Web-Based Expert System for Diagnosing Rabies Disease

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Article Info	ABSTRACT
	This study discusses the design and creation of an expert system application to diagnose rabies in dogs using the certainty factor method and utilizing computers as a tool in providing consultation services on rabies. Expert system capabilities can be obtained by implementing an algorithm that will be determined by its performance. The expert system model that is created is then to help diagnose rabies early and to make it easier to serve pets without having to leave the house. In addition, with this program, it can help a veterinarian's task in serving his patients, especially dogs. After the implementation of the Certainty Factor method, an expert system application is produced that can identify rabies in dogs from several symptom inputs. This expert system can be developed if the input data is continuously updated so that rabies in dogs that are found can be even more.
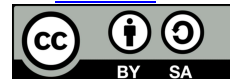
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1. INTRODUCTION

Since history has not yet been recorded and has begun to be recorded, there has been a close relationship between humans and dogs as animals. Now dogs have become human pets, even humans are willing to serve and protect pet dogs from various disturbances and risks, and are ready to accept all burdens such as food, health and other needs.

Dogs are the most adaptable animals and can be friends for humans so that many are kept. As a dog owner, it is necessary to know and understand the nature and habits of dogs. One thing that needs to be realized is that the meaning of keeping means that in addition to providing food and drink, you must also be willing to take care of it. Maintaining health, giving attention and affection and educating it are the consequences of keeping animals. And as a prospective dog owner, you need to know and recognize the dog that will be kept.

The high interest of people to keep dogs causes many people to need information on how to protect and care for their beloved dogs easily, without having to queue at the animal clinic or veterinarian. In addition, there are still many dog owners who do not pay attention to the health of their pets, they assume that a dog that is taken to the veterinarian by its owner to be checked for health is a dog that has problems or has a disease that is dangerous to the local community, this makes dog owners afraid of the public's response, and the existence of veterinarians themselves is still very lacking.

Along with the development of information technology today, almost everyone can get information about how to care for dogs either through books, even the most popular today is through the internet. One alternative that can be used is an expert system that is increasingly being developed in various fields. However, around the 1970s to 1980s, there were still many obstacles in the development of artificial intelligence, especially in the field of expert systems, becoming something that was still very difficult to implement. This is because there are still limitations to the system, both hardware and software to carry out large-scale data processing, even though the main strength of the expert system is knowledge-based and rule-based consisting of a very large collection of data.

This expert system is expected to help dog owners in carrying out their duties and responsibilities, and so that every dog owner can get to know their pet dog starting from its abilities, habits, behavior, and so on so that it will be easier to care for it, considering the cost is not small to take a dog to the vet.

2. METHOD
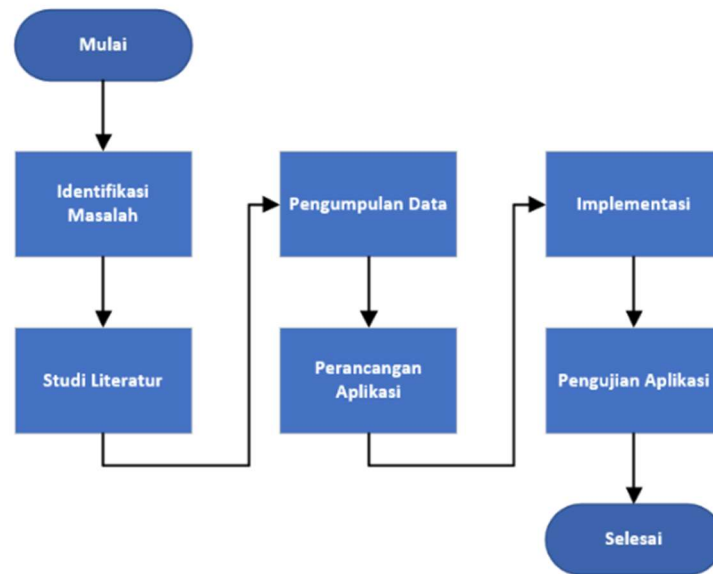
System Algorithm

The knowledge-based system algorithm consists of facts and rules. Facts are obtained from the knowledge of specialist doctors in the field of rabies diagnosis, the internet, and other literature related to rabies, while the rules used by considering the CF (Certainty Factor) value given by experts.
The general formula for determining the Certainty Factor is as follows:

$$CF(H,E) = MB\,(H,E) - MD\,(H,E)$$

Where :

CF (H,E): Certainty Factor of hypothesis H which is influenced by symptom (evidence) E. The value of CF ranges from 0 to 1. A value of 0 indicates absolute disbelief, while a value of 1 indicates absolute belief.

MB (H,E) : Measure of increased belief in hypothesis H which is influenced by symptom H.

MD (H,E) : Measure of increased disbelief towards hypothesis H which is influenced by symptom E.

To determine the final CF value in a diagnosis, use the Combined CF formula with a combination of two rules with different evidence (E1 and E2), but the same hypothesis. The formula is as follows:

IF   E1   THEN H   Rule 1 CF (H,E1) = CF1 = C (E1) x CF (Rule 1)

IF   E2   THEN H   Rule 2 CF (H,E2) = CF2 = C (E2) x CF (Rule 2)

CF (CF1,CF2) = CF1 + CF2 (1 – CF1) If CF1 > 0 and CF2 > 0

At the consultation sessioni fact, the user only has 2 answer choices, namely if they experience or choose the fact () then the CF value = 1, if the fact is not experienced or not chosen then the CF value = 0. While in the symptom consultation session, the user is given the option to choose what symptoms occur in humans. Each symptom has a CF weight. The CF value (rule) is obtained from the interpretation of the "term" from the expert, which is converted into a certain CF value according to the table.

Table 3.1 Certain Term MD/MD

Certain Term	CF
Tidak Tahu	$0 - 0.2$
Mungkin	$0.21 - 0.4$
Kemungkinan Besar	$0.41 - 0.6$
Hampir Pasti	$0.61 - 0.8$
Pasti	$0.81 - 1$

Sumber : (T.Sutojo, dkk,2011:196)

3. RESULTS AND DISCUSSION

System Implementation

A program is a series of systematic and logical instructions to control a computer to achieve goals according to certain rules.

Main Menu Page

This page is used as a place to accommodate all the options contained in the system designed as shown below:

Figure 4.1 : Main Menu

Website Data Page

This page is used to display information categories from the website.

Disease, the image of the implementation of this page can be seen in the image below:

Figure 4.1 : Category page

Rabies Information Page

This page is used to display Rabies Information, the image of the implementation of this page can be seen in the image below:

Figure 4.3: Rabies Disease Information Form

Consultation Login Page

Figure 4.4 : Consultation Login

Consultation Login Page Step-1

This page is used for consultation, the image of the implementation of this page can be seen in the image below:

Figure 4.5 Selection of Disease Type

Consultation Page Step-2

Figure 4.6 Selection of Disease Symptoms

Consultation Page Step-3

4. CONCLUSION

From the explanation and discussion of the results of the implementation of the expert system as a tool to diagnose rabies in dogs, the following conclusions can be drawn: Creation of expert system software to diagnose and assist in providing consultation services for rabies in dogs using MySQL with the Certainty Factor method. In creating an expert system to diagnose rabies in dogs, it can be determined from the symptoms experienced, then the system will process it so that it can produce whether the animal is rabid or not, then the system will provide a solution.

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