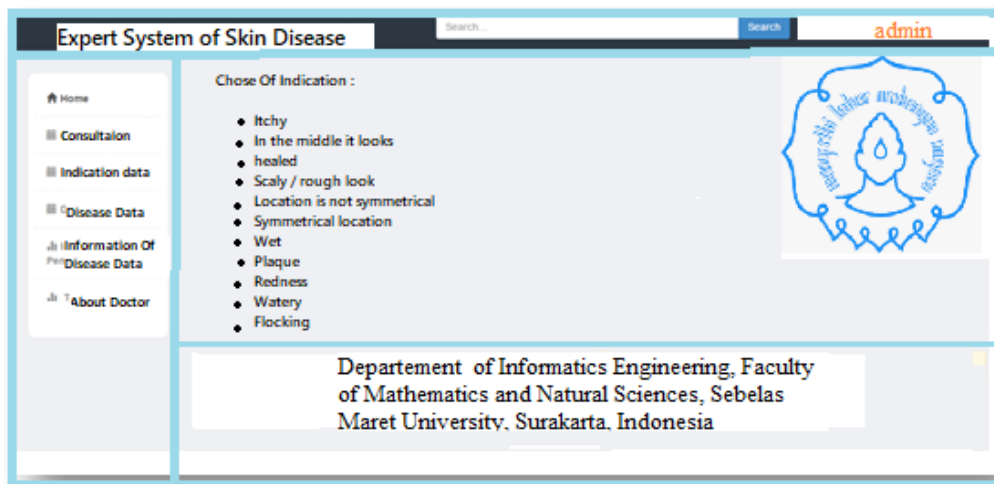


Figure 5. Implementation of admin page Dipenku.

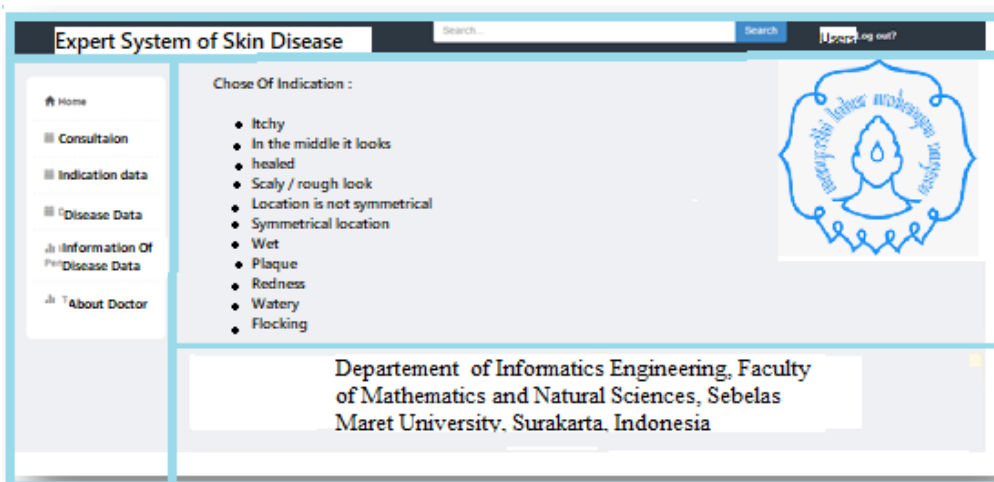


Figure 6. Implementation of consultation Dipenku.

The script of dipen-ku is a script for admin login which the admin can later manage data after login which resulting interface in figure 5 [11].

Expert system that is made is tested by conducting interviews with respondents. The respondent tried the expert system that was made and then asked questions. From survey result that 65% percent stated that this expert system was very helpful, this can be seen on Figure 7 .

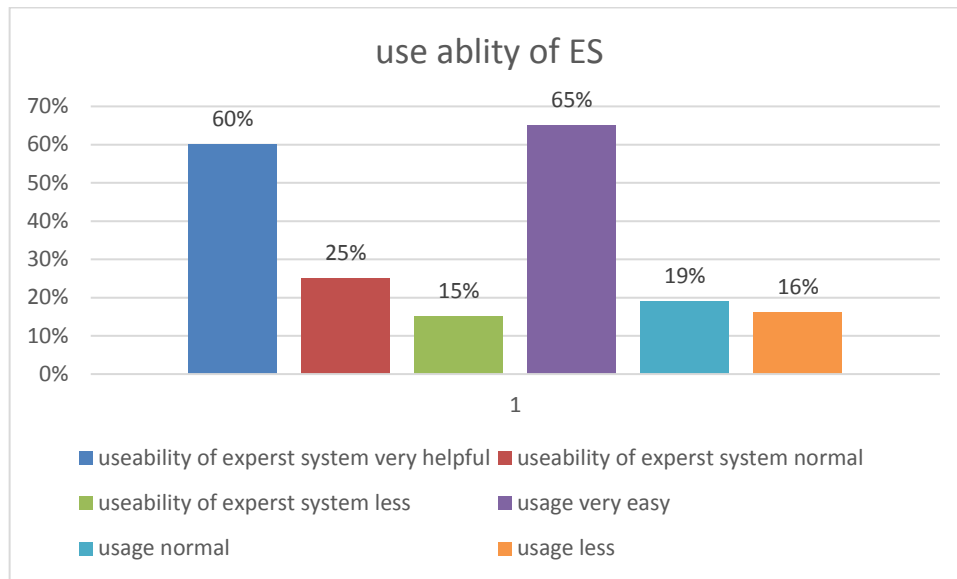


Figure 7. Survey result for Dipen-ku

The application is tested in general to 101 respondents and most of the respondents stated that it is very helpful for students to learn to write which is 60 % said that the application is very helpful in figure 8[10,11]. This is can be information that dipenku is one of riil action for smart health development planning.

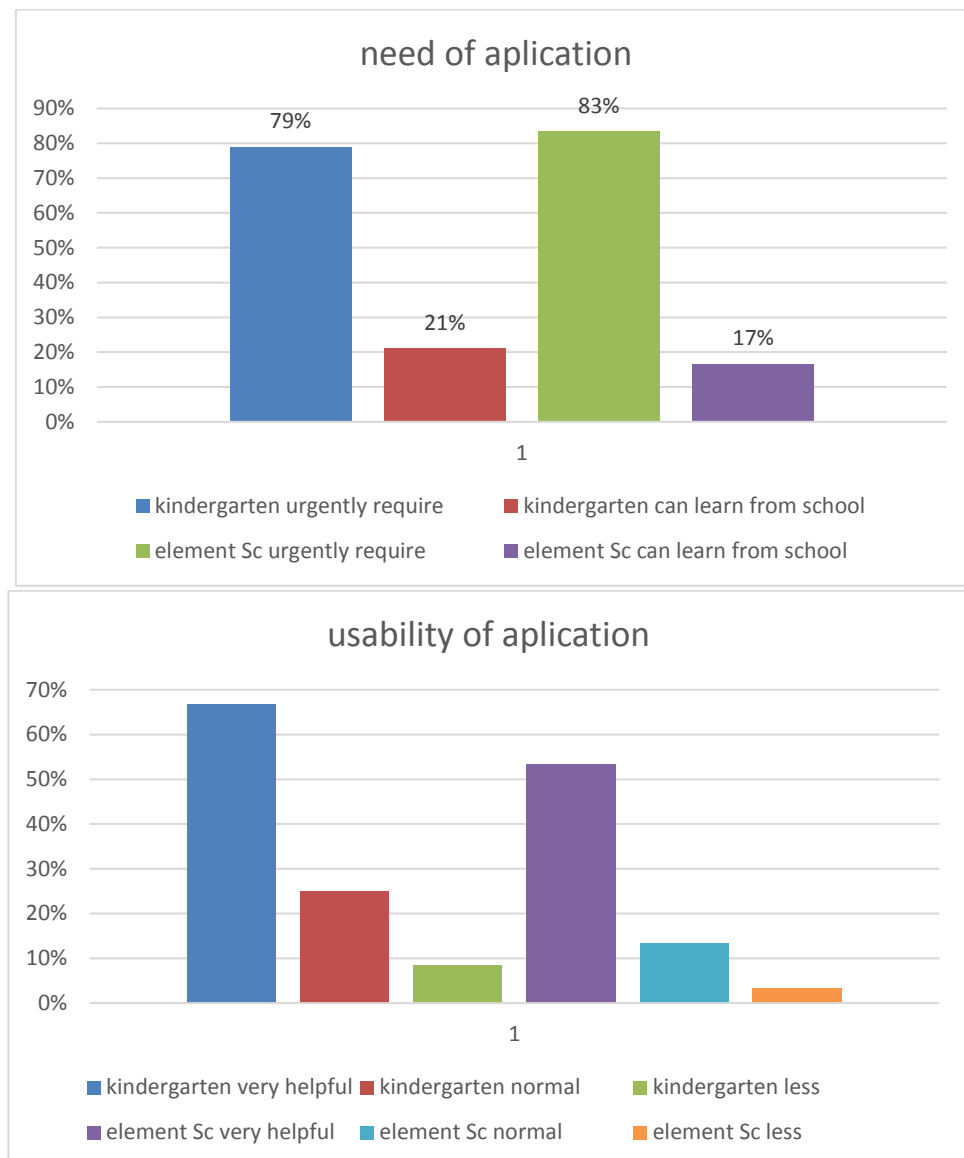


Figure 8. public test result

4. Conclusion

Based on the results of the above study it can be concluded that dipenku is a expert System for Detecting Skin Diseases and a drug technology in smart health can be successfully created which uses the PHP programming language with the CodeIgniter framework and the MySQL management system database with the Naive Bayes method .

Acknowledgments

The authors acknowledge their thanks to Sebelas Maret University, especially thanks to Departement of Informatics Engineering for this research opportunity.

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