



Expert System for Dental Disease Diagnosis with Forward Chaining Method at Sidoarjo Dental Clinic

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Abstract

A Dental health is very important. For most Indonesians, the recommendation to have their teeth checked every six months is generally considered less important because they prioritize the health of other organs of the body. In fact, diseases that attack the teeth can have a very pronounced impact, such as cosmetic problems. Applied computer science research in the field of medicine, especially dental disease problems at the clinic sidoarjo, uses the concept of an expert system. An expert system is a system in the form of computer software in which the computer is created to think like an expert system. The search method used is forward chaining with a decision tree, namely tracing known facts that support the conclusions drawn. This expert system facilitates patient consultations to manage symptom data along with diseases and patient data can be seen from the results of a very useful diagnosis, which can be used as an initial diagnosis by a doctor.

Keywords: Expert System, Dental Disease, Forward Chaining

1. Introduction

Diagnosis of dental disease that can affect anyone, one of which is in the health sector. provides an example of a rapidly developing way in which computer science is used to assist doctors in medical analysis. The medical field can also benefit from expert systems. Computerized application programs known as expert systems are able to imitate the reasoning process of a problem solver with specifications that are duplicates of an expert because the expert's knowledge is stored in a knowledge base for problem solving

Teeth are vital organs and are very necessary. As a result, oral health is very important. because the majority of Indonesians are advised to have their teeth checked every six months, which is often considered unimportant because they may be more concerned with the health of other organs of the body. even though in fact oral disease can have significant effects, such as appearance problems.

The idea of an expert system is used in this study to apply computer science to the medical field, especially in the problem of dental disease in a dental clinic. A system designed to demonstrate a person's expertise in answering questions and solving problems is an expert system. Forward chaining is a tracking technique, which is used when facts are known to support the drawing of conclusions. Patient symptoms are the basis for the facts of this study, and opinion findings are the basis for its conclusions. The facts used in the study are the symptoms experienced by the patient while the conclusion is the result of the diagnosis of the disease

2. Result and Analysis

2.1. Data Analysis

Formation of rules (Rules) and Symptom Tables With rules, you can easily find out the final results later based on the existing rules. The following are the rules in diagnosing dental diseases.

2.2. Disease List Table

Based on research and interviews with Drg.Qurrata Dini Amaliyah, 5 diseases with 15 symptoms were obtained, namely:

Table 1: Disease

No	Disease Name	Description
P01	periodontal abscess	It is an infection that can damage the jawbone around the periodontal pocket.
P02	periapical abscess	The formation of pus on the tooth root is a continuation of the tooth pulp infection which begins with a hole in the pulp so that the pulp becomes necrotic.
P03	Alveolar Osteitis	It is a rare pain that occurs one to three days after tooth extraction caused by a blood clot during tooth extraction.
P04	Tooth Abrasion	It is the loss of tooth structure due to brushing too hard. Sometimes the enamel and sometimes the dentin are eroded causing pain.
P05	Bruxism	Occurs when teeth are moved due to habit. Teeth grinding can cause teeth to become sharp or worn down, causing damage, sometimes leading to headaches.

2.3. Table of symptom names

Table 2: Symptom

Disease ID	Symptom Name
G1	Difficulty Chewing Food
G2	Gum Inflammation
G3	Loose Teeth
G4	Jaw Swelling
G5	Enlarged lymph nodes in the jaw
G6	Fever
G7	Bad Breath
G8	Gum Pain
G9	Pain After Tooth Extraction
G10	Bone in the tooth socket is visible
G11	Sensitive Teeth
G12	Eroded Teeth
G13	Headaches
G14	Lack of Sleep or Feelings of Anxiety
G15	Cavities

2.4. Expert System Rule Table

Table 3: Rule

Types of Disease Classification (Diagnosis)	Problem
P01 Classification of Diseases Peridontal Abscess	G1 Difficulty Chewing Food G2 Gum Inflammation G3 Loose Teeth
P02 Classification of Diseases Peripical Abscess	G1 Difficulty Chewing Food G4 Swelling of the Jaw G5 Enlarged lymph nodes in the jaw G6 Fever G7 Bad Breath G8 Gum Pain
P03 Disease Classification Alveolar Osteitis	G7 Bad breath G9 Pain after tooth extraction G10 Bone in the tooth socket is visible
P04 Disease Classification Tooth Abrasion	G11 Sensitive Teeth G12 Eroded Teeth
P05 Disease Classification Bruxism	G13 headache G14 Lack of sleep or anxiety G15 Cavities

2.5. Decision Table

Table 4: Decision

Symptom Code	P01	P02	P03	P04	P05
G1	True	True	False	False	False
G2	True	False	False	False	False
G3	True	False	False	False	False
G4	False	True	False	False	False

G5	False	True	False	False	False
G6	False	True	False	False	False
G7	False	True	True	False	False
G8	False	True	False	False	False
G9	False	False	True	False	False
G10	False	False	True	False	False
G11	False	False	False	True	False
G12	False	False	False	True	False
G13	False	False	False	False	True
G14	False	False	False	False	True
G15	False	False	False	False	True

2.6. Decision Tree

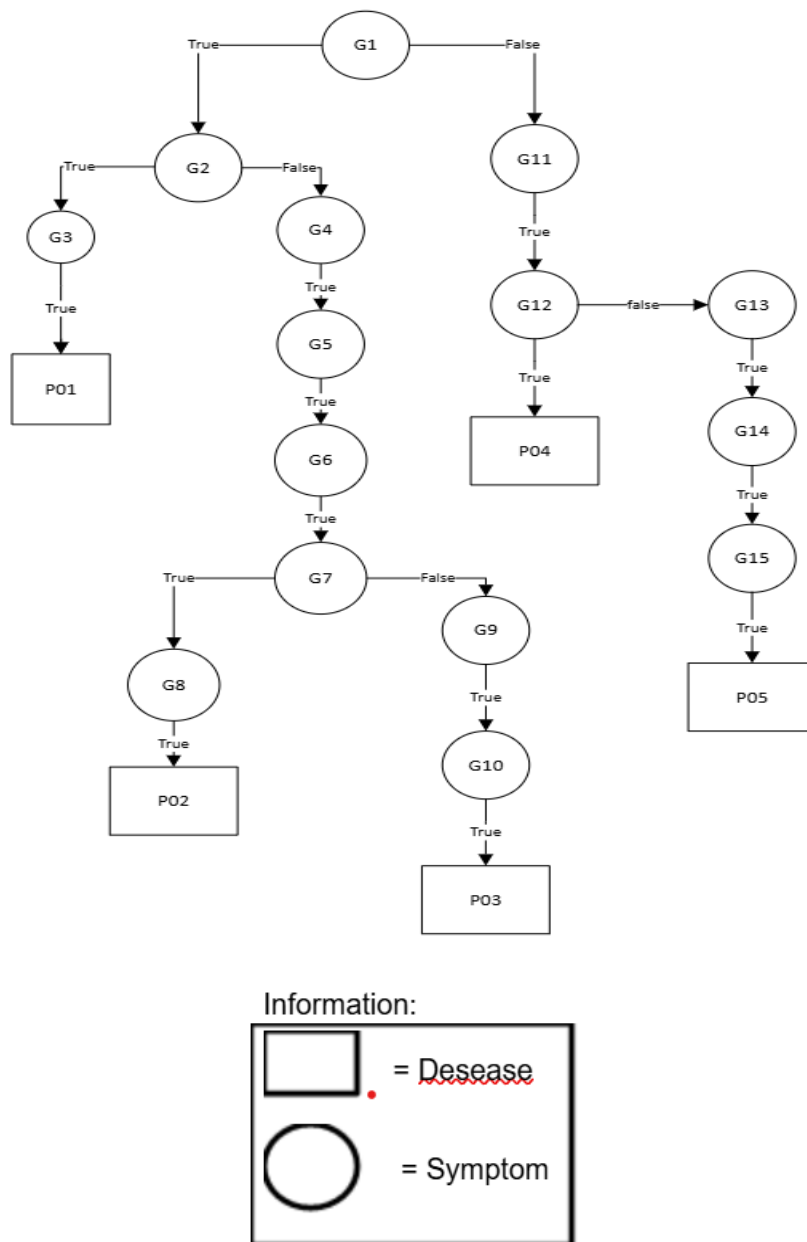


Fig. 1: Decision Tree

3. Conclusion

The implementation of the expert system for diagnosing dental diseases using the forward chaining method resulted in the following conclusions:

1. The use of an expert system to determine the initial diagnosis of dental diseases experienced by patients.
2. The implementation of the system uses the Forward Chaining method with a decision tree to draw conclusions based on existing symptoms
3. The output of the expert system is based on the patient's needs during previous consultations with doctors

References

- [1] Haryanto KW., Cahyono AD. APLIKASI SISTEM PAKAR DIAGNOSA PENYAKIT GIGI METODE FORWARD CHAINING DI UPTD KESEHATAN PUSKESMAS BANGIL (2019): Vol 4 no 1
- [2] Susilo N, Riyadi A, Fairuzabadi, SISTEM PAKAR DIAGNOSA PENYAKIT GIGI DAN MULUT MENGGUNAKAN METODE FORWARD CHAINING BERBASIS WEB (2018)
- [3] Walhidayat, Nanda R. SISTEM PAKAR DIAGNOSA PENYAKIT GIGI MENGGUNAKAN METODE FORWARD CHAINING (STUDI KASUS: KLINIK GIGI DRG. TETRA ASMIRA TELUK KUANTAN)(2019): Vol 5 no 2
- [4] Trianasari A, Nanang. Sistem Pakar Diagnosa Penyakit Kulit Menggunakan Metode Forward Chaining Berbasis Web (2018):vol 2 no 1
- [5] Widodo AE, Suleman, Ardiansyah A, Pratmanto D, Aji S, Savitri D. SI-PAKARDI (Sistem Pakar Diagnosa Penyakit Gigi) Menggunakan Metode Forward Chaining (2020): Vol 8 no 1