Expert System to Diagnose Problems Acne Whitening Method Using the Base Case Reasoning

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Abstract—Lack of knowledge about the problem of acne for the people who do not know how to Prevent early steps to Prevent acne more inflamed. This system can help doctors to Facilitate patient diagnosis and can save the patient's medical records for the consideration of the results of diagnoses of new problems that will come. Therefore, this study aims to produce an expert system for diagnosing problems acne on the face using the case base reasoning method. The algorithm used for the CBR method is the Nearest Neighbor Retrieval Algorithm for Determining the value of disease symptoms weighting based on: if the symptoms of the selected disease will be the same value of 1 and if the symptoms chosen are not the same will be value of 0 to the symptoms of old disease cases.

Keywords: Acne, Case Base Reasoning, Nearest Neighbor Retrieval Algorithm

1. Introduction

Life is inseparable from bahayannya diseases that interfere with any life that exists in nature. Indirectly life and the disease goes hand in hand with time lived. For that reason, life lived by every person or community requires a sistempakar to overcome the disease early. The system will help to facilitate the public or people suffering from the disease can do diaknosa own. Because kebanyakan we know someone only entrust their disease naturally by way of direct encounter with the specialist or his own doctor to treat diseases they experienced. If every person who has the disease do so will lead to a long Antria for many patients and the cost is more expensive. Due to the specialist or physician practices have time constraints and limited working hours a bit of an expert or doctor sepesialis that exist today. With that era, the rapid development of technology today, pemanfaatan computer capabilities in managing and storing information can be dimanfaatkan to help people memproleh information. The technology dimaatpaatkan one satunnya ie expert system is a computer program that reasoning and present some expert knowledge to solve problems or provide solutions to existing problems. The method used in this research is the method *Case Base Reasoning* which is a method that does reasoning by case basis memanfaatkan long way to make the solution of the new cases, Agardapat assist in the assessment for a system that accurately mendaptkan. This system will release the results output information acne problems suffered selected based on symptoms and the value simalirity acne patients who experienced with the use of the methods Reasoning Base Case will provide solutions to the new case. [1] According to Ketut Arlin Aryani, Dewa Gede Hendra Divayana, I Made Agus Wirawa, (2017), a skin disease caused by the influence of tropical climate, among others phlegm (attacking the folds of the skin), scabies (generally strike the covered area, for example the back and body), ringworm (attacking areas that rough and scaly eg hands and feet) and acne (raided the face and body) The cause of acne is the blockage of the drain oil glands, closing the outlet of the sebaceous glands if mass externally, both of cosmetics, chemicals, dust and pollution as well as the outlet of the sebaceous glands narrower (hyperkeratosis) from ultraviolet radiation, sunlight, or radiotraffic active, The study was done by researchers, found the results of some types of acne, among which acne blackhead, whiteheads, papules, pustules, nodules cysts, conglobata and fulminans. Of some types of acne have a level of each group, ranging from mild (mild), moderate (moderate) and severe (severe), most patients with acne disorders psikologis and development of personality that can reduce the level of confidence or be embarrassed because of illness acne.

2. Theory

2.1 Sietem Expert

An expert system is a system whose performance adopting the expertise of an expert in a particular field into the system or a computer program is presented with a display that can be used by a user who is not an expert so as to sestem the user can make a decision or set policy like an expert, According to [3] Anik Andriani (2017: 9).

2.2 Case Base Reasoning (CBR)

Menurut Zulfian Azmi and Verdi Yasin (2017: 115) there are several stages in the process of Case Base Reasoning method which is as follows:

a. *Retrieve*

Doing a search input degree of similarity in symptoms given case patients with existing cases in the knowledge base to look for cases that are similar (similarity) is the highest. Only cases that have similarities with the base case to be processed.

b. *reuse*

At this stage of calculating the value of similarity every case that had previously been done matching of new cases in the case of the old one, so that the results of calculation of the value equation similarity each case obtained from: (total value of symptom similarity elected x weight / total weight symptoms in old case data).

c. *Revision*

Revision stages is a stage review of the proposed solution cases, this process will revise the information system proposed solutions will be evaluated and corrected back to address the errors that occurred on the issue of new cases.

d. *retain*

In the indexing process will retain, integrate, and extract the new solutions into the database as patient medical records, if experts said the new case as the case is valid then the case can be updated to this new case basis to resolve the problems to come.

The formula used as follows:

Weighting parameter (W):

The characteristics of the selected symptoms of old cases (same) = 1

The characteristics of the selected symptoms of old cases (not equal) = 0

$$\text{similarity problem, case} = \frac{S_1 W_1 + S_2 W_2 + \dots + S_n W_n}{W_1 + W_2 + \dots + W_n}$$

In the above formula using the technique of similarity (problem, case) to the Nearest Neighbor algorithm Retrieval, while keternagan of the following formula:

S = similarity (Similarity value) is 1 (equal) and 0 (diff)

W = weight (Weight given).

Fig 1. Method Struktur CBR

Source: <https://www.researchgate.net/publication/293328997>

3 Analysis

The following will explain any parts that are in part analysis and design:

3.1 Data analysis

Table 1.
Data Table symptoms

No.	code symptom	symptom
1	G01	Opening pores clogged by sebum
2	G02	pus
3	G03	Black lumps
4	G04	Located on the surface of the skin
5	G05	prickly
6	G06	Formed under the skin
7	G07	Oily skin
8	G08	Small white lumps
9	G09	Appeared in groups
10	G10	painful
11	G11	Acne prominent
12	G12	Looks redness of the skin
13	G13	small bump

No.	code symptom	symptom
14	G14	hard lumps
15	G15	inflammation
16	G16	big bump
17	G17	Coloured Red

Table 2
Table Disease Acne on Face

No.	Diseases code	name of disease
1	P01	Blackheads Black (Blackhead / Open comedo)
2	P02	White comedones (Whitehead / Closed comedo)
3	P03	Acne papules (papules acne)
4	P04	Acne pustules (Pustules ance)
5	P05	Acne nodules (nodule ance)
6	P06	Cystic acne (cystic acne)

Table 3.
Table Case Old Disease

Diseases code	The characteristics of the disease symptoms	Solutions disease
P01	Opening pores clogged by sebum pus Black lumps Located on the surface of the skin prickly	The most effective way that can be done at home is to use a face wash, pore strips, exfoliator, and a face mask to absorb all excessive dirt from the pores. If not improved please consult your doctor, who will give a particular drug.
P02	Formed under the skin Oily skin prickly Small white lumps Appeared in groups	To treat acne whiteheads using a facial soap containing benzoyl peroxide is the main option to mengontrolkadar excessive oil in the pores. Acne can not be cured by treatment overnight it takes at least two months with this soap. If not yet healed you should see a physician for other treatment, the doctor will meresep medicines containing retinoids and antibiotics when there is inflammation.
P03	Acne prominent Under the skin feels nyaeri Looks redness of the skin	To treat acne whiteheads using a facial soap containing benzoyl peroxide is the main option to control the levels of excess oil in the pore-pori. Jika not improved please consult your doctor, who will give a particular drug.
P04	painful Oily skin small bump prickly pus	Acne is not known whether the disease pustules (Pustules ance) can be treated. However, if not improved please consult your doctor, who will give a particular drug.
P05	painful Formed under the skin prickly hard lumps inflammation	The most effective way that can be done at home is to use a face wash, pore strips, exfoliator, and a face mask to absorb all excessive dirt from the pores. To be sure there is no cure for mengobatinnya please consult your doctor, who will give a particular drug.
P06	painful inflammation big bump Coloured Red pus Formed under the skin	Please consult a doctor, who will give a particular drug. , Due to tackle the disease Cystic acne (cystic acne) has no cure. Drugs that it can only make the patient does not feel pain.

a. Acne Disease Case For Disease Similarity Value New Case

The process of determining similarity similarity value of new cases by adapting the old cases in 4 CBR process as follows:

1) Retrieve

At this stage of the process of determining the symptoms of each disease based on the records pengetahuan acne experts in the form of disease data, the characteristics of the symptoms of the disease, and disease prevention solutions acne cases of old patients. After that the system will perform weighting by matching one by one between the characteristics of the symptoms of a new disease cases selected patients against disease cases old cases that exist in the knowledge base and the user will input the symptoms that have been selected. Weighting process performed by the system shown in the calculation of a patient chooses symptoms if the characteristic symptoms are selected (equal) among new cases with old