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Web-Based Swine Disease Diagnosis Expert System Using Forward Chaining in Waingapu City District

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Abstract

The policy of the East Sumba Regency Livestock Office is to advance the business of livestock products and in developing an information system about the distribution of livestock populations in East Sumba Regency in an integrated and comprehensive manner to the community and make it easier for the community to find out the development of the number of livestock populations in East Sumba Regency. Pigs are a type of ungulated animal with a long snout and a straight nose and are animals that originally originated in Eurasia. Also known as Pig in (Arabic). Pigs are omnivores, which means they eat both meat and plants. However, with the large existing pig population, consumption and population resulting in the potential for much higher disease, let alone infectious diseases. The problem found in pig farmers is that it is difficult for farmers to identify the type of disease by pigs. Misdiagnosis gives rise to errors in treatment or errors in treating sick pigs. Therefore, based on these problems, the author proposes a system-based approach to assist farmers in diagnosing the types of diseases experienced by pigs. So that the treatment of pigs can be more targeted according to the disease diagnosed.

Keywords: *Swine Disease Diagnosis, Specialist Systems, Website*

1. Introduction

The development of technology and science in this era of globalization has been felt to be increasing and sophisticated, this can be seen from the development of computer science which is increasingly developing rapidly. In addition, technological developments are increasingly supporting the development of information dissemination through internet media that spreads to all circles of society. The internet is part of information technology that provides benefits and convenience in all aspects. The internet is a general technology media that is in great demand by the public. Through the internet, a person can find out a variety of information that suits what they want and information that is fast and accurate in supporting the performance of a business. The application of information today provides various advantages and conveniences in various aspects of life.
The expert system is one of the sciences that provides solutions to solve problems that can usually only be solved by an expert or expert. An expert system is a system that seeks to adopt human knowledge to a computer designed to model problem-solving skills like an expert Muhamad Arhami, 2003 [1].

A general form of an expert system is a program created based on a set of rules that analyzes information (usually provided by the user of a system) about a specific class of problems as well as a mathematical analysis of that problem. Depending on the design, the expert system is also able to recommend a series of user actions to be able to apply corrections. The expert system consists of 2 main components, namely the knowledge-base which contains knowledge and the inference engine that uses inferences. This conclusion is a response from the expert system to the user's request.

Pig farming is a type of small animal business that is a promising source of economy. So that intensive care and maintenance of pigs will produce double profits, but these profits cannot be achieved if many pig farm animals are affected by diseases.
So far, pig farmers have not given importance to the symptoms of diseases that occur in their pigs' bodies, causing negligence which results in the infection of infectious diseases between pigs that they have and can result in death. In addition, economic factors also cause the reluctance of farmers to check the health of pigs to the veterinarian. Pig disease not only affects pigs' bodies but can also affect environmental health and even be fatal to humans. For this reason, pig farmers must know exactly what diseases affect their pigs by knowing the symptoms that occur so that pig farmers can treat and treat the pig disease.

The spread of pig disease in Waingapu City District from year to year has increased, according to data from the livestock service in 2023 there has been a slight decrease, in 2020 the number of pig deaths due to disease in Waingapu City District reached 2,275 heads. In 2022, the spread of swine disease that caused pig deaths reached 3,501 heads. According to the results of research at the East Sumba Regency Livestock Office, the potential for the spread of swine disease in 2023 has decreased to 3,252 heads. Therefore, to overcome the spread of money pig disease in the district of Waingapu city, it is necessary to carry out socialization on how to overcome the spread of pig disease. The East Sumba Regency Livestock Service is one of the agencies that handles livestock affairs and animal health, recording 9,028 pig deaths in Waingapu City District from 2020-2023. The causes of disease in pigs can come from bacteria, viruses, worms, fungi, and others.

Based on the above problems, the author aims to build an expert system to help pig farmers find out what diseases are attacking their pigs' bodies based on the symptoms that occur. So that when cattle farmers know the possibility of diseases that attack their cows, farmers will get information on solutions for the treatment they must do to cure the pigs. This system uses the forward chaining method.
With this expert system, it is hoped that pig farmers are more familiar with the symptoms, types of diseases and how to handle diseases in pigs, so that their pig farms are more productive without infectious disease attacks in pigs.
The purpose of this study is to produce an Expert System in the form of a web-based application that can make it easier for Animal Owners to detect early health problems in pigs by using the forward chaining method which is expected to provide accurate and effective results in order to reduce the high risk of pet death, especially pigs.
The system created can be useful to make it easier for pig owners to accurately know the type of disease suffered by their pet pigs based on the symptoms of the disease experienced.

2. Literature Review

2.1 Farm

Livestock is a field or breeding of livestock to get a result from these activities. Animals raised include pigs, chickens, cows, buffaloes, goats, ducks and sheep. There are many agricultural products from meat, eggs and clothing materials (such as leather). In addition, animal manure can be used as a means of travel and for plowing rice fields [2].

2.2 Pig

Pigs are a type of ungulated animal with a long snout and a straight nose and are animals that originally originated in Eurasia. Also known as Pig in (Arabic). Pigs are omnivores, which means they eat both meat and plants [3].

2.3 Swine Disease

Efforts to manage data into information, so that it can support the main goal in accordance with the stage of identifying disease diagnosis problems. At this stage there are several types of symptoms and types of diseases.

No	Nama	Gejala
1	Kontrol vitamin	Bintik-bintik otot jantung pada babi Nafsu makan buruk Pertumbuhan terhambat Kelainan bentuk Pembengkokan tulang panjang Ketimpangan pada babi muda Patah tulang dan kelumpuhan posterior Selaput lendir pucat Jantung membesar Edema kulit sekitar leher dan bahu Lesu Pernafasan sesak Reproduksi pada babi terganggu
2	Helminthiasis (cacingan)	Lesu Mata sayu Diare Rambut kusam dan mudah rontok
3	ASF/HC	Kemerahan di bagian perut, dada dan teliga Diare berdarah Demam tinggi Pendarahan kulit sianosis Batuk dan kesulitan bernafas Tidak ada nafsu makan
4	Enteritis (radang usus)	Diare berwarna keabu-abuan Jaringan usus yang mengelupas Kotoran berbau bususk Muntah Tidak ada nafsu makan
5	Infeksi bakteri	Kebengkakan pada sendi kaki belakang dan depan Suhu tubuh naik Nafsu makan menurun Kulit kelihatan kemerahan Ingusan dan ngorok Susah berak Batuk darah
6	White scours (mencret putih)	Warna putih pada kotoran Lebih sering menyerang anak Peradangan usus yang membuat sistem pencernaan terganggu

Fig. 1: Symptoms and Diseases of Pigs

2.4 Expert System

Expert systems or Expert Systems are also called Knowledge Based System, which is a computer application that is intended to help decision-making or problem solving in a specific field. This system works by using knowledge and analysis methods that have been defined in advance by experts who are in accordance with their field of expertise. This system is called an expert system because its function and role are the same as an expert who must have knowledge and experience in solving a problem. The system usually serves as an important key that will help a decision support system or executive support system [4].

2.5 Information Systems

An information system is a set of components that are interconnected, collecting, storing and distributing information to support decision-making and supervision in a [5].

2.6 Website

A website is a collection of pages that contain certain information and can be easily accessed by anyone, anytime and anywhere via the internet. The website was initially developed as a hypertext where documents are presented electronically that are integrated with each other. Hypertext not only presents text, but can store images, sounds, and videos until it develops into multimedia. The development of web-based systems is carried out for the reason that its use is more widespread, namely being able to use smartphone or laptop devices [6].

2.7 Forward Chaining

Forward Chaining is a search method or technique for solving a problem to find a solution that starts with existing information and combining rules to produce a conclusion and goal.
Each match, start with the top rule. Each rule can only be executed once. The search methods used are Deptth-Firstf Search (DFS), Breadth-First Search (BFS) or Best First Search.
Forward Chaining is data-driven because it has inferences starting with available information and then conclusions are drawn. The operation of the forward chaining method begins by entering a set of known facts in the working memory, after which it derives new facts or known facts. This process can be continued until the goal is reached or there are no more rules that match the known facts [7].

3. Research Methodology

3.1 Profile of the Animal Husbandry Service

The implementation of the research is located at the East Sumba Regency Livestock Office which is located at Jln.Jend. Soeharto Hambala Kec.Waingapu City, East Sumba Regency is located between the coordinates 119°45'–120°52' East Longitude (BT) and 9°16'–10°20' South Latitude (LS). Based on its geographical position, East Sumba Regency has boundaries, namely: The North is bordered by the Sumba Strait, the South is bordered by the Indian Ocean, the East is bordered by the Sabu Sea, the West is bordered by Central Sumba Regency.
The area of East Sumba Regency is 7,000.5 Km2 or 700,050 Ha. Of the 98 islands, only 3 islands have been inhabited, namely Sulia Island, Menggudu Island, and Kotak Island. About 40% of the area of East Sumba Regency is a hilly area, especially in the southern area, where the hillsides are quite fertile land, while the northern part is in the form of rocky and less fertile plains. Administratively, since 2007 there has been an expansion of a number of sub-districts in East Sumba Regency into 22 sub-districts, 16 sub-districts and 140 villages.

3.2 Forward Chaining Method

Forward Chaining is an inference method that applies rules of conditions and actions. Data is used in this approach to select appropriate rules, which are then put into practice. The Forward Chaining method is suitable to be used to handle control and prognosis problems. A diagram of the process of the Forward Chaining method in overcoming a problem can be seen in Figure 2.

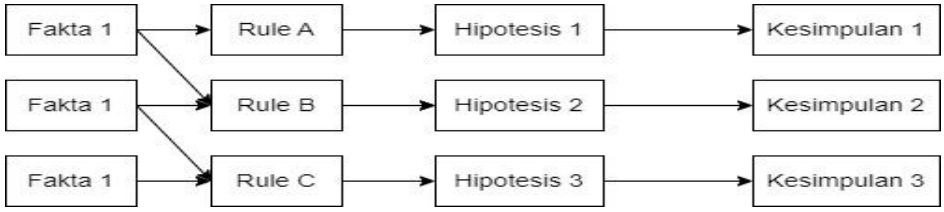

Fig. 2: Forward Chaining Method

3.3 Research Flow

The first step taken to obtain complete data in this study is to conduct research directly in the field to find data on the spread of swine disease in East Sumba Regency.

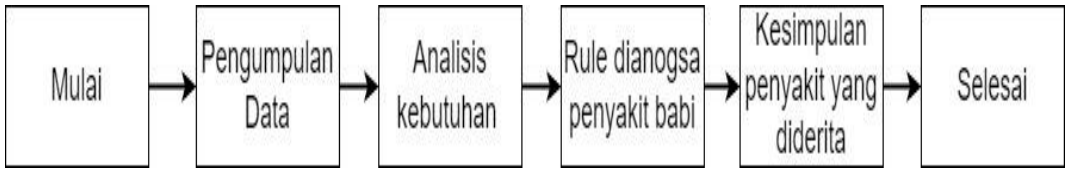

Fig. 3: Research Flow

3.4 Use Case Diagram

A use case diagram is an abstraction of the interaction between the system and the actor. Use cases work by describing the type of interaction between users of a system and their own system through a story of how a system is used. Uses case is a construction to describe how the system will look to the user's eyes. Use case diagram of a geographic information system to monitor the distribution location of pig weed can be seen in figure 4.

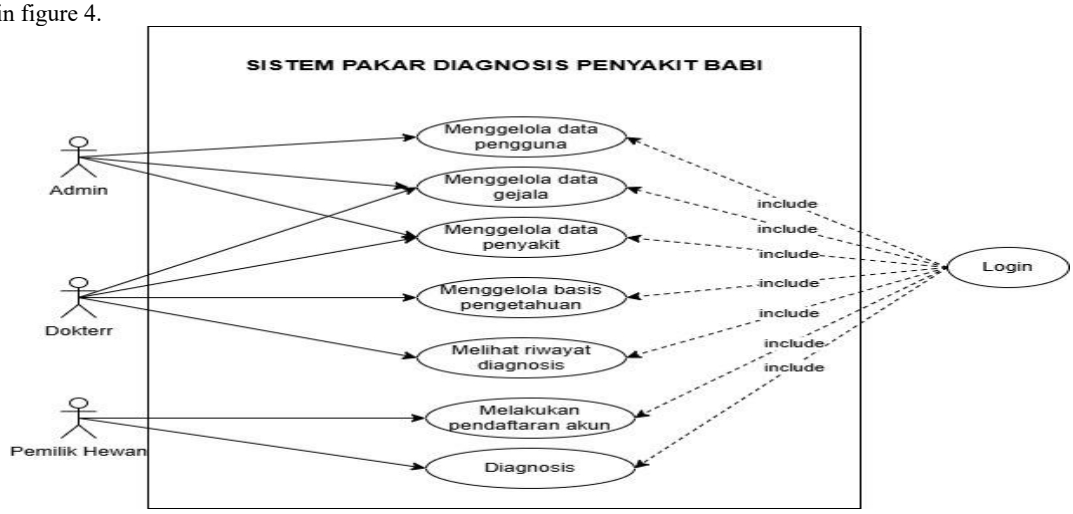

Fig. 4: Use Case Diagram

In the Use Case Diagram in figure 4, it can be seen that there are 3 actors in the Decision Support System for Pig Disease Diagnosis, namely Admin, Doctor and Animal Owner. Each actor can perform different functions within the system.

For Actors, admins can manage user data, manage symptom data (add symptoms), manage swine disease (add disease). All of these functions can be done if the admin logs in first.

For Actors, veterinarians can manage symptom data, manage disease data, change threshold values, manage knowledge bases, view diagnosis history, and manage prevention solutions. All of these functions can be performed if the veterinarian actor logs in first.

For Animal Owner Actors, they can register a system account and make a diagnosis. All of these functions can be done if the admin logs in first.

4. System Implementation and Testing

4.1 System Implementation

This implementation stage is a stage to describe all the results of the implementation of the system that has been made based on the design that has been made before. The following is the implementation of the "Expert System for Supporting Decisions for Pig Disease Diagnosis in Waingapu City District" which is divided based on system users, namely admins and animal owners.

4.1.1 Implementation of the Admin Section

The implementation in this admin section has several pages. The page is used by admins to manage the data used in the system. The following are the results of the implementation of the Expert System for Supporting Decisions for Swine Disease Diagnosis in Waingapu City District in the admin user section.

a. Login Page

The login page is the first page used by the admin to be able to access the system. Admins need to enter the appropriate username and password to log in to the system. The implementation of this login page can be seen in Figure 5.

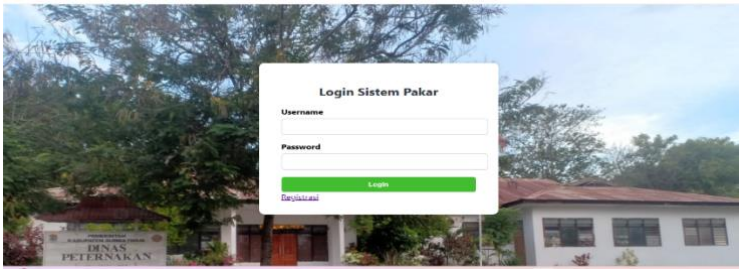

Fig. 5: Admin Login Page

b. Admin Dashboard Page

This dashboard page is the first page that will appear when the admin successfully logs in. The display of the admin dashboard can be seen in Figure 6.

Fig. 6: Admin Dashboard Page

On the left sidebar, there are four main menus, namely users, symptoms, diseases, and doctors. The display from the admin sidebar menu can be seen in figure 7.

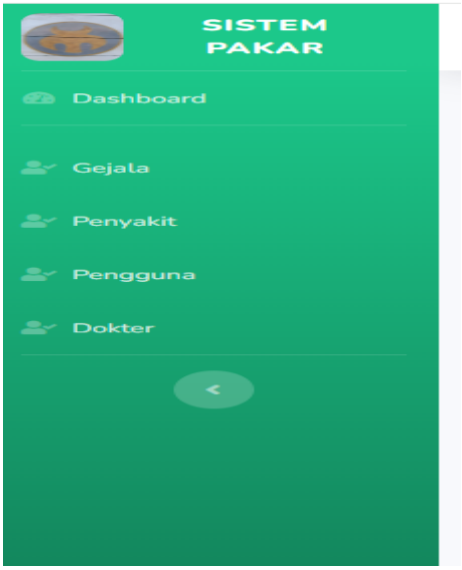

Fig. 7: Menu on the Admin Dashboard

c. User Page

This page displays the data of users who use the system. The implementation from the user can be seen in figure 8.

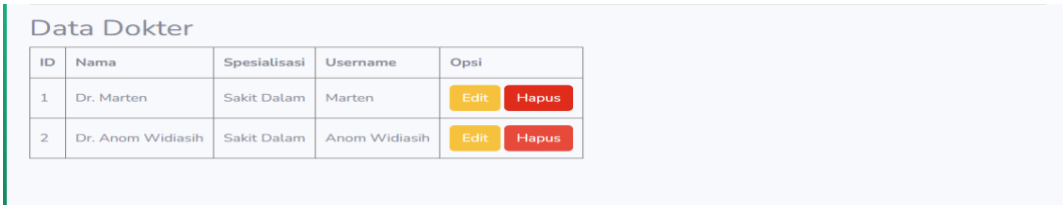

Fig. 8: User Pages

Admins can add new user data by clicking the add button at the top right when viewed from the image. If the button is pressed, a form will appear to fill in the username, username and password of the new system user as shown in figure 9.

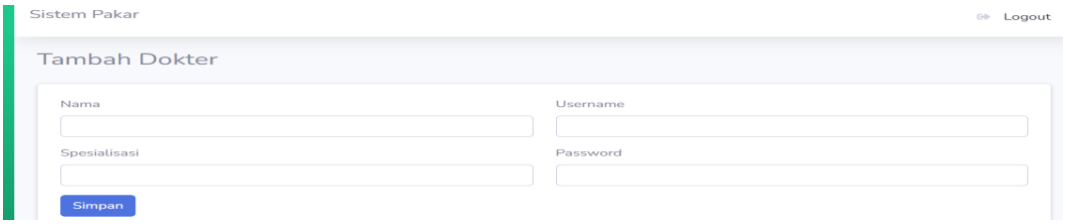

Fig. 9: Add User Page

To edit the username, username, and password of the system user, namely by pressing the edit button in the action column, according to the user who wants the admin to change their data. If the edit button is pressed, a form will appear containing the username, username and password that the admin wants to change the data as shown in figure 10.

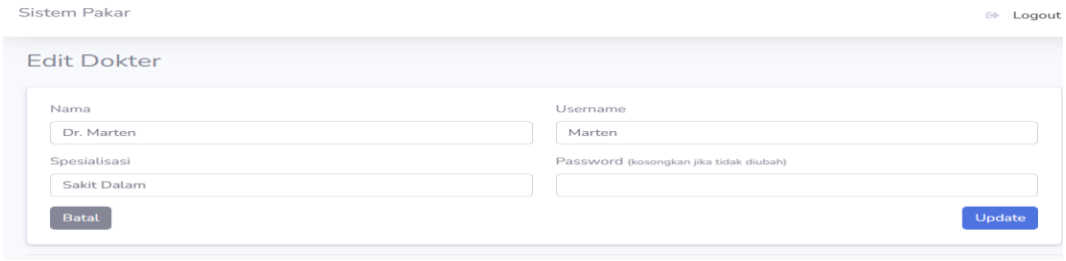

Fig. 10: User Edit Page

d. Symptoms Page

This symptoms page is used by admins to manage adding new symptoms. The results of the implementation of the symptoms page are as shown in figure 11.

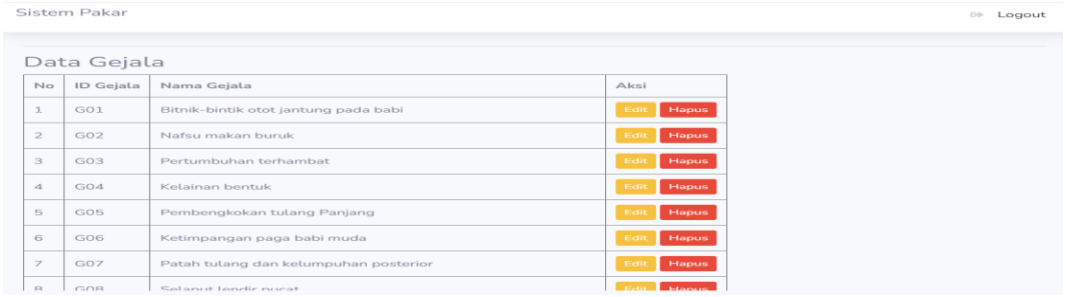

Fig. 11: Symptom Data Page

To add a new symptom is to press the plus button at the top right as in the image. If the button is pressed, a new symptom add form will appear as shown in figure 12.

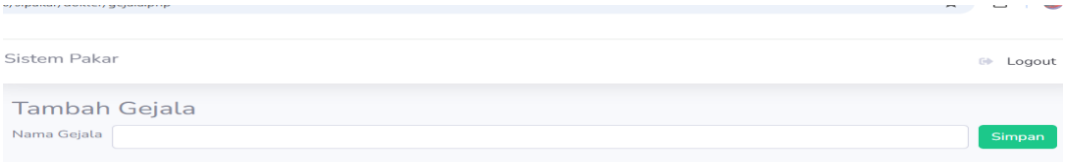

Fig. 12: Page Add Symptoms

e. Diseases Page

This disease page is used by admins to display disease pages in the user and doctor sections, admins can only add new diseases, disease names, disease descriptions, and disease solutions that the data directly gets from the admin. The implementation of the disease page can be seen in figure 13.

Fig. 13: Disease Data Page

To add a new disease by clicking the add button in the upper right corner as shown in the image. If the button is pressed, a form will appear to fill in the new disease as shown in figure 14.

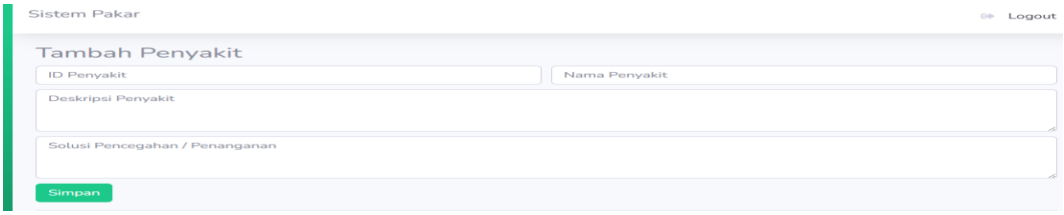

Fig. 14: Disease Add Page

f. Patient Page

This patient page is used by admins to view incoming patient data, admins can manage adding and deleting patient data. The implementation of the patient page can be seen in figure 15.

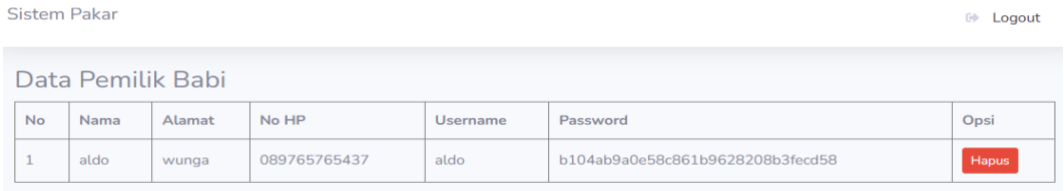

Fig. 15: Patient Data Pages

4.1.2 Implementation of the Animal Owners Section

The page is used by animal owners to fill in the symptoms experienced by their pets. The following are the results of the implementation of the Expert System for Pig Disease Diagnosis Decision Support in Waingapu City District on the animal owner's side. The implementation on the animal owner's section has several pages.

a. Account Registration Page

The list of accounts is used by pet owners to log in to the system if they do not have an account. To make a list, you have to press the list button located on the main page. When the button is pressed, a new user registration form will appear to fill in the username, username and password data as can be seen in figure 16.

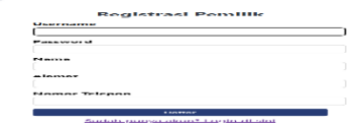

Fig. 16: Account List Page

b. Login Page

Login is used by pet owners to be able to log in to the system and be able to carry out further activities in the system, animal owners are required to enter a username and password as shown in figure 17.

Fig. 17: Login Page

c. Diagnosis Page

The diagnosis page is a page that animal owners use to carry out the diagnosis process for pig diseases suffered by their pets, as can be seen in the picture. On this page is displayed a table of patient lists. Pet owners can add new pig data by clicking the add new pig button. To make a diagnosis the animal owner only needs to fill in the address data, the name of the pig and the age of the pig can be seen in figure 18.

Fig. 18: Diagnosis Page

d. Diagnosis Process Page

The diagnosis process page is the page used by the animal owner to carry out the diagnosis process based on the symptoms that his pet is experiencing can be seen in the picture. By clicking the blue diagnosis button, after clicking the button, the pet owner can carry out the diagnosis process by selecting the appropriate symptoms that their pet feels. The following implementation can be seen in figure 19.

Fig. 19: Diagnosis Process Page

e. Diagnosis Results Page

The diagnosis results page is a page that displays the results of the diagnosis that has been made by the animal owner based on the selected symptoms. On this page, data is displayed on the animal owner, selected symptoms and case results as well as percentage values. The implementation of the diagnosis results can be seen in figure 20.

Fig. 20: Pages of Diagnosis Results

4.1.3 Implementation of the Doctor's Section

The implementation of the doctor section is a page that is displayed when the doctor successfully logs in to the system. This page consists of several menus, namely, the Symptoms, Diseases, Knowledge Base, Diagnosis and Diagnosis history. The implementation can be seen as shown in figure 21.

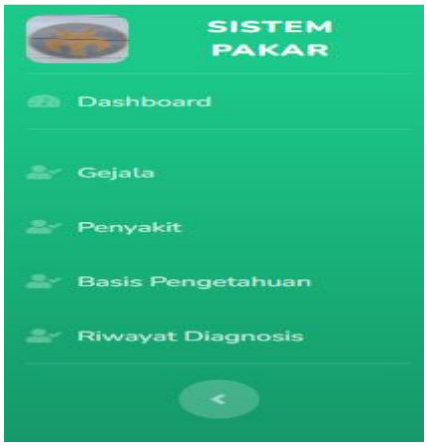

Fig. 21: Doctor's Menu Page

a. Symptom Data Page

The symptom data page is a page that displays all symptom data in the doctor's section as shown in the image. On this page the doctor can add new symptoms, edit the symptoms and remove the symptoms.

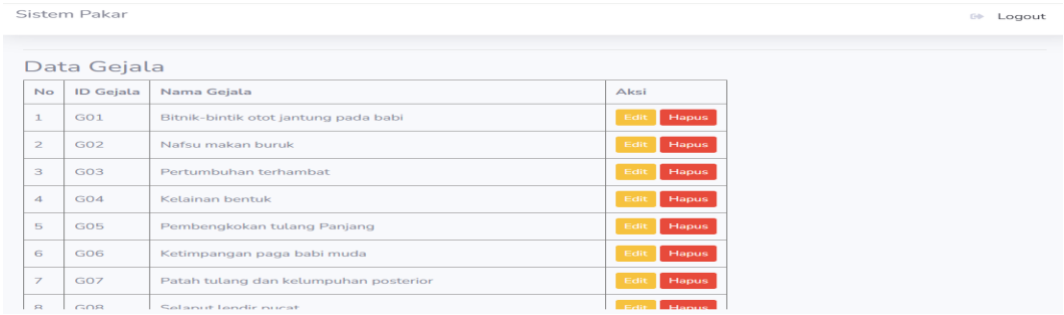

Fig. 22: Symptom Data Pages

To add a new symptom, you can press the plus button located in the upper right corner of the page as in the image. When the button is pressed, a data add form will appear as shown in figure 23.

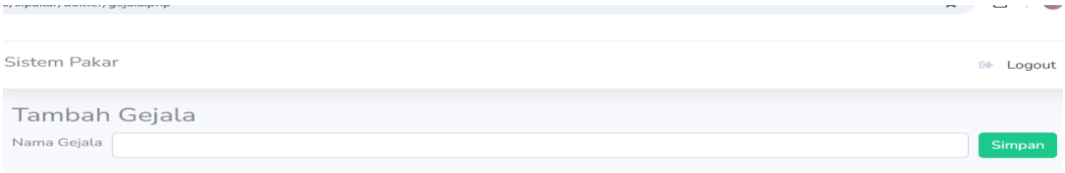

Fig. 23: Page Add Symptoms

To edit existing symptoms, the doctor can also do this by pressing the edit button in the action section as in the image. When the button is pressed, a data edit form will appear as shown in figure 24.

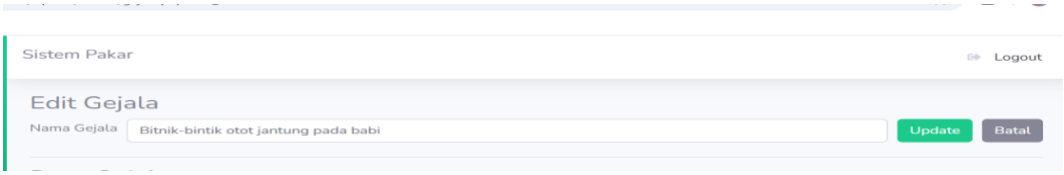

Fig. 24: Symptom Edit Page

b. Disease Data Page

The doctor's disease data page is data that displays all diseases in the doctor as shown in the picture. On this page doctors can add new diseases, edit diseases and remove diseases.

Fig. 25: Disease Data Page

To add a new disease on the doctor's side by pressing the add button at the top right as shown in the picture. When the button is pressed, the add disease form will appear as shown in figure 26.

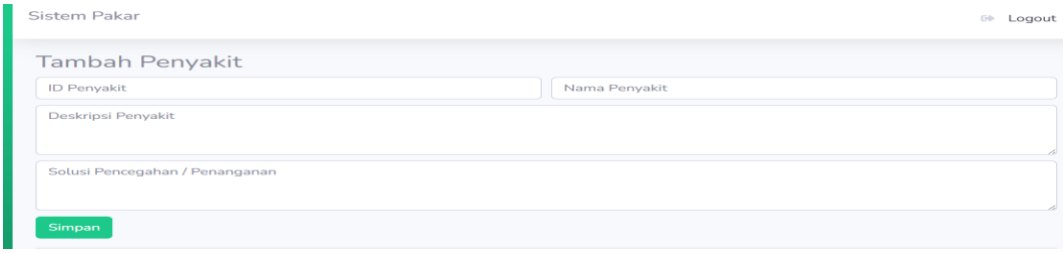

Fig. 26: Disease Add Page

To edit an existing disease, the doctor can also do it by pressing the edit button in the action section as in the image. When the button is pressed, a data edit form will appear as shown in figure 27.

Fig. 27: Disease Edit Page

c. Knowledge Base Page

A knowledge base page is a page for managing the knowledge base can be seen in the image. On this page, diseases and symptoms will be displayed that are used as a knowledge base for old cases. In the process of searching for similarity values. The new cases will be compared to the old cases that are in the knowledge base. Then there is the add button to add new data, edit and delete data in the knowledge base.

Fig. 28: Knowledge Base Pages

If the doctor wants to add a new knowledge base, it is by pressing the plus button located in the upper right corner as shown in the image. When the button is pressed, a new knowledge base add form will appear. If the process of adding the knowledge base has been successfully carried out, the data will be automatically stored in the database. The results of the knowledge base data addition can be seen in figure 29.

Fig. 29: Pages Add Knowledge Base

If the doctor wants to change the knowledge base, that is, by pressing the edit button located in the action section can be seen in figure 30.

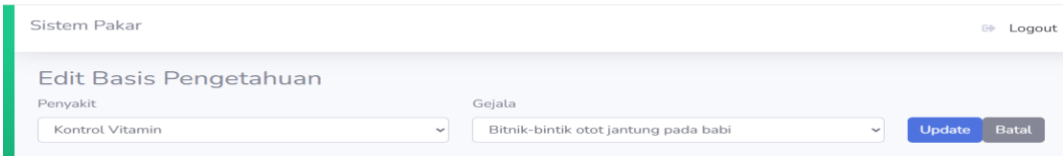

Fig. 30: Knowledge Base Edit Page

d. Diagnosis History Page

This page is used by doctors to view the history of patients after self-diagnosis in the user section, and on this page doctors can perform the retrive and revise process. It can be seen in figure 31.

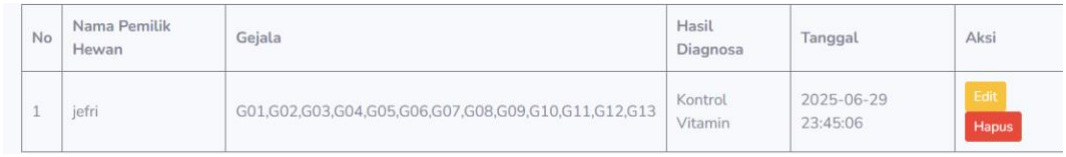

Fig. 31: Diagnosis History Page

If the doctor wants to add a new diagnosis history, it is by pressing the plus button located in the upper right corner as shown in the image. When the button is pressed, a form will appear Add Diagnosis history. If the process of adding the knowledge base has been successfully carried out, the data will be automatically stored in the database. The results of the knowledge base data addition can be seen in figure 32.

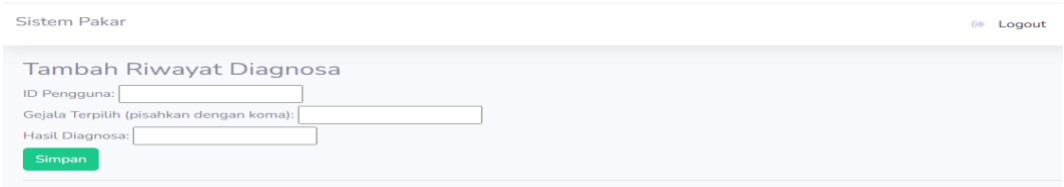

Fig. 32: Pages Add Diagnosis History

If the doctor wants to change the diagnosis history, that is, by pressing the edit button located in the action section, it can be seen in figure 33.

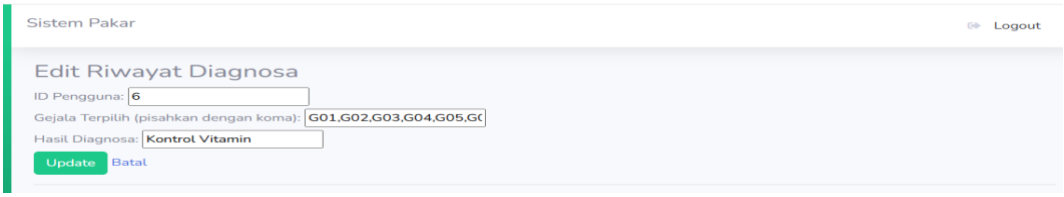

Fig. 33: Diagnosis History Edit Page

4.2 System Testing

System testing is a process to test a system whether its function is running according to the design made. The test will be carried out in two stages, namely testing by comparing the results of the doctor's diagnosis with the results of the system diagnosis and the usability test that will be carried out by veterinarian Dr. Anom Widiasih from the Animal Husbandry Service and pig owners as users.

4.2.1 Diagnostic Testing from Doctors and Systems

In this testing process, it is carried out to compare the results of the doctor's diagnosis and the system. The symptoms that are put into the system are symptoms obtained from the results of interviews with the veterinarian directly. There are three diseases that doctors test the system for. The system will process these symptoms by checking the knowledge base to conclude the diagnosis. The results of the comparison between the diagnosis by the doctor and the diagnosis by the system can be seen in table 1.

Table 1: Diagnostic Testing of Physicians and Systems

Yes		Symptoms of the disease	Doctor's Diagnosis Results	System Diagnosis Results
1	✓	Heart muscle spots in pigs	Vitamin Control	Vitamin Control
	✓	Poor appetite		(similarity
	✓	Stunted growth		100%)
	✓	Deformities		VALID
	✓	Long bone bending		
	✓	Inequality of young pigs		
	✓	Fractures and posterior paralysis		
	✓	Pale mucous membranes		
	✓	Enlarged heart		
	✓	Skin edema around the neck and shoulders		
	✓	Weak		
	✓	Shortness of breath		
	✓	Reproduction in pigs is disrupted		
2	✓	Weak	Helminitasis (cacingan)	Helminitasis (cacingan)
	✓	Eye Sage		(similarity
	✓	Diarrhea		100%)
	✓	Dull hair and easy to fall out		VALID
3	✓	Redness in the abdomen, chest and ears	ASF/HC	ASF/HC
	✓	Diare berdarah		(similarity
	✓	High fever		100%)
	✓	Cyanosis skin bleeding		VALID
	✓	Cough and shortness of breath		
	✓	No appetite		
4	✓	Gray diarrhea	Enteritis (inflammation of the intestine)	Enteritis (inflammation of the intestine)
	✓	Peeling intestinal tissue		(similarity
	✓	Foul-smelling poop		100%)
	✓	Vomit		VALID
	✓	No appetite		
5	✓	Swelling in the joints of the hind and front legs	Bacterial infections	Bacterial infections
	✓	Body temperature rises		(similarity
	✓	Decreased appetite		100%)
	✓	Skin looks reddish		VALID
	✓	Snoring and snoring		
	✓	Coughing up blood		
6	✓	White color on the dirt	White scours	White scours
	✓	More frequent attacks on children		(similarity
	✓	Inflammation of the intestines that makes the digestive system disrupted		100%) VALID

4.2.2 Likert scale

The Likert scale is a test used to measure the opinion of respondents, this method is usually used to calculate a questionnaire by knowing the scale of a certain object. In the likert scale, there is an ideal score that is used to determine the rating scale and the number of all answers (Sugiyono, 2009:83). If the highest score is 5 and the number of respondents is 5, then it is formulated as in table 2.

Table 2: Ideal Score

Respondent x Scale Value	Scale
5 x 5 = 25	Strongly agree
4 x 5 = 20	Agree
3 x 5 = 15	Simply Agree
2 x 5 = 10	Disagree
1 x 5 = 5	Strongly Disagree

Furthermore, the score obtained can be included in the rating scale. The rating scale serves to determine the overall results of the questionnaire obtained from the respondents' assessment. The following is an example if the highest score is 5 and the number of respondents is 5, then the interval is obtained as in formula 5.1 (Syofian, 2015) the percentage rating scale results in table 3.

Rumus interval

I = 100 / Total Score

Score 100 / 5 = 20

Yield (I) = 20

(Interval distance from low 0% to high 100%)

Table 3: Rating Scale Presentase

Answer Percentage	Score
0% - 19,99 %	Strongly Disagree
20% - 39,99 %	Disagree

40%-59,99 %	Simply Agree
60%-79,99 %	Setuju
80%-100%	Strongly agree

4.2.3 Questionnaire Testing Process (Veterinarian)

The questionnaire testing by the veterinarian will be filled out by Dr. Anom Widiasih from the Animal Husbandry Service. This test aims to carry out the validity of the system that has been built, in accordance with the existing application in the medical field. Testing with this questionnaire will be calculated using the Likert scale, which measures the opinion of respondents. The questions on the questionnaire include the features of the system, the system appearance and the functions of the system. The results of the questionnaire that have been filled out by dr. Anom Widiasih are as shown in table 4.

Table 4: Testing of Physician Questionnaire

No	Question	Respondent's Answer					Result	Percentage
		SS	S	CS	TS	STS		
1	Symptom data and disease data in the system are appropriate			✓			3/5	60%
2	The features contained in the system are in accordance with the needs of doctors.			✓			3/5	60%
3	Case-based systems for diagnosis are easy to use.			✓			3/5	60%
4	The use of case-based reasoning methods in the diagnosis system can help pet owners to make an early diagnosis based on perceived symptoms.			✓			3/5	60%
5	The use of the case-based reasoning method in the diagnosis system can help doctors.			✓			3/5	60%
6	The system can produce accurate and easy-to-understand diagnostic conclusions.			✓			3/5	60%
	Total							60%

Based on the results of the usability test with a questionnaire with the Veterinarian, the calculation results were obtained using the rikert scale formula which produced a score of 60% which was entered in the percentage range of 60%-79.99% (agreed). From the results of the score, it can be concluded that veterinarians are quite agreeable with the existence of a diagnostic decision support system for health disorders in pigs.

4.2.4 Questionnaire Testing Process (Pet Owners)

The testing of this questionnaire is carried out by the animal owner as a user on the system. This test aims to conduct a usability test on the system that has been created, whether the system can be understood by the user who uses it. Tests with questionnaires will be calculated using the Likert scale. Questions that will be given to pet owners after trying the system include the features in the system, the appearance and functions of the system. The results of the questionnaire that have been filled out by 5 people consist of 3 pet owners and 2 cat lovers as shown in table 5.

Table 5 : Animal Owner Quiz Testing

No	Question	Respondent's Answer					Result	Percentage
		SS	S	CS	TS	STS		
1	The use of case-based reasoning methods can help pet owners to make an early diagnosis of pets based on perceived symptoms	1	4				21/25	84%
2	The system interface is easy for users to understand.		5				20/25	80%
3	Case-based systems for diagnosis are easy to use.		5				20/25	80%
4	The system can help in the early diagnosis process.		3	2			18/25	72%
5	Supporting features in the system can help pet owners.		5				20/25	80%
	Total							79,2%

Based on the results of the feasibility test with a questionnaire with the Animal Owner, the calculation results were obtained using the Rikert scale formula which produced a score of 79.2% which was in the percentage range of 60%-79.99% (agree). From the results of the score, it can be concluded that respondents from animal farmers agree with the existence of a decision support system for early diagnosis of health disorders in pigs.

5. Conclusions and Suggestions

Based on the problems that have been discussed and resolved through this report, there are several conclusions, including:

1. The way to use this expert system is very easy to use, because the rules used are easy for users to understand.
2. This expert system makes it easier to find and get coping solutions in overcoming symptoms that occur in pigs.
3. The results of the analysis in this expert system are almost in accordance with the expert none other than the veterinarian.

The suggestions that can be given for the development and improvement of this system in the future are that it is necessary to add disease and symptom data for the knowledge acquisition process of this expert system.

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