



## DESIGN OF AN EXPERT SYSTEM FOR DIAGNOSING CAT DISEASES CAUSED BY FUNGI OR VIRUSES USING THE CERTAINTY FACTOR METHOD

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**Abstract :** The health and beautiful appearance of pets is important because treating these diseases requires more money. If the pet is infected with a disease that can be transmitted, then as the owner you have to do something to find out the type of disease and treatment, one of which is cats. However, many keepers still do not know the symptoms of diseases suffered by cats. So the treatment that should have been carried out at the beginning is delayed and the cat is no longer healthy because it is already suffering from an illness. The lack of veterinarians is also one of the factors causing delays in treatment for cats. For this reason, we need a system that can store knowledge about the symptoms and treatment process of the disease experienced by the cat. Expert system is a system that adopts human knowledge into a computer so that the computer is able to solve problems the way an expert works. Meanwhile, the Certainty Factor Method is a method that defines a measure of certainty regarding facts or rules to describe an expert's confidence in the problem being faced. Based on the results of the trials carried out, it was found that the highest confidence value was in the symptoms of Ringworm disease with a confidence value of 91%.

**Keywords:** Certainty Factor, Doctors, Cats, Diseases, Expert Systems.

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*the problem being faced. Based on the results of the trials carried out, it was found that the highest confidence value was in the symptoms of Ringworm disease with a confidence value of 91%.*

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## 1 Introduction

The health and beauty of a pet's appearance is important because treating this disease requires more money, besides that the condition of a sick pet will make the pet become less enthusiastic and affect its appearance if it is affected by disease on its skin. If the pet is infected with a disease that can be transmitted, then as the owner you must take steps to find out the type of disease and its treatment so that you can take the necessary actions effectively. Likewise in keeping pets such as cats.

The problem that has occurred so far is that ordinary people who keep cats do not understand the symptoms of diseases suffered by cats, so that over time their cats are no longer healthy due to the disease they are suffering from, where currently there are not as many veterinarians as there are doctors for humans to be able to overcome the problem of skin diseases. In cats caused by fungi or viruses, an expert system was created, so that people who keep cats can consult on the symptoms suffered by cats, from the results of the consultation a solution will be given on how to treat the disease suffered by cats by applying the Certainty Factor Method.

An expert system is a system that adopts human knowledge into a computer so that the computer is able to solve problems the way an expert works. A good expert system is not created to replace humans but as an experienced assistant. Meanwhile, the Certainty Factor Method is a method that defines a measure of certainty regarding facts or rules to describe an expert's confidence in the problem being faced [1].

## 2 Literature Review

Research by Aditia Syahputra, et al (2022) entitled "Expert System for Diagnosing Quail Diseases Using the Certainty Factor Method (Case Study of CV. Barlet Stabat, Langkat Regency, North Sumatra)" the system was created to make it easier for breeders to find out the types of diseases that attack bird livestock. quail, and can provide solutions that must be implemented so that disease management in quail can be resolved more quickly. To test this, we used 8 samples of consultation data carried out by the user. Based on the calculations in this case, the results obtained were a diagnosis of quail enteritis disease with a certainty level of 40.72%, a diagnosis of Tatelo disease with a certainty level of 63.45%, a diagnosis of lime stool disease with a certainty level of 82.73%. %, diagnosis of bloody stool disease with a certainty level of 90.85%,

Further research by Livia Dirma Pr, et al (2022) entitled "Expert System for Diagnosing Rabies in Cats Using the Certainty Factor Method" Usually, to find out if a cat has rabies, a veterinarian is needed for an examination. However, people or cat lovers are lazy to consult directly with veterinarians because they don't have the time or because they are busy with their work. Based on the description above, it is necessary to build a system that can diagnose rabies in cats. The system built is an expert system that has abilities like an expert or doctor [3].

Further research by Heri Susanto, et al (2020) entitled "Cases of Scabies (Sarcoptes Scabei) in cats at the Medipet Core Clinic Surabaya" which provides treatment and prevention solutions in

diagnosing skin diseases caused by several types of parasites/viruses such as demodecosis, scabies , and other skin diseases such as ringworm, skin scraping is usually carried out. This method aims to find and identify the type of parasite. Treating scabies is quite simple, there are several factors that must be considered. In addition to focusing on parasitic mites, nutrition and rearing management must be considered. Poor nutrition and maintenance management will cause animals to become stressed and reduce animal immunity, making animals susceptible to other diseases [4]

### 3 Research methods

In designing this knowledge base, production rules are used as a means of representing knowledge. Production rules are written in the form of IF [premise] THEN [conclusion] statements. In designing this expert system knowledge base, the premise is the visible symptoms and the conclusion is the type of disease, so the form of the statement is IF [symptom] THEN [disease]. The premise part of a production rule can have more than one proposition, that is, in this expert system, one rule can have more than one symptom. These symptoms are connected with the logical operator AND. The form of the statement is:

IF [symptom 1]  
AND [symptom 2]  
AND [symptom 3]  
THEN [disease]

In the Certainty Factor method there are several calculation stages carried out including the following:

1. Create a table of symptoms of cat disease caused by fungi or viruses.
2. From the symptom table, a weight value is determined which will determine the certainty of cat disease

caused by fungi or viruses.

3. Determine the rule / rule

4. Calculate the Certainty factor value using the formula:

$$\begin{aligned} CF(H,E) &= CF(H) * CF(E) \\ &= CF(Expert) * CF(User) \\ CFCOMBINE CF (H) &= CF(H,E)_{old} + CF (H,E)^3 * [1 - CF (H,E)_{old}] \\ &= CF(R1) + [ CF(R2) * (1 - CF(R1)) ] \\ \text{confidence percentage} &= CF * 100\% \end{aligned}$$

Information :

$CF(H,E)$  = Certainty Factor hypothesis which is influenced by evidence E is known with certainty.

$CF(R1)$  = Certainty Value for the First Symptom

$CF(R2)$  = Certainty Value for the Second Symptom

5. Calculate the total certainty factor by adding up all the weight values.

Knowledge in the expert system for diagnosing cat diseases caused by fungi or viruses is as follows.

**Table 1 Symptoms of Cat Diseases Caused by Fungi or Viruses**

No	Symptom Id	Symptom Name	P1	P2	P3
1	G1	Licking Feathers	✓		✓
2	G2	Rotok Feather	✓	✓	✓
3	G3	Scratching the Skin	✓	✓	✓
4	G4	Intense itching	✓	✓	
5	G5	Thickening Occurs In The Skin	✓		

6	G6	There are sores/scabs on the skin (initial symptoms are ears, nose, tail, then all over the body)	✓		
7	G7	Skin Redness (Irritation)	✓		
8	G8	Biting the body	✓	✓	✓
9	G9	Crusty or Wrinkled Skin, Especially in the Ear Area	✓		
10	G10	Scales on the scalp that develop into patches with a special shape like round rings		✓	
11	G11	Red Spots		✓	✓
12	G12	Exfoliation		✓	
13	G13	Baldness occurs in several parts such as the head, chin or body area		✓	
14	G14	You can see red pepper-like granules spreading over the fur/hair			✓
15	G15	Scab Especially on the hind legs			✓
16	G16	Blackish Brown Patches in Hair on Back Parts Due to Tunga			✓
17	G17	Inflammation of the feet			✓

**Table 2. Weight of Certainty of Cat Diseases**

Certainty Term	CF value
Very confident	1
Certain	0.8
Sure enough	0.6
Not sure	0.4
Not sure	0.2
No	0

## 4 Results and Discussion

The results of research conducted on the symptoms of cat disease by applying the CF method, at the Bungsu Pet Care clinic on Jln Dermais no 56 Kec. Percut Sei Tuan Kab. Deli Serdang there are symptoms of cat skin disease caused by viruses or fungi with user weight values as below This.

**Table 3 Expert and User Weight Values**

No	Symptom	The type of disease	CF value	User Value
1	Fur Licking	Scabies	0.6	0.4
2	Rotok Feather		0.6	0.6
3	Scratching the Skin		0.6	0.4
4	Intense itching		0.6	0.6
5	Thickening Occurs In The Skin		0.6	0
6	There are sores/scabs on the skin (initial symptoms are ears,		0.8	0

	nose, tail, then all over the body			
7	Skin Redness (Irritation)		0.6	0
8	Biting the body		0.6	0.6
9	Crusty or Wrinkled Skin, Especially in the Ear Area		0.8	0
10	Scales on the scalp that develop into patches with a special shape like round rings	Ringworms	0.8	0
11	Feather Loss		0.8	0.6
12	Red Spots		0.6	0
13	Exfoliation		0.6	0
14	Baldness occurs in several parts such as the head, chin or body area		0.8	0
15	scratching the skin		0.8	0.4
16	Intense itching		0.6	0.6
17	Biting the body		0.6	0.6
18	You can see red pepper-like granules spreading over the fur/hair	Lynxacarus	0.8	0
19	Red Spots		0.4	0
20	Scabs, especially on the back legs		0.8	0
21	Licking fur		0.8	0.4
22	Dark brown spots on the hair on the back due to mites		0.6	0
23	Feather Loss		0.8	0.6
24	Biting the body		0.8	0.6
25	Scratching the skin		0.6	0.4

Based on the results of Cf, the highest confidence value is in the symptoms of Ringworm disease with a confidence value of 91%. From the results obtained, the system will diagnose that the person has the disease. The solution that will be given to the disease is

1. Often dried in the sun
2. Anti-parasite injection carried out by a veterinarian
3. Providing therapeutic food for skin disorders
4. Bathing with anti-fungal shampoo
5. Often exposed to the sun, not allowed to sleep in the bathroom and the cage is clean

## 5 Conclusion

Based on the research that has been carried out above, several conclusions have been obtained, namely that the existence of an expert system for diagnosing cat diseases caused by fungi or viruses using the certainty factor method can make it easier for keepers to get a solution to skin diseases in cats by carrying out an initial diagnosis before going to the doctor. animal. With this system, the keeper can find out the symptoms of what disease the cat is suffering from and provide solutions for treating and preventing skin diseases in cats caused by fungi or viruses. This system can also be used by veterinarians to provide treatment to cats for illnesses they suffer from. From the results of the trials that have been carried out, it was found that the highest confidence value was in the symptoms of Ringworm disease with a confidence value of 91%.



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