Expert System To Diagnose Skin Diseases Caused By Fungal Infection Using The Association Rule Mining Method

1st Tiara Anggraini Gaib, 2nd Basari,[3] 3rd Sity Fauziyah Rahman

[1]University Of Indonesia, Pondok Cina, Kecamatan Beji, Kota Depok, postal 16424, and Jawa Barat

Abstract - An expert system is a piece of high-level software or high-level programming language that seeks to duplicate the functions of an expert in a particular field. From several previous studies, system experts have provided good results in solving cases that use complex data, such as skin disease diagnosis, pregnancy disease diagnosis, asset damage analysis, and digestive disease diagnosis. This study uses the association rule (AR) method. The stages of research were carried out by reviewing previous research, data collection, and analysis. Data collection for this study used software that was directly filled in by the subject and several alternative answers were provided that the subject had to choose from. Confidence and support values are based on the data that has been obtained to determine the results of disease diagnoses in the community, namely whether they have skin diseases due to fungal infections or not so that it is expected to obtain disease diagnosis results effectively and efficiently. Furthermore, system development uses association rules and system testing uses black boxes, lift ratio tests & the SUS method. This research produces an output in the form of a skin disease diagnosis due to a fungal infection. Data collection was carried out using a survey method (questionnaire). Calculations using the association rule method can be used to find out the results of the diagnosis of skin diseases due to fungal infections from data on symptoms of diseases of people who suffer from skin diseases due to fungal infections. The results of testing the system using the SUS method get a score of 80 so that the system made is declared acceptable.

Index Terms - Expert System; Skin Disease; Fungal Infection; Association Rule

I. INTRODUCTION

An expert system is a piece of high-level software or high-level programming language that seeks to duplicate the functions of an expert in a particular field. In several previous studies, system experts have provided good results in solving cases that use complex data, such as skin disease diagnosis, pregnancy disease diagnosis, asset damage analysis, and digestive disease diagnosis [1]. The incidence of skin disease in Indonesia is still relatively high and is a significant problem. Skin diseases can be caused by several factors such as bad environments and daily habits, climate change, viruses, bacteria, allergies, the immune system, and so on [2]. For those who care about the health condition of the skin, therefore a special doctor is needed who specializes in skin diseases, but sometimes people tend to remain silent about this disease, this is due to the embarrassment, to be honest, and limited funds for treatment [1]. Lack of knowledge about the types of skin diseases and not knowing the types of prevention can result in a person being exposed to acute-level skin diseases so with the help of computer technology it is hoped that diseases that attack the human body's skin can be detected early and this can minimize the occurrence of more dangerous diseases. There are many benefits to computer technology in detecting skin diseases including increasing work efficiency, saving time in solving problems, and expert knowledge that can be documented without a time limit. As for this study, raising problems that often occur in humans to help determine the diagnosis of skin diseases requires an identification system that can provide diagnostic recommendations and solutions. Often people are confused about their illness and have to go to a doctor for treatment or consultation. This research will discuss how to diagnose skin diseases due to fungal infections using the association rule method. The first research in his research stated that his research aims to design an application to make it easier for users to obtain information as material for consideration in making a decision [2]. This research resulted in a supermarket or shop that can process sales transaction data quickly and accurately, knowing the level of consumer purchases in association rules between combinations of goods with confidence values of 26.67% and 25%. [3] a second study in his research stated that the development and application of an MBA application with the AR method using an a priori algorithm on self-service business center (BC) transaction data at UIN Malang, can run well. With an average confidence value obtained of 46.69% of the support value of 1.78% and the resulting rules are 30 rules. The third study in his research applied an a priori algorithm in determining association rules based on gender, age, complaint, and ICD10 code. By using 1668 data and using a minimum support of 6% and a minimum of 50% confidence then the results of the association rules are 22 rules [4]. This research has proven that the a priori algorithm is appropriate when finding frequent item sets. This it is proposed a study entitled "Expert System for Diagnosing Skin Diseases Due to Fungal Infections Using the Association Rule Mining Method" Compared to other methods, the advantage of the association rule method s is that it is simpler and can handle large data. This study aims to create a system that can be used to diagnose skin diseases caused by a fungal infection.

II. METHODS

The research methodology is used as a guide in conducting research so that the results achieved do not deviate from the objectives to be achieved. In this study there is a research methodology as a step to obtain data so that it can be processed into more accurate information according to the problem to be studied. (Figure 1) illustrates all the steps in our methodology.

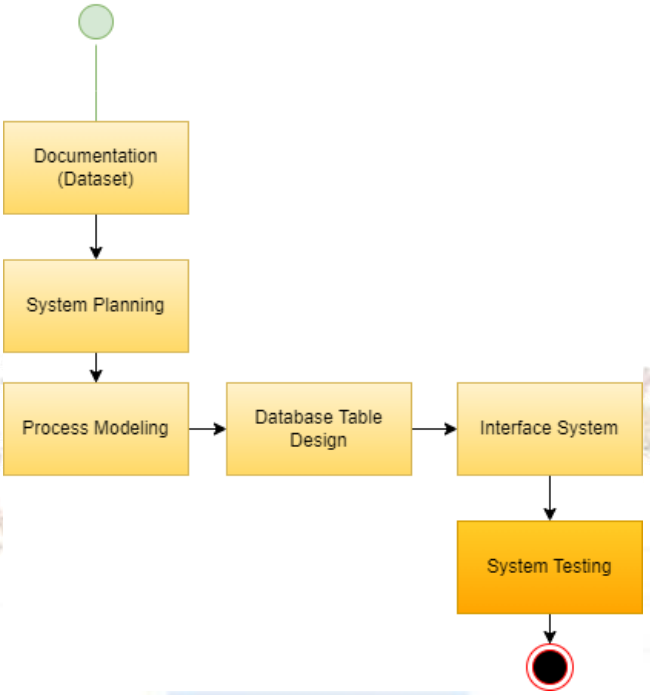

Fig.1 Methodology of the study

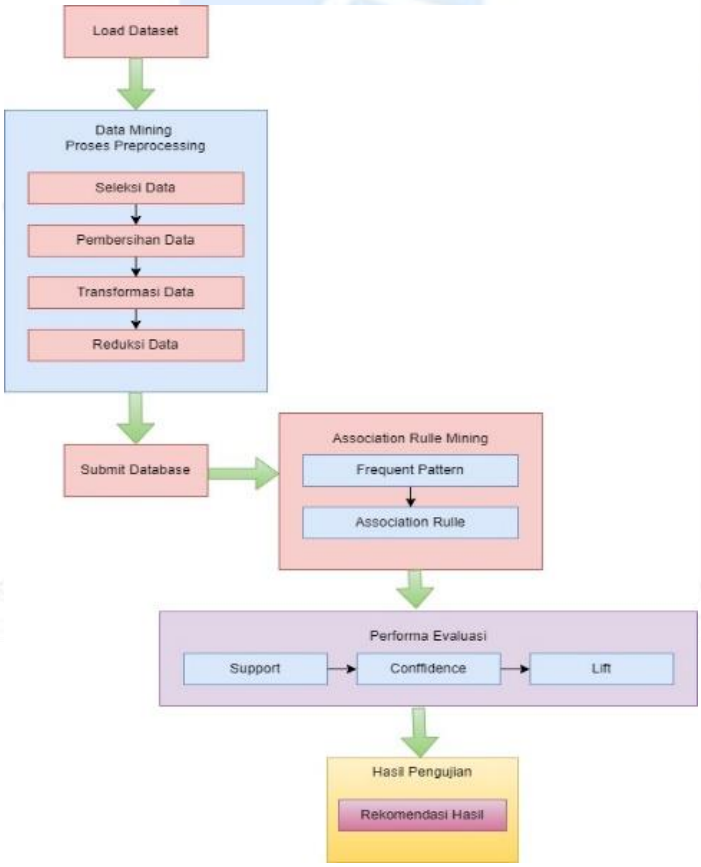

Fig.2 Flowchart Design

III. RESULTS AND DISCUSSION

3.1. Results of data collection

3.1.1. Research data

The data is in the form of images of 23 types of skin diseases taken from "http://www.dermnet.com/dermatology-pictures-skin-disease-pictures". The total number of images is approximately 19,500. The research data used in the manufacture of this expert system is data on the name of a skin disease fungal infection, symptoms of disease, as well management. The following research data was used [5].

1. Fungal Infection Skin Disease Data
This data contains a list of names of skin diseases caused by fungal infections used for making expert systems, such as in Table

Table. 1 Data of Skin Disease Fungus Infection

Code	Disease Name
P01	Tinea Versikolor (Panu)
P02	Tinea Nigra Palmaris
P03	Tinea Kapitis Gray Patch Ringworm
P04	Tinea Kapitis Black Dot Ring Worm
P05	Tinea Kapitis Kerion
P06	Tinea Kapitis Favosa
P07	Tinea Barbae & Sikosis Barbae
…	…….
P08	Tinea Korporis

2. Symptom Data
This data contains a list of symptom names from fungal infection skin diseases used for making expert systems, symptom data is shown in Table 2.

Table. 2 Symptom Data

Code	Symptom Name
G01	The skin feels itchy and itches more and more sweating
G02	There is a slight pain
G03	There is pain
G04	There are small injuries at the initial symptoms or insect bites
…	……..
G70	Well-defined rash or lesions

3. Implementation

Implementation is an application of a manufacturing system that has been designed with detail and detail.

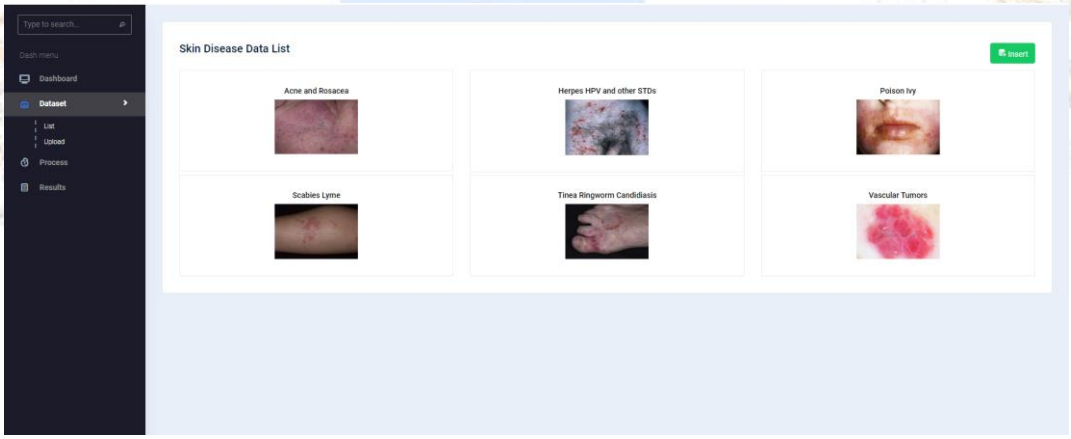

Fig.3 Dataset Page

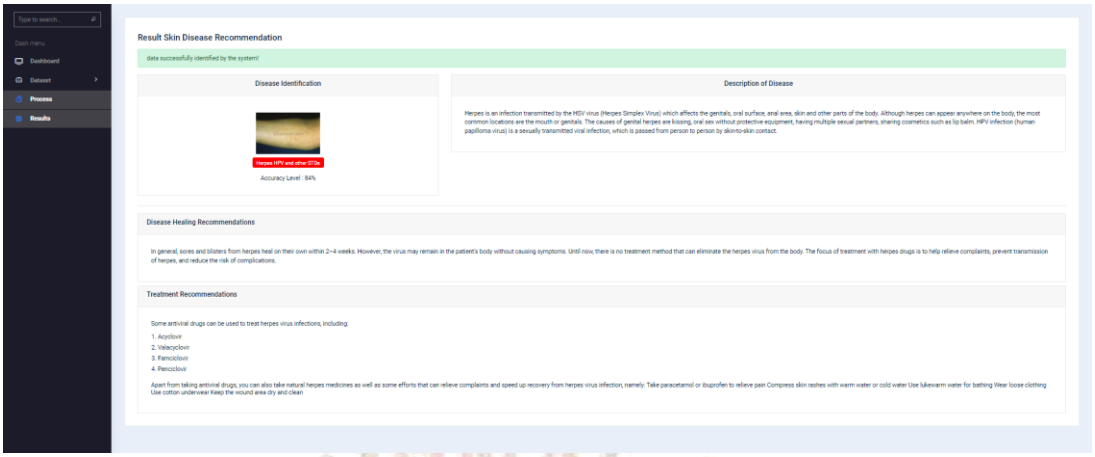

Fig.3 Test Dataset Page

IV. CONCLUSIONS

Based on the discussion, it can be concluded that:

a. In this study, it has been proven that the a priori algorithm is appropriate when finding frequent item sets. This it is proposed a study entitled "Expert System for Diagnosing Skin Diseases Due to Fungal Infections Using the Association Rule Mining Method".
b. The design and system requirements of an expert system for diagnosing skin diseases due to fungal infections using the association rule mining method have been made.

V. REFERENCES

[1] A. M. Alfatah, R. Arifudin, and A. Muslim, "Implementation of Decision Tree and Dempster Shafer on Expert System for Lung Disease Diagnosis," Scientific Journal of Informatics, vol. 5, no. 1, pp. 2407–7658, 2018, [Online]. Available: http://journal.unnes.ac.id/nju/index.php/sji
[2] W. Mulyani, "Penyuluhan Personal Hygiene Untuk Meningkatkan Kesehatan Kulit Anak-Anak Panti Asuhan Hikmah Rumbai Pekanbaru," AMMA: Jurnal Pengabdian Masyarakat, vol. 1, no. 06, 2022.
[3] Y. R. N. R. F. Mhd Furqan, "Klasifikasi Penyakit Kulit Menggunakan," vol. 6, 2022.
[4] J. M. Suharto, R. Indriati, and T. Andriyanto, "Seminar Nasional Inovasi Teknologi ANALISIS PERILAKU KONSUMEN PADA PEMBELIAN PRODUK PERLENGKAPAN BAYI,"
[5] F. K. Binti Umayaha, "Analisa Perilaku Konsumen Melalui Data Transaksi Berbasis Pendekatan Market Basket Analysis," 2019.
[6] Nola Ritha, E. Suswaini, and W. Pebriadi, "Penerapan Association Rule Menggunakan Algoritma Apriori Pada Poliklinik Penyakit Dalam (Studi Kasus: Rumah Sakit Umum Daerah Bintan)," Jurnal Sains dan Informatika, vol. 7, no. 2, pp. 222–230, Dec. 2021, doi: 10.34128/jsi.v7i2.329.
[7] Kaggle, "Dermatology." http://www.dermnet.com/dermatology-pictures-skin-disease-pictures (accessed May 25, 2023).