EXPERT SYSTEM FOR DETECTION OF CORN DISEASE USING FORWARD CHAINING METHOD IN SUSTAINABLE FARMING GROUPBANDAR KUMBUL VILLAGE

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Article Info	Abstract
	One of the causes of the failure of hybrid corn cultivation activities is pests and diseases which are the result of complex or unbalanced interactions between the three components in weak aquatic ecosystems, ferocious pathogens and deteriorating environmental quality. With that, it is necessary to have an application that can help farmers to take care of corn plants so that they are not attacked by pests and diseases. The application system created in this study is an expert system that can analyze the types of diseases in corn. The expert system in this study uses the Forward Changing method. This expert system is expected to be able to assist farmers in solving farmer problems in detecting corn disease by making applications using WEB, with MySQL and Xampp databases.

1. INTRODUCTION

Plant expert systems use computer artificial intelligence. With artificial intelligence, computers can do things that were previously only done by humans. Humans can make computers as decision-makers based on how the human brain works in making decisions. One branch of artificial intelligence that is getting a lot of attention from scientists today is expert systems. One that is studied in artificial intelligence is an expert system using the Forward Chaining method.

The main pest found in corn plants is the seed fly (Atherigona sp.). Other pests found were stem borer (Ostrinia furnacalis), cob borer (Helicoverpa armigera), leaf eaters (Spodoptera litura), aphids (Rhopalosiphum maidis), grasshoppers and rats (Kalshoven, 1981). North Kalimantan has several corn-producing areas, according to BPS results, North Kalimantan Province experienced a decrease in 2015 by 203 tons (-16.44%) compared to 2014 production. The low corn yield was caused by many factors, one of which was pest attack (OPT). Based on the threat of production from these main pests, it is necessary to identify insects to find out the main types of pests that attack corn plants which can reduce corn production. Yield losses of up to 80% due to pest attacks can affect food security at regional and national levels.

Corn farmers in the Bandar Kumbul area are currently still using a manual system to diagnose corn plant diseases. Because in this very modern era, of course, you have to use a more accurate and efficient corn disease diagnostic system. The current diagnostic system can be said to be very manual and very prone to errors. So we need a solution to the existing problems by designing an expert system that is commonly used to diagnose corn disease that is more effective and efficient than using manual methods. Based on the description above, a study was conducted to create an expert system for diagnosing corn diseases that can help farmers' performance.

2. RESEARCH METHOD

Forward chaining is a sequential process that begins by displaying a collection of data or facts that convince to a final conclusion. The forward chain starts from the premises or input information (if) first then goes to the conclusion or derived information (then) or can be modeled as follows:
- IF (input information)
- THEN (conclusion)

In general, in forward reasoning inference (Forward Chaining) the rules will be tested one by one in a certain order. As each rule is tested, the system evaluates whether the condition is true or false. In other words, reasoning starts from facts first to test hypotheses. Forward chaining is data-driven because inference starts with available information and then conclusions will be obtained.

3. RESULT AND DISCUSSION

Based on the description of the problem above, the required system requirements are as follows Hardware in the form of an Intel Core i3 Laptop. For software needs in the form of Windows 10, Macromedia Dreamweaver 8, Xampp Control, Adobe Photoshop.

The Input Display contains an overview of the input display that will be generated from the system as follows:

Figure 1. Home view

The main menu display above is the first menu display that appears when run or opened on the http://localhost/jagung/home.php page. Contains home, login, gallery, information, and contact us buttons to continue to the login view.

Figure 2. Login View

In the image above, the login menu display explains how to use the designed system. Login here is useful for limiting access from a user and admin. In this view the user can perform the first process, namely logging into the system by entering the user name and password. If the user name and password are not correct then the user cannot enter the main menu.

Figure 3. Corn Data Input Display

The display above explains how the admin enters Corn data, by filling in some data that must be filled in before being marketed. The input display is responsible for entering commands and data for processing, later the data will be processed by the processing unit and produce output.

Figure 4. Criteria Data Input Display

The criteria data input display above explains how the admin enters Criteria data or by filling in some of the required data. The users can choose which disease to operate on. Because the author discusses corn disease, the user can select the disease data. In the corn criteria input master menu it contains menus kd_criteria, nm_criteria, ket, if the data has been filled in according to the corn criteria then the admin needs to save the data by clicking the save button and if it doesn't match then click the cancel button.

Figure 5. Symptom Data Input Display

The symptom data input display above explains how the admin enters symptom data or by filling in some of the required data. In the master input display for corn symptoms it contains the menu kd_gej, symptoms, ket, if the corn symptoms have been filled in according to corn disease then the admin needs to save the data by clicking the save button and if it doesn't match then click the cancel button.

Figure 6. Diagnostic Input Display

The display above explains how the admin enters the diagnostic process data, by filling in some data that must be entered before it is marketed. Diagnostic process data is data used to include various types of diseases in corn plants. Diagnostic process data will show several types associated with corn plant diseases. This display will make it easier for program users to recognize types of corn plant diseases.

The display output that will be generated by this system is as follows:

Figure 7. Corn Data Report Display

The corn data display above explains the display for reports from corn data and in this view the admin can directly print the report.
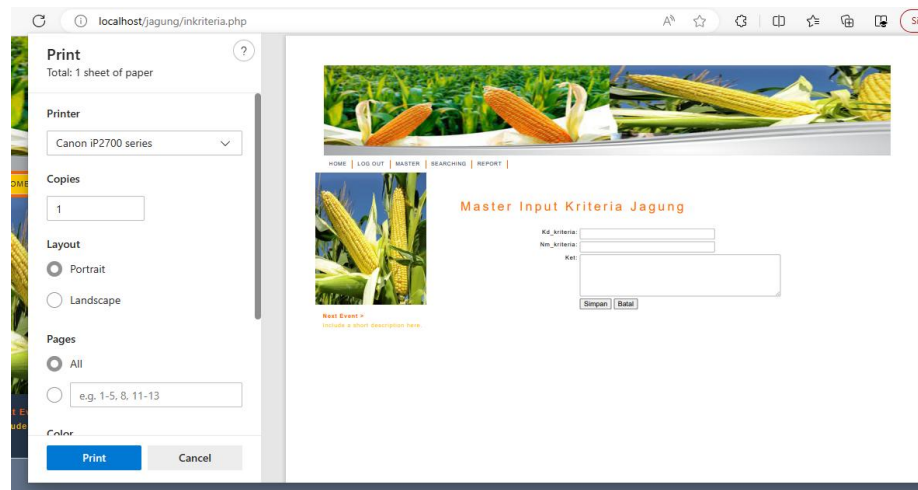
Figure 8. Criteria Data Report

The display above explains the display for reports from the criteria data and in this view the admin can print the report directly.
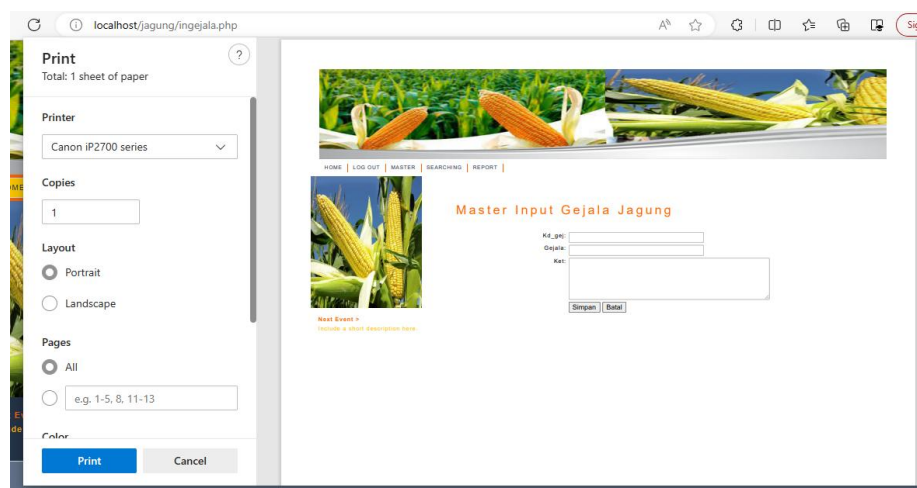

Figure 9. Symptom Data Report Display

The display above explains the display for reports from Symptom data and in this view the admin can print the report directly. the symptom data display is a display that is used to enter various types of symptoms in corn plants. The Symptom Form will display several Symptom names related to the Symptoms of corn plants. These names will make it easier for program users to recognize the types of symptoms of corn plants .
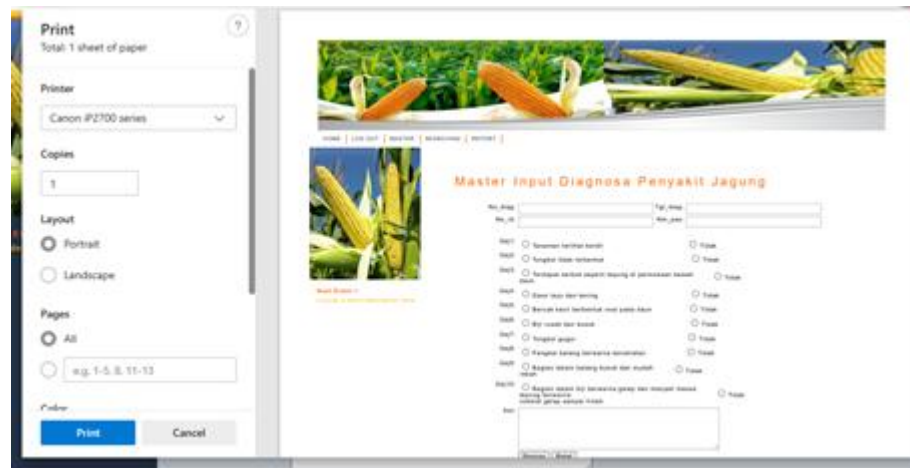
Figure 10. Diagnostic Process Output Design

The display above explains the display for reports from diagnostic data and in this view the admin can print the report directly.

4. CONCLUSION

In discussing the conclusions, here are some conclusions that the author will explain based on the preparation of the writing, namely the design made to facilitate the detection of corn disease. Proficiency in designing an expert system of diagnostic results that is presented flexibly and responsively. And also to store and process the author's data using the advantages of the PHP and SQL programming languages, the results of which are stored in a database (MySQL).

REFERENCE

[1]   A. Ramadhanu and R. Gusrianto, "Sistem Pakar Diagnosa Penyakit Rubeola Pada Anak Menggunakan Metode Forward Chaining Dengan Bahasa Pempograman Php & Database Mysql," J. Teknol. Dan Sist. Inf. Bisnis, vol. 3, no. 1, pp. 254–258, 2021, doi: 10.47233/jteksis.v3i1.216.

[2]   N. Purwati, "Identifikasi jenis serangga hama pada tanaman jagung (Zea mays) di Kota Tarakan," Identifikasi jenis serangga hama pada Tanam. jagung (Zea mays) di Kota Tarakan, vol. 2, no. 1, pp. 19–22, 2021, doi: 10.19184/jptt.v2i1.21607.

[3]   A. Ramadhanu and R. Gusrianto, "Sistem Pakar Diagnosa Penyakit Rubeola Pada Anak Menggunakan Metode Forward Chaining Dengan Bahasa Pempograman Php & Database Mysql," J. Teknol. Dan Sist. Inf. Bisnis, vol. 3, no. 1, pp. 254–258, 2021, doi: 10.47233/jteksis.v3i1.216.

[4]   D. Kurniadi, A. Mulyani, and S. Rahayu, "Implementasi Metode Forward Chaining Pada Sistem Pakar Diagnosis Keperawatan Penyakit Stroke Infark," Aiti, vol. 17, no. 2, pp. 104–117, 2021, doi: 10.24246/aiti.v17i2.104-117.

[5]   P. Sumber, D. Manusia, and K. Sumbawa, "Abstrak: Pelaksanaan pelayanan penyediaan dan pengelolaan data dan informasi kepegawaian belum maksimal, untuk informasi kepegawaian hanya disajikan apabila ada permintaan dari pihak," vol. 3, no. 2, pp. 316–325, 2021.

[6]   S. N. Irrawan, R. A. Simanjuntak, and M. Yusuf, "ISSN : 2338-7750 Institut Sains & Teknologi AKPRIND Yogyakarta Jurnal REKAVASI ISSN :," J. REKAVASI, vol. 7, no. 1, 2019.

[7]   D. D. Jantce TJ Sitinjak, . Maman, and J. Suwita, "Analisa Dan Perancangan Sistem Informasi Administrasi Kursus Bahasa Inggris Pada Intensive English Course Di Ciledug Tangerang," Insa. Pembang. Sist. Inf. dan Komput., vol. 8, no. 1, 2020, doi: 10.58217/ipsikom.v8i1.164.

[8]   S. R. U. A. S. Andy Antonius Setiawan, Arie S.M. Lumenta, "Rancang Bangun Aplikasi Unsrat E-Catalog," J. Tek. Inform., vol. 14, no. 4, pp. 1–9, 2019.