



## Expert System Identification of Pest and Diseases of Rice using Html5

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**Abstract:** Rice plants vulnerable to diseases caused by pests and diseases. Handling against pests and diseases that slow, resulting rice plants could not grow well, and even the worst thing is to crop failure that can be detrimental to farmers. Instead precise handling and quick will make rice plants grow well and obtain a satisfactory result. In connection with that in this study, an expert system that use for the identification of pests and diseases of rice. The method used is the expert system rule-based reasoning. This expert system is making use of the programming language PHP and HTML5 while the MySQL database used. HTML5 is a new technology for web development has the advantage can be run on multiplatform, both personal computers and mobile devices. Data was collected through interviews with agricultural experts and from reference books. Expert system requesting a response from the user to the signs of pests and diseases of rice that appears on the computer interface, then the output of the possibility of pests and diseases that exist on the rice plants, as well as solutions to overcome pests and diseases of rice

**Keywords:** Expert system, rule-based reasoning, HTML5, pests and diseases of rice

### I. INTRODUCTION

Indonesia is an agricultural country that produces many food products. One product that is widely cultivated rice. Paddy rice plants grown as a crop that is essential for humans. Rice plants produce rice that is the staple food for half the world's population.

Farmers and the business person involved in the field of rice plants need information faster, detailed, precise and readily available on the types of pests and diseases in rice plants. However, the lack of people who are experts or specialists and the lack of information makes farmers find it difficult to deal with pests and diseases of rice.

Handling against pests and diseases that slow, resulting rice plants could not grow well, and even the worst thing is to crop failure that can be detrimental to farmers. Instead precise handling and quick will make rice plants grow well and obtain a satisfactory result. Information for pest and disease management solutions rice can be done by utilizing information technology. One form of utilization of informatics in the agricultural sector is by applying expert system. An expert system is a system that is trying to copy the human knowledge into a computer. The expert system can solve the problem as an expert [4]. Expertise man does not last long, can be lost because the expert died, stopped working or transfer employment. An expert system is a software that requires a computer to run. By using expert systems, expertise can be continuously used as long as the computer is turned on. An expert in the conclusion is influenced by several factors while an expert system that can perform with consistent findings. It is also in certain cases may lead to the end that much faster. An expert system is software, and the expert system can be customized so that it can be made the same expert system in large numbers and can work continuously.

This research applies an expert system that is used to obtain a solution of pests and diseases contained in rice plants. Users answer the questions displayed by the application then the expert system will show solutions for

pest and disease control. This expert system using HTML5 and multiplatform making it easily accessible using a personal computer or mobile device. Mobile devices are getting cheaper and easier will be the right choice for solution means of information about pests and diseases for farmers.

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### II. LITERATURE REVIEW

This expert system using rule-based reasoning. The rule-based expert system is a specialist system that represents knowledge using rules in the form: IF-THEN [7]. Expert system using IF-Then, if there are a number of expert knowledge on a particular issue, and an expert can solve the problem sequentially. Also, this form is also used when needed an explanation of trace achievement solutions.

An expert system for rice plants was examined using several methods one of which is a forward chaining method [3]. Forward chaining method is a data-driven method where the search begins taking facts first, and then the points are already used to draw conclusions. So the symptoms that occur in rice plants used as facts to draw conclusions about who contracted the disease on rice plants. Web-based expert system, but still could not be responsive when run on mobile devices.

An expert system for rice plants also based in addition to a web-based desktop [10]. Knowledge about the disease of rice in a computerized informed by the forward chaining inference method. Expert systems can assist extension workers in the Department of Food Crops and Horticulture

in carrying out their duties more efficiently. This expert system still uses a desktop device so that mobile devices can't run this system.

### III. DEVELOPMENT METHOD

This study uses a device consisting of two components, namely hardware and software. For hardware consists of Toshiba Satellite L745 laptop processor core i5 and mobile devices smartfren andromax u, while for software consisting of the operating system and application programming languages used.

Materials used in this study of the data obtained from interviews with agricultural experts and reference books on pests and diseases of rice.

#### A. Expert System

In completing this study requires stages comprising stages:

1. Identify the problem  
step at this stage is to map the problems that will be encountered during the making of expert systems.
2. Observation  
Observations are used in an attempt to get data and pictures of the various pests and diseases of rice plants.
3. Finding references and experts  
Stages find references are used to obtain information about various pests and diseases that have been identified by agricultural experts. Reference is taken from a book or ask directly with agricultural experts.
4. The design of the system  
Before an expert system created to design to make the DFD, ERD and interface design.
5. Making Applications  
Making an application is an implementation of the plan in the form of expert system applications.
6. Acquisition of knowledge  
Acquisition of knowledge is the process of testing the knowledge of experts into the expert system database.
7. Creating inference engine  
Make the inference engine is the process of connecting the various symptoms with solutions based on expert knowledge.
8. Testing  
Testing is done to ensure that the expert system has not found error.
9. The decision whether representing expertise?  
The decision is to check whether the system has resulted in a solution according to the expertise or not, if not then it will return to the stage of acquisition of knowledge.
10. Create a report  
The final part of the stage of the research is to make a report. These steps to create a document of all research activities.

#### B. Identification of problems

In this study, the author discusses the problem of how to make an expert system software that can diagnose pests and diseases in rice plants like an agricultural expert in diagnosing pests and diseases in rice plants. Expert systems require an expert to carry out the acquisition of knowledge.

Specialist in this study is Mr. Luluk Sulistiyo Budi as a consultant pests and diseases in rice plants.

Results of the consultation are then used to make the material an expert system that will address the problems of pests and diseases of rice. Issues discussed related to the data collection of pests and diseases, the cause of the data, the scientific name data, the data part of the attack, the attack symptom data, time data of the attack, the data in the attack, treatment and prevention of the problem.

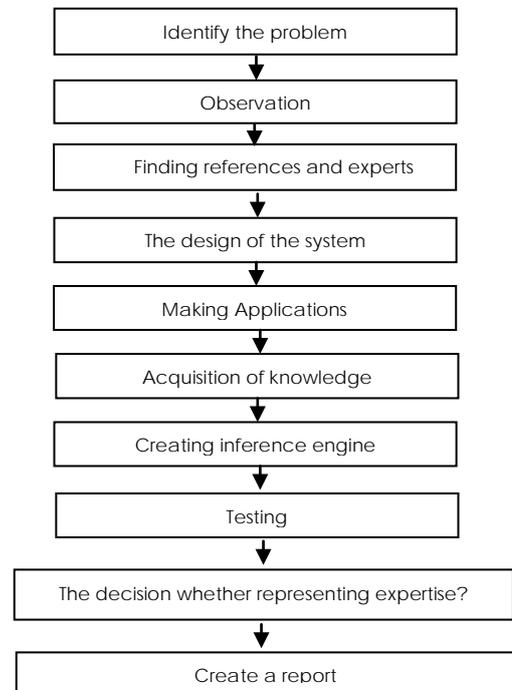


Figure 3.1 Stages Of Research To An Expert System

Expert system to be created using a forward chaining inference engine where the search begins taking facts first, then the facts are already used to draw conclusions. In this system symptom that occur in rice plants used as facts to draw conclusions regarding the pests and diseases contracted in rice plants.

This expert system using a web-based HTML5 and responsive to use techniques that can adjust the screen size on mobile devices. Making the web with the old techniques are still not using responsive techniques will result in a small display screen when run on mobile devices, making it difficult to read the time.

#### C. Knowledge Acquisition

Acquisition of knowledge in this system are the symptoms of pests and diseases in rice plants as well as the types of pests and diseases of rice plants. The acquisition of such knowledge will be presented in tabular form to the table knowledge, and this knowledge will be made a decision table and then made a rule. Knowledge acquisition authors take from reference books airy pest problem nutrients in rice[11].

#### D. Production Rule Analysis Pests And Diseases

Production rules written in the form if it (IF-THEN). Production rules can be said as the relations implications of two parts, namely the premise (if) and part conclusion

(then). The following are some of the rules that are used to identify pests and diseases of rice plants:

Rule 1 :

IF emergence of moths  
 AND sundep namely rice shoots death  
 AND Outs namely death panicle  
 AND caterpillar (larva) stem borer  
 THEN Stem Borer

Rule 2 :

IF leaves turn yellow  
 AND hopperburn namely rice dries quickly, burning  
 AND Vector dwarf virus disease and stunted grass hollow  
 THEN brown planthopper

#### IV. RESULT AND DISCUSSION

##### A. Implementation

Results of the research activities following the stages that exist in research methods it is now successfully built an expert system of pests and diseases of rice based web. Where these applications that use HTML5 using the bootstrap technique that has the advantage can adjust the screen size both on personal computers or on mobile devices. A web-based expert system that has been built subsequently uploaded to the hosting server that can be accessed by the general public using the internet media www.pakarpadi.com address.

##### B. Interface Applications

Expert systems can be accessed using a browser with www.pakarpadi.com addresses that have the initial view as shown in Figure 4.1.

Menu available in the application of this expert system is a menu of home, about us, consultation, gallery and contact. Menu about us can be seen in Figure 4.2 On the menu about us explain about expert systems



Figure 4.1. Menu Home

Menu consultation is the main menu of this expert system because the menu is used for the consultation process between the user and the system. Consultation menu displays shown in Figure 4.3.

Menu gallery used to display images of pests and diseases in rice. Menu gallery can be seen in Figure 4.4.

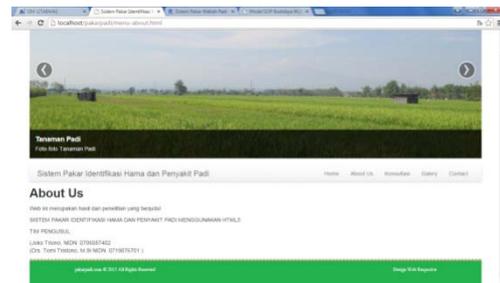


Figure 4.3 Menu Consultation

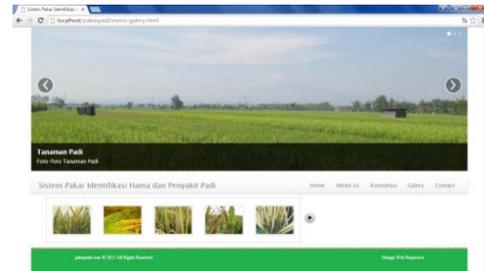


Figure 4.4 Menu Galery

Contact menu is used to contact the author either through a written message on the web or through the available addresses. Contact menu as shown in Figure 4.5.

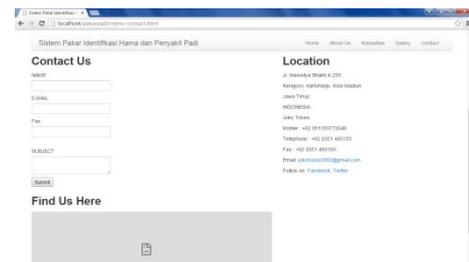


Figure 4.5. Menu Contact

##### C. Consultation Process

This expert system is used to consult the expert knowledge base has been stored into the database. The process to consult the user first entered into consultation menu then choose consultations pests or diseases such as picture 4.3. After selecting one of the menus systems will ask the name of the user after that will come to the questions in the form of symptoms will be adjusted paddy crop conditions. Questions about the symptoms can be seen in Figure 4.6. When finished answering a question will display the results of the consultation are available also a print menu that can be seen in Figure 4.7. The results of consultation using mobile devices that can be seen in Figure 4.8.



Figure 4.6. The questions that arise in the consultation process



Figure 4.7. Consultation results



Figure 4.7. the results of consultation using mobile devices

## V. CONCLUSION

Based on the implementation of the phases of research that has been conducted so far, it can be deduced as follows:

1. It has successfully built an expert system of pests and diseases of rice that uses HTML5.

2. An expert system has been tested on personal computers and mobile devices with the results of the application can adjust the screen size on each device.
3. Application can help farmers to know pest and a disease affecting their grain so fast find the solution.

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