Expert System for Diagnosing Diseases in Cats Using the Forward Chaining Method

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ABSTRACT

An expert system for diseases in cats is an application that aims to helps in diagnosing disease in cats based on its symptoms and signs observed. The forward chaining method is used in this system to collect information from users, apply existing rules, and reach a final diagnosis. In this method, the expert system will start with the information provided by the user or results of observations, and use existing rules to reach conclusions or final diagnosis. The main steps in the forward chaining method include collection information, activating rules, evaluating conditions, and iterating until a final diagnosis is reached.While these methods can provide initial advice in diagnosing feline diseases, it is important to remember that expert systems are no substitute for a comprehensive medical assessment by a qualified veterinarian.

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1.   Introduction

Cats are popular pets and are often loved members of the family. However, like other animals, cats are also susceptible to various diseases and health problems. Diagnosing diseases in cats can be a tricky task because cats cannot express their symptoms verbally. In an effort to assist cat owners and veterinarians in diagnosing cat diseases, the development of an expert system for cat diseases has been carried out. An expert system is a computer application designed to mimic the ability and knowledge of a human expert in a particular field. The cat disease expert system aims to provide initial advice regarding diseases that cats may experience based on the observed symptoms and signs. One method commonly used in cat disease expert systems is the forward chaining method. This method focuses on gathering information and applying existing rules to reach a final diagnosis. In the forward chaining method, the expert system starts with information provided by the user or observations, and uses existing rules to reach a conclusion or final diagnosis. In this study, we will explain in more detail the use of the forward chaining method in cat disease expert systems. We will cover the steps involved in this method, including gathering information, activating rules, evaluating conditions, and iterating until a final diagnosis is reached. We will also highlight the importance of remembering that expert systems only provide initial advice and cannot

replace a comprehensive medical assessment by a qualified veterinarian. By using the forward chaining method in an expert system of cat diseases, it is hoped that cat owners and veterinarians can obtain valuable assistance in diagnosing cat diseases more efficiently and accurately.

2. Method

The Forward Chaining method is one of the methods used in cat disease expert systems to reach a final diagnosis. This method involves a systematic process from gathering information, activating rules, evaluating conditions, and iterating until a final diagnosis is reached. The following is a more detailed explanation of the Forward Chaining method:

1. Information Gathering: This method starts with gathering information about the symptoms or signs observed in the cat. This information can be provided by the user or obtained through direct observation by a veterinarian. This information forms the basis for analyzing and processing the diagnosis.
2. Knowledge Base: Expert systems have a knowledge base consisting of rules that relate symptoms to possible diseases. Each rule consists of a condition (if) and an action (then). Conditions are symptoms or combinations of symptoms that must be met for an action to take place. Actions are actions that are taken when conditions are met, such as adding a new fact to a knowledge base or continuing an inference.
3. Condition Evaluation: The expert system will evaluate whether the conditions contained in the rules are met based on the information provided. If the conditions are met, then the rule is activated.
4. Activation of Rules: Once the rules are activated, the expert system will take action related to those rules. This action can be in the form of adding new facts to the knowledge base or additional inferences that will aid in the diagnosis. This action can also activate other related rules.
5. Iteration: The process of evaluating conditions and activating rules is repeated until there are no more rules that can be activated or until a final diagnosis is reached. During iterations, the expert system will continue to collect new information, add facts to the knowledge base, and perform inferences to gain a deeper understanding of the cat's condition.
6. Final Diagnosis: After no more rules can be activated, the expert system will reach a final diagnosis based on the facts gathered during the forward chaining process. This diagnosis will identify the disease or condition that is most likely to occur based on the information available.

This Forward Chaining method is effective in diagnosing diseases in cats because it allows expert systems to systematically collect information, activate relevant rules, and reach a final diagnosis based on specified conditions and actions. However, it is important to note that this expert system can only provide initial advice and cannot replace a medical assessment by a qualified veterinarian.
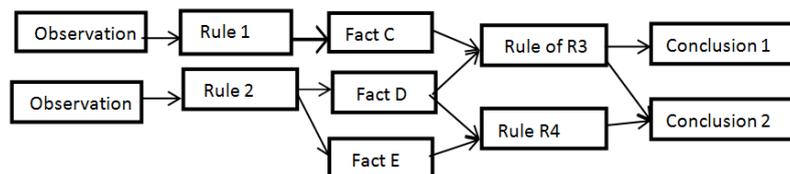
3. Results And Discussion

In order to provide specific results and discussion regarding an expert system of diseases in cats using the forward chaining method, it is necessary to implement and test the system. However, as a general example, the following is an example of the results and discussion that can appear in the expert system: Results: After running an expert system of diseases in cats

using the forward chaining method, the results obtained are the final diagnosis or recommendations regarding diseases that cats may experience based on the input symptoms. For example, the result could be:

1. Final Diagnosis: Rhinotracheitis
   Symptoms observed: Sneezing, coughing and fever. Diagnosed disease: Rhinotracheitis. Discussion: After reaching a final diagnosis, discussions can be held to provide further information about the disease diagnosed and the steps that need to be taken. Such discussions may include the following:

2. Rhinotracheitis Disease:
   a. Description of the disease: Rhinotracheitis is a viral infection that causes upper respiratory tract disease in cats. Symptoms include sneezing, coughing and fever.
   b. Treatment: Treatment for this disease may involve administering antiviral medications, supportive care to relieve symptoms, and keeping the cat's environment clean to prevent the spread of infection.

It is important to note that the results and discussion will differ depending on the symptoms entered and the disease diagnosed by the expert system. An expert system of diseases in cats using the forward chaining method can provide more complete results and recommendations for appropriate treatment based on the rules in the knowledge base.

However, the results and discussion are only general examples, and the real implementation of an expert system of diseases in cats using the forward chaining method will involve a broader knowledge base, more complex rules, and a more accurate diagnosis based on the observed symptoms. .

Expert Table

is a fact obtained by experts and science, this study has experience that they recognize from the symptoms of cat disease. The information collected is as follows.

Table 1 Disease Table

DiseaseCode	Disease Name
P1	Worms
P2	Scabies
P3	Fleas, fleas, ticks
P4	Coccidiosis
P5	Sore throat
P6	Breathing
P7	Evil cat
P8	Ear mite

Table 2. Symptom Table

SymptomCode	Symptom Name
G1	I don't want to eat
G2	Cough
G3	Hair loss
G4	Dry
G5	Thin
G6	blood diarrhea
G7	Itchy rash
G8	Anemia
G9	Saliva comes out
G10	Diarrheal worms
G11	Fever
G12	Cover your ears because it hurts
G13	Flu

G14	sneeze sneeze
G15	Loss of skin tissue
G16	Eye swelling
G17	Tears come out
G18	Redness of the skin
G19	Damage to the lens of the eye
G20	Bad sound in the ear
G21	Cloudy discharge from the nose
G22	Weak
G23	Sleepy
G24	Itchy
G25	Mouth poke
G26	Ear injury
G27	He shook his head
G28	Vomit
G29	Vomiting worms
G30	Breathe through your mouth
G31	Borrowers cover the breath
G32	Difficulty breathing
G33	Ears are always dirty
G34	Bad breath
G35	Not calm

Expert rules

Table 3. Rules

CodeRules	rules
R1	IF G1 AND G2 AND G5 AND G6 AND G10 AND G29THEN P1
R2	IF G1 AND G2 AND G7 AND G15 AND G24 ANDG26 THEN P2
R3	IF G3 AND G5 AND G7 AND G8 AND G18 AND G35THEN P3
R4	IF G4 AND G5 AND G6 AND G8 AND G22 THEN P4
R5	IF G2 AND G9 AND G13 AND G14 AND G16 ANDG17 AND G19 AND 21 AND 30 AND G32 THEN P5
R6	IF G1 AND G4 AND G9 AND G25 AND G31 THEN P6
R7	IF G1 AND G4 AND G6 AND G11 AND G23 ANDG28 AND G37 THEN P7
R8	IF G12 AND G20 AND G27 AND G33 THEN P8

Table 4 Relationship Table

Symptom Code	P1	P2	P3	P4	P5	P6	Q7	Q8
G1	X	X					X	
G2	X				X			
G3			X	X				
G4				X		X	X	
G5	X		X	X				

	C1	C2	C3	C4	C5	C6	C7	C8
G6	X			X			X	
G7		X	X					
G8			X	X				
G9					X	X		
G10	X							
G11							X	
G12								X
G13					X			
G14					X			
G15					X			
G16					X			
G17			X					
G18					X			
G19								X
G20					X			
G21								
G22		X						
G23						X		
G24		X						
G25								X
G26							X	
G27								
G28	X							
G30				X				
G31						X		
G32					X			
G33								X
G34							X	
G35			X					

4. Conclusion

As we know cats are animals that are liked by some humans. In discussing the expert system for diagnosing cat diseases, we can draw a conclusion: basically the expert system for diagnosing cat diseases provides a benefit to humans who care for them and this expert system can be used as a veterinary dictator who has expertise in the field of animal diseases.

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