JISTE (Journal of Information System, Technology and Engineering)
Volume 1, No. 4, pp. 137-141
E-ISSN: 2987-6117
http://gemapublisher.com/index.php/jiste
Received: October 2023
Accepted: November 2023
Published: December 2023

Cat Disease Detection Expert System Application Using WML on Mobile Phone

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Abstract

This research aims to find out how to implement the forward chaining method in an expert system. This research used observation methods, questionnaires, literature studies, and interviews conducted with experts, namely veterinarians. This interview was conducted in the form of an unstructured interview. The researcher used a PC (personal computer) as the hardware. The software used in this research is Notepad++ 6.1.6. The operating system that the author uses in research is Windows XP SP2. The research results show that using this expert system helps detect disease in animals by helping users consult by answering a series of questions based on visible disease symptoms, which in turn will lead to a series of answers leading to a particular disease. In the solutions section, you can find first aid measures and follow-up actions that pet owners are expected to take to help the animal recover. Adding knowledge, documentation, and development to this expert system can be done via the mobile phone available on the admin page, so there is no need to overhaul the existing system; just insert, delete, and update. Development can be carried out by people with authority to add symptoms, diseases, and solutions to diseases.

Keywords: expert system development life-cycle, waterfall, animal disease, expert systems.

INTRODUCTION

Diseases in animals are a frightening specter for animal lovers. Why not? Without fast and appropriate treatment, your beloved pet will experience something bad that will lead to death. Unfortunately, pet owners generally do not pay attention to what and how the symptoms of the disease are, so treatment for pets is too late (Sulistyorini et al., 2023). According to the results of a questionnaire conducted on 30 respondents, 15 people did not care about the initial symptoms that appeared and 24 people did not have regular check-ups at the nearest veterinarian. Most pet owners think that if symptoms such as coughing or vomiting appear, they will generally assume that their animal is just choking. In fact, if we trace it, vomiting in animals is a symptom of almost all dangerous digestive diseases in animals. As stated in the statement, "We often think it is normal for animals to vomit. An animal that vomits is a sign that there is a problem within itself, including if it vomits hairballs,

and animals do have a natural ability to survive. However, when you decide to keep it, the animal sometimes also needs your help, such as brushing its fur, cutting its nails, and bathing it." Therefore, we need a system that is able to analyze and inform and is easily accessible to cat keepers for monitoring the animal's physical health condition (Noveldi et al., 2023).

An expert system is an intelligent inference system from an expert that aims to solve problems like an expert. In general, the way an expert system works is by processing user statements in the form of answers to a series of questions according to the prevailing circumstances to be processed, which will ultimately produce a conclusion regarding the problem. An expert system is a computer program designed to model the problem-solving abilities carried out by an expert system (Aldiansyah et al., 2023). An expert system is an artificial intelligence program that combines a knowledge base with an inference engine. Inference is a process of gaining knowledge based on experience. Basically, an expert system contains expert expertise, the transfer of expertise, inferences, rules, and the ability to explain. There are various methods for creating expert systems by applying various existing rules. Inference with rules is an implementation of ponens mode, which is reflected in the search mechanism. Using this method, you can also check all the rules in the knowledge base in both forward and backward directions. The search process continues until there are no rules that can be used or until a goal is achieved (Lerian et al., 2023).

From interviews with animal owners, it is known that animal owners pay little attention to the early symptoms of a disease. In general, animal keepers will start to pay attention when the animal's condition begins to deteriorate. So it was concluded that most of the causes of rescue failures stem from delays in realizing the disease they were suffering from. Based on this problem, an expert system is really needed to monitor animal health conditions. With an expert system, animal owners have a handle so they don't have to guess about every physical complaint that arises with the animal. Owners can consult the expert system for any symptoms that may arise so that diseases can be identified and treated as early as possible. In this expert system, the inference method applied is forward chaining. Forward chaining is an inference method that is commonly used in creating expert systems. This method is effectively used to create an expert system with the deep tree model. In the case of animal diseases, where consultations are formed from symptoms asked by the doctor in a chain to form a deep tree, forward chaining is an effective method (Putra et al., 2023).

Speed of access and mobility of a platform so that it can be accessed anytime and anywhere easily and quickly are essential. A mobile phone is a device that is very popular to use. Chairman of the Indonesian Cellular Telecommunications Association, Sarwoto Atmosutarno, at the 2010 Indonesia Celular Show (ICS), at the Jakarta Convention Center, gave the statement, "The number of cellular users of 180 million numbers was achieved after 15 years of GSM services operating in the country." The mobile phone has undergone a transformation from a tool limited to voice and text transmission to a multi-function device that can help humans solve various problems. Because of this, the mobile phone has become a device that has the potential to become a platform for this expert system (Lerian & Chenayan, 2023).

METHOD

In creating an expert system, the data collection method is the most essential thing because this is where the inference process, which functions to accumulate, transfer, and transform expertise or knowledge from various sources of knowledge, occurs. The following are the data collection methods used: In the observation method, the author uses a questionnaire that functions to develop the system and is carried out without using sampling methods or statistical calculations. Next, the researcher also conducted a literature study to

find relevant references to the research object. Reference searches are carried out in libraries, bookstores, and also online via the internet. Later, these references will be used to prepare the theoretical basis, research methodology, and applications. In this research, interviews were conducted with experts, namely veterinarians. This interview is conducted in the form of an unstructured interview, where the interviewer can modify, repeat, elaborate on questions, and follow the interviewee's answers as long as they do not deviate from the purpose of the interview, thereby producing feedback.

The following are the phases carried out in creating an expert system application that is in accordance with ESDLC: First, in this phase, problems are identified, namely caretaker negligence in anticipating symptoms in animals that arise. The data from the observations is then used to assess and limit the problems that will be implemented in an expert system. The expert will determine the concept of disease symptoms, which will be a guide in determining which disease the animal is infected with. At this stage, the veterinarian will describe the symptoms that can be used as factors in identifying the disease. In this phase, relationships between elements will be designed in the form of formats commonly used by expert systems, such as inference mechanisms, which include reasoning techniques using forward chaining techniques, search techniques using depth-first search, and knowledge representation, which includes tree diagrams and production rules. After completing the basic representation of the prototype, proceed with creating a system design. This system development consists of process design, database design, and user interface design. System implementation is the construction, installation, testing, and delivery of the system into production. There are two phases to implementing a system. This is important to do to maintain the quality of the application by carrying out documentation for the development of the application with the latest information in the future.

A PC (personal computer) is the hardware that researchers use. (PC) with the specifications that the author used in this research, namely the Intel® Core™2 Duo Processor P8600, 4 GB of memory, and a 500 GB hard disk. The software used in this research is Notepad++ 6.1.6 as the PHPv5.2.6 and WML programming language editor, Macromedia Dreaweaver 8.0 to design the interface, Mozilla Firefox as a web browser, Openwave V7 Simulator as a WAP emulator before running on a real cellphone, and Appserv-Win32-2.5.10, which includes Apache 2.2.8 as the local web server and MySQL 5.0.51b as the database. The operating system that the author uses in research is Windows XP SP2.

RESULT AND DISCUSSION

According to the results of distributing questionnaires, most pet owners pay little attention to the early symptoms of disease that appear. So there is often a delay in handling and anticipating disease in these animals. Other problems also arise when consultations with veterinarians involve limited materials, space, and time. This difficulty in accessing a veterinarian for consultation is an obstacle for cat owners to carry out medical check-ups when symptoms of disease appear. In this phase, knowledge engineers and experts determine the concept that will be developed into an expert system for detecting disease in animals by collecting information about disease symptoms that arise in animals and then translating it into a computer application program so that it can be used as a disease management step. The result of creating concepts between knowledge engineers and experts is the collection of data needed in this research as a collection of knowledge from the expert system being developed, such as data regarding symptoms and anticipation of disease in animals. The author has packaged these data into one in the form of a database of diseases, disease symptoms, and disease symptoms in animals.

expert system flowchart using the forward chaining method. This expert system

flowchart shows how the process flows during user consultations. In the context diagram, there are two external entities that support the expert system process: admin, or knowledge engineer, and user. Only people who have access rights as admins can log in, enter, delete, and change data, which includes damage data, damage cause data, solution data, and workshop data. Meanwhile, all users or visitors can directly access the expert system. In the construction phase, the programming languages used are PHP and WML using a MySQL database, a forward-backward chaining reasoning model and depth-first search techniques. Appserv version 2.5.10 is used to control the MySQL database on the system; Macromedia Dreaweaver 8.0 and Notepad++ are used as editors; Google Chrome is a web browser; Openwave V7 Simulator is a WAP emulator before running on a real cellphone; and it is used for testing, checking, and running the system and executing rules.

The testing carried out is in the form of independent testing and functional testing to ensure the correctness of the program. Independent testing is carried out by the author himself to ensure the existence of errors and bugs, while functional testing is carried out by participants who are animal owners. Functional testing is carried out by running the application as a whole, using input, and paying attention to the output produced by the system. After the expert system for detecting disease in animals is implemented, the next phase is the advanced implementation phase, which includes system development. The aim of the advanced stage of implementation is so that the system that has been built can be put to good use, so regular maintenance and evaluation of the system are needed as well as upgrading so that this system can be used for a long time so that it does not become obsolete and useless. The most useful aspect of system development is the system documentation process, which contains benchmarks for future system development.

CONCLUSION

By using this expert system, it helps detect diseases in animals by helping users consult by answering a series of questions regarding the visible symptoms of cat disease, which in turn will lead to a series of answers leading to a particular disease. In the solutions section, you can find first aid measures and follow-up actions that pet owners are expected to take to help the cat recover. Adding knowledge, documentation, and development to this expert system can be done via the mobile phone available on the admin page, so there is no need to overhaul the existing system; just insert, delete, and update. People in positions of authority can carry out development by adding symptoms, diseases, and treatments to animal diseases. Based on the conclusions that have been expressed, several suggestions can be made for further development: Expansion of the expert system to detect disease in species that are not limited to pets (Felis Silvestris Catus), including pets such as dogs, fish, rabbits, and birds. Uses multimedia content such as sound and video (on higher technology) so it will be more accurate. If necessary, the backward chaining method can be implemented. Expanding this expert system through diagnosis from laboratory tests. Expanding symptom and disease rules to increase system accuracy.

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