Expert System for Diseases Detection in Canary Birds

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Abstract— The canary is a bird that is popular and collected by the community, especially in Indonesia. The craze is based on sound canaries melodious and beautiful shades of color. Maintenance of this type of bird is simple but if indicated by a complaint or illness suffered frequent errors in handling. To get a diagnosis that fit the symptoms of the disease, canary collectors or sellers often have misconceptions about the disease symptoms of bird species. This has an impact on disease management is wrong so that the Canaries do not improve will actually happen otherwise. This program is used as a tool for the collector or seller canary in the detection of the avian disease. This expert system tracking rules by using forward chaining. The facilities in this program also comes with a knowledge base that can be added and the display interface is more user friendly, both in terms of adding the data questions and conclusions. Representation method performed in this system is the logic. This system uses the Delphi programming language and MS Access database. Based on the results of this study submitted suggestions to the collector or seller canaries in order to understand and provide solutions (treatment) right aehingga bird life and the quality can be maintained. This expert system are tools that final diagnosis still must consult with the relevant parties in this case the vet and correlation.

Keywords—Expert System; canary; forward chaining

I. INTRODUCTION

Canaries were first discovered by a French sailor, namely Jean de Berthan Cout in the Canary Islands area around the 15th century. He made amazed the beauty of feathers and bird 's voice sweetly. The canary has the Latin name Serinus Canaria. Diversity of canaries at this point is the result of development of the wild canary. Besides natural conditions and crossbreeding that occurs produces various types of walnuts which have occurred since the 5th century ago .

Canary name has absolutely nothing to do with walnut, but the name is taken from the name of the island where the original habitat of the canaries, namely the Canary Islands. While the islands' name is derived from the Latin word meaning canarias island dogs, because a lot of stray dogs that live in these islands at that time.

Fig. 1. Canary Birds

Generally, expert systems is a system that is trying to adopt human knowledge into a computer, so that the computer can resolve the problem as was done by the experts. Expert systems composed by two main parts, namely the development environment and consultation environment.
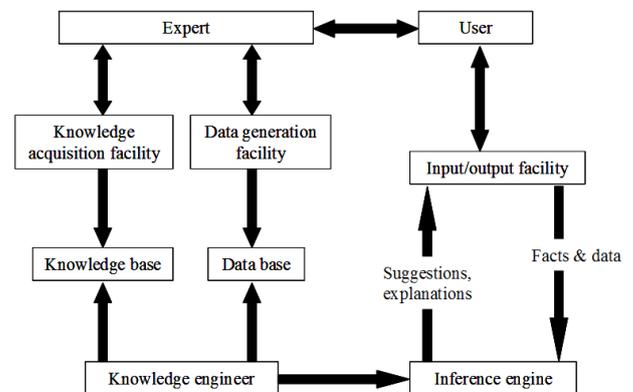

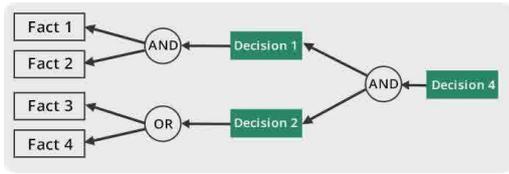Fig. 2. Expert Systems Architecture

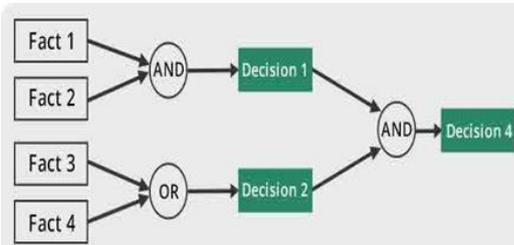Fig. 3. Backward Chaining Diagram

Fig. 4. Forward Chaining Diagram

The knowledge base contains knowledge for understanding, formulation, and problem resolution. This expert system components are arranged on two basic elements are facts and rules. The fact is the information about the object in a certain problem areas, while the rule is the information on how to obtain new facts and the facts are already known [1]. The knowledge base contains knowledge-knowledge in problem solving. There are 2 forms of approach to knowledge base :

- Rule-based reasoning
- Case-based reasoning

Acquisition of knowledge is the accumulation, transfer and transformation expertise in solving the problem of the sources of knowledge into a computer program. There are three main methods in the acquisition of knowledge, namely interviews, Protocol Analysis and Observations on the work of experts .

So that knowledge can be used in the system, knowledge must be represented in a particular format which is then assembled into a knowledge base. Knowledge representation is the method used to encode knowledge in a knowledge-based expert system that is intended to capture the properties of important issues and make that information accessible to the troubleshooting procedure. Several models of representation of knowledge are important, such as: logic, semantic networks, tree, frame, Script, and production rules.

Logic is a scientific assessment of a series of reasoning, the system rules and procedures that assist the process of reasoning. In the reasoning, the computer should be able to use deductive and inductive reasoning process into a form suitable for computer manipulation [2].
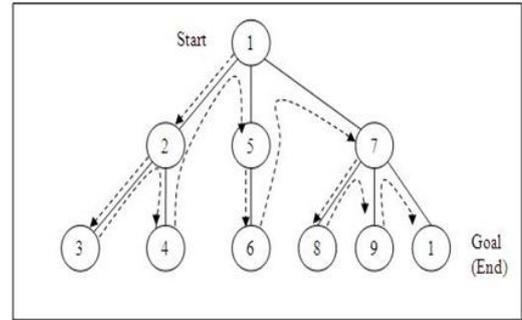

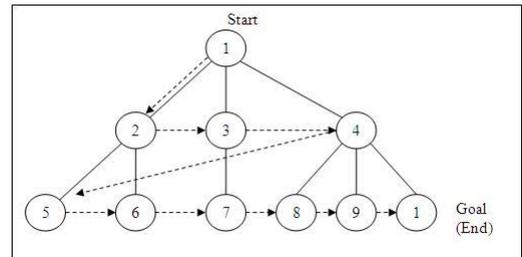Fig. 5. Depth-first Search Diagram. Source : [1]

Fig. 6. Breadth-first Search Diagram. Source : [1]

Both the inference method, influenced by three kinds of search techniques, namely depth-first search s, breadth-first search and best-first search.

II. METHODS

Expert system development phase conducted in the study are shown in Figure 7.

In the manufacture of an expert system program, the first step is to draft a knowledge base. Then proceed with the creation of an expert system program in Delphi. In the expert system will be used forward chaining because the system will work from the collection of the facts to form some conclusions While its search technique uses depth- first search method for determining the rules of inference system looking in depth search of the root node to move down to the level in the sequence.

III. RESULTS AND DISCUSSION

In the design of an Expert System for Diseases Detection in Canary Birds, the authors chose a model inductive logic to represent knowledge gained. Inductive logic method is used on the grounds of knowledge involves only a simple mathematical analysis and does not require large amounts of data so it does not have to worry about going on inefficient and slow work on the system. Because the system works on the facts particular to take a general conclusion, the use of inductive reasoning. An example of logical reasoning are shown in table 1.
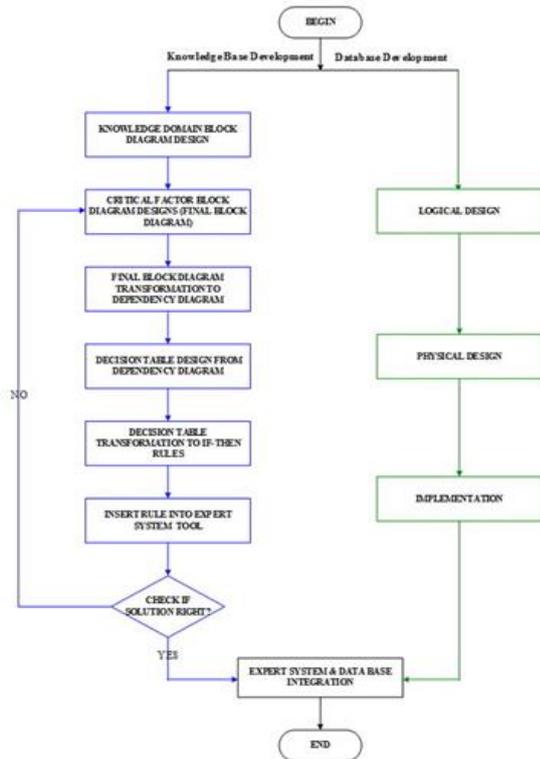
Fig. 7.   Research Methods Flowchart

TABLE I.   EXAMPLE OF LOGICAL REASONING DESEASE OF CANARY

Premise 1 :	Object on Respiratory Disease
Premise 2 :	Symptoms Difficulty breathing
Conclusion	This type of disease is a respiratory disorder with a solution of birds treated with drugs listed breath, dried bird routine, reduce feeding slimy .

Inference techniques used forward chaining. This can be seen when the user make the choice of objects sequentially disease. Diagnostic process starts from the object to the canaries that indicated disease. Then the results of this search will be combined from symptoms that can lead to the conclusion. The conclusion that can be obtained is the type of disease and its solution.

User interface functions as a bridge between the user and the system to interact. In the design of the interface designer interface required to create an interface that is easily understood by the user so that the use of the application will be more interactive.

On page Interface domain experts have permission to add, modify, and delete data in the knowledge base canary disease (see Figure 8).
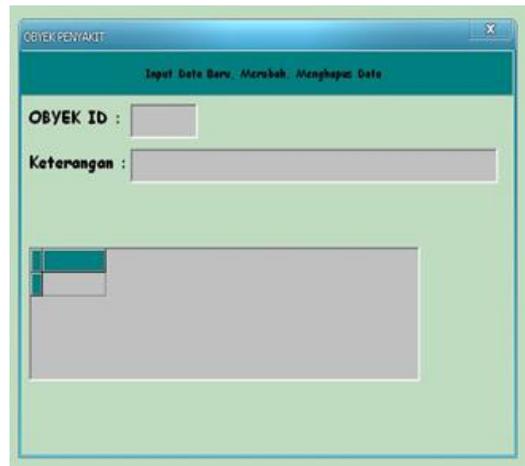

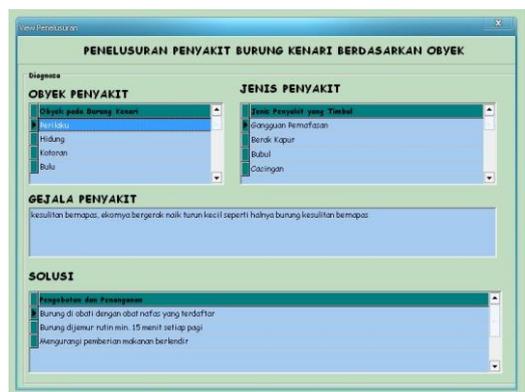Fig. 8.   Expert Domain Page Interface

Fig. 9.   User Domain Page Interface

On page Interface domain user has permissions to browse the search results based on the object canary disease and its symptoms (see Figure 9).

IV. CONCLUSION

After testing and analysis program, it can be concluded that the expert system developed to help owners or sellers canary in analyzing the kind of bird diseases. Based on the conclusions suggested ongoing research to develop other applications of expert systems in various types of diseases of poultry and other animals .

REFERENCE

[1]   M. Arhami, "Konsep Dasar Sistem Pakar,". Yogyakarta: ANDI, 2005.
[2]   K. Kusrini, "Sistem Pakar Teori dan Aplikasi,". Yogyakarta: ANDI, 2006.