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Plant Disease Diagnosis Expert System Using Rice Backward Chaining

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Abstract

Expert systems are application based on the computer in use to finish a problem as who thinking by experts. experts sistem have diagnosis a disease of rice plants is a application of computer which able to thinking like a expert rice plant which given conclusion about disease experienced based on the symptoms have been given with solution of the problem. experts sistem is build to use a prolog programe language because inference engine was contained in programe language so don't need to re-build the inference engine from begining as for the inference method using backward chaining inference methods. backward chaining method is a approach from begin of conclusion and hyphothesis that its alright.

Keywords : *expert system, a disease of rice plants, prolog, backward chaining inference methods*

1 INTRODUCTION

The rice plant is one of the staple food crops. A wide variety of factors that are involved here problems ranging from rice fields of diminishing returns, then the change in the weather could not be sure, pests and diseases and so forth.

Along the development of technology, expert or experts no longer have to be a man who can be consulted. Expertise or the expertise of a person can be transferred into a system called expert systems. Examples of problems that can be interpreted is an expert system on rice plant diseases. If there are features of the disease, it can be concluded the types of diseases and their prevention can be known.

Conclusions in expert systems are generally used reasoning Forward or Backward Chaining Chaining. However, with the use of both the reasoning can not be determined the value of the confidence in the hypothesis. Accordance with the characteristics of the decision-making backward chaining reasoning is used to diagnose.

Purpose of Research is How to make Expert System In Rice Diseases Using Backward Chaining Method. The purpose of this study are :

1. Creating a knowledge base of the rice plant diseases.

2. Designing and building software (software) to determine the types of rice diseases using backward chaining inference methods.

3. Implement a knowledge base that has been gained into the software (software) on rice plant diseases.

The function derived from this study are:

1. Add insight into the people who need the information the rice plant diseases.

2. Easier for people to be able to determine the types of rice plant diseases without having to experts directly (extension workers).

3. Complementary or aids in determining the type of rice plant diseases.

The scope of the Expert System for Rice Disease Diagnosis Using backward chaining method is as follows:

1. Methods of inference in expert systems is made by the method of Backward Chaining.

2. System on the rice plant disease determines the symptoms that exist in the disease.

3. The system is built using the programming language Prolog.

According Kusrini (2008) expert system can be defined as a computer-based application that is used to solve the problem, as is thought by experts. Meanwhile, according Arhami (2005) s istem expert (expert systems) can be defined as a software package or a package of computer programs intended as a provider of advice and aid in solving problems in a particular specialty areas such as science, engineering, mathematics, medicine, education and so forth.

According to Turban (2005) k onsep basic expert system includes several basic problems such as:

1. Experts

   Experts are people who have the knowledge, judgment, experience, and special methods, as well as the ability to apply these talents in giving advice and solving problems.

2. Expertise

   Expertise is the extensive knowledge that is specific to the task of expert owned. Expertise includes explicit knowledge, such as theory dipeajari from textbooks or class, and implicit knowledge gained from experience.

The three main components that appear in virtually every expert system is the knowledge base, inference engine, and user interface. In addition, the expert system includes additional components, namely knowledge acquisition subsystem, blackboard (work), explanation subsystem (justifier), and system repair knowledge. (Turban, 2005).

The Experts system have the following characteristics (Turban, 1995):

1. Limited to the domain of expertise.

2. Based on the rules / specific rule.

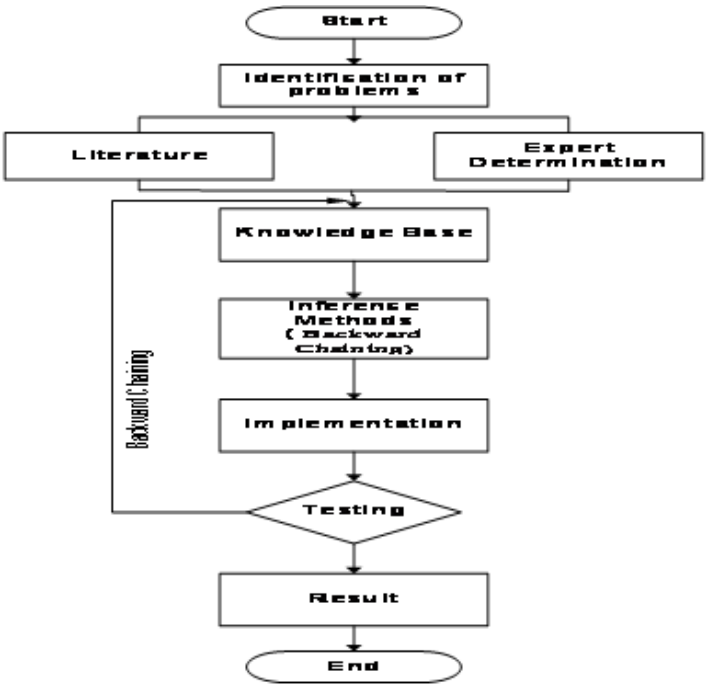

Figure 1: Main page of news aggregator

3. Can be used in various types of computers.
4. Easily modified, by adding or removing an ability of its knowledge base.

The system can activate the corresponding rules in the same direction, guided by a dialogue with the user.

According to Turban (2005) outline, many benefits that can be taken in the presence of expert systems, among others:

1. Increase output and productivity
2. Lowering time decision making
3. Improving the quality of process and product
4. Reduce downtime
5. Absorb rare skill
6. flexibility.
7. Operating the equipment easier
8. Elimination of expensive equipment needs
9. The ability to work with information that is incomplete or uncertain
10. Ability to solve complex problems.

Figure 2: List of news aggregator

2 RESEARCH METHODOLOGY

2.1 Inference Methods

According to Turban (2005) m achine inference can be defined as the most critical modules that expert system to function properly. Knowledge must be represented and organized appropriately in the knowledge base.Inference engine can use the knowledge to draw new conclusions from the facts and rules. Two approaches to draw conclusions about the forward chaining and backward chaining.

2.2 Forward Chaining Method (trace forward)

Forward Chaining methods seek first IF section. After all IF conditions are met, the rule chosen to get a conclusion. If the conclusions drawn from the first state, not of the latter, then it will be used as facts to conform to the rules of another IF conditions to get a better conclusion.

2.3 Backward Chaining Method (trace Balik)

Backward Chaining is a method of approach starts from the conclusion and the hypothesis that the conclusion is true. Inference engine then identifies the IF conditions necessary to make the correct conclusions and look for the facts to test whether the IF condition is true.

2.4 The Characteristics of Expert Systems

According to Turban (2005) forward and backward chaining characteristics are as follows: (Show in Table 1)

2.5 Types of Rice Diseases

Disease of rice plants have different types. The types of diseases of several books and experts include: bacterial leaf blight (BLB Bligh bacterial leaf), bacterial leaf striped (bacterial leaf streak), blast (blast), sheath blight (sheath blight), stem rot (stem rot), foul sheath (sheath rot), brown spot (brown spot), Cercospora spot (narrow brown leaf spot), leaf blight orange (red stripe).

Table 1: Characteristics of forward and backward chaining

Forward Chaining	**Backward Chaining**
Planning, monitoring, control	Diagnosis
Presented to the future	Presented to the past
Data guiding, reasoning from the ground up	Guiding purpose, reasoning from top to bottom
Work ahead to get a solution what follows the fact	Working backwards to get the facts support the hypothesis
Breadth-first search facilitated	Depth first search facilitated
Antecedent determining search	Consequently determine the search
The explanation is not facilitated	Explanation facilitated
Antecedent to consequent	Consequent to the antecedent

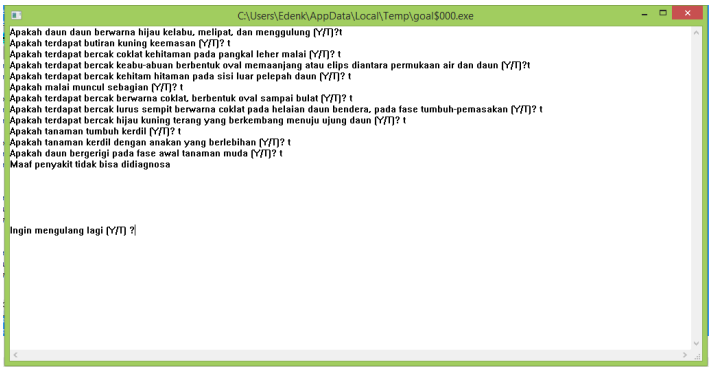

Figure 3: List of news based on categories

2.6 Framework

Framework show in Figure 1.

3 RESULT AND DISCUSSION

3.1 Consultation page

This page contains a consultation about symptoms questions that will be answered by the user, the user can answer the symptoms of the disease by answering yes or no. If the answer according to the symptoms of the disease will be detected and solutions. Figure 5.1. there are additional symptoms of each disease, the questionnaire also increased in accordance with the existing data on the symptoms of the disease. Show in Figure 2.

3.2 Page Fail Consultation

This page contains a failed consultation consultation in accordance with the symptoms and not the disease can not be diagnosed. Show in Figure 2.

3.3 Discussion Testing

In the engine there are two methods in which a forward chaining inference and backward chaining. Forward chaining will explore the facts first (looking for parts if / if), if all are met then it will be concluded.Backward chaining is the reverse of fordward chaining. This approach starts from the hypothesis to the conclusion or facts which justify a hypothesis.

In this study an expert system is more appropriate to use Rule Based Reasoning as a knowledge base which is based on the rules that already exist on the basis of his KNOWLEDGE n. By using backward chaininginference method for seen from the rule (rule) of the prologue is a visual script: - A1, A2, ... 's.

4 CONCLUSION

Based on the discussion in the previous chapter, the author can provide the following conclusions:

1. With the knowledge base of the rice plant diseases, it can be used as a source of knowledge for the user who wants to know the type of rice plant disease based on the symptoms that have been.

2. Development of expert system on rice diseases using the backward inference methods This chaining can check input symptoms and will be concluded on the type of disease experienced.

3. Expert systems in rice disease capable of producing accurate information and accompanied the solution of the problem solving.

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