
Expert System Mediagnosa Hama On Phon Oil With Certainty Factor Method

Lamhot Situmorang¹, Fristi Riandari²

^{1,2}Informatics Engineering Study Program, STMIK Pelita Nusantara, Jl. Iskandar Muda No. 1 Medan, North Sumatra, Indonesia 20154

E-mail: tumranglamhot601@gmail.com

Abstract-The process of palm oil culture is influenced by various factors, one of the which is the pest and disease factors. Generally the problem of farmers differentiating pests and diseases, this is dyed most of the farmers lack information and Rely on the experience of other farmers to Overcome the existing pest and disease problems. In handling pests and diseases, it is Necessary to have a farmer consilant who is Able to diagnose pests and diseases on oil palm trees. In this study, an expert system for diagnosing pests and diseases in plants palm tree, as well as providing various solutions for pests or diseases. The method used in this expert system is the Certainty Fators method. Certainty Method The factors was chosen Because this method is suitable in the process of Determining the identification of pests and diseases, and the result of this application is the percentage of the system. The percentage is influenced by the CF value Obtained from the system, the percentage of expert systems Consultations is taken from the highest yield as an alternative to other pests or diseases that attack crops of oil palm tree.

Keywords : Pests and diseases, expert systems, Certainty Factors, Palm trees

1. Introduction

certainty Factor(CF) is a clinical parameter values given MYCIN to show how much confidence. In the face of a problem often found answers that do not have full certainty. This uncertainty can be a probability or keboleh invented that depends on the outcome of an event. The results are uncertain due to two factors: the rules that are uncertain and the uncertain answer to a question posed by the system (Hengki Tamando Sitohang, 2014).

2. Theory

2.1 Expert system

The use of the concept of artificial intelligence, it is generally done to make the software in the field of expert systems, which is a program that acts as an advisory or consulting clever. An expert system is a computer system that combines basic knowledge, facts and search techniques to solve problems that typically require the expertise of an expert (Arifin et al, 2017).

One application of artificial intelligence program is an expert system with a knowledge base that combines inference system, trying to duplicate the functions of an expert in a particular field of expertise. The system does not replace the position of an expert, but to popularize the knowledge and experience of an expert.

2.1.1 Basic Concepts of Expert Systems

Expert (Expert) is someone who is able to explain a response, learn new things about the subject matter (domain), rearrange knowledge if deemed necessary, break the rules if necessary, and determine whether or not relevant to their expertise. Diversion keahlian (Transferring expertise) of the experts to the computer then transferred again to other people who are not experts, it is this which is the main purpose of the expert system. This process requires four activities, namely:

- Additional knowledge (of experts or other resources)
- Representation of knowledge (to the computer)
- inference knowledge
- The transfer of knowledge to the user.

Knowledge is stored in the computer is called by the name of the knowledge base. There are two types of knowledge, namely the facts and procedures (usually in the form of rules).

One feature that should be owned by an expert system is the ability to reason. If the skills are already stored as a knowledge base and are readily available programs that can access the database, the computer must be programmed to make nferensi. The inference process is packaged in bentukmesin inference (inference engine). Most commercial expert system made in the form of rule based systems, where knowledge is stored in the form of rules. The rules are usually in the form of IF-THEN.

Another feature of expert systems is the ability to provide

advice or recommend. It is this ability that distinguishes the expert system with a conventional system.,

2.1.2 Disease

Plant diseases is something that deviates from the normal state, quite obviously cause symptoms that can be seen, lowering the quality or economic value, and is the result of a long interaction (Grace Rukmana and Sugandi Saputra, 2011). Here are some examples of diseases that often occur in oil palm plantations:

- a. Leaf spotting diseases
Biotic diseases which are found in the initial seeding is leaf spot disease caused by the fungus *Curvularia* sp., *Cochlibolus carbonus*, *Drechslera halodes* var *elaecolig* *Helminthosporium* sp., *Pestalotia* sp., *Cercospora* SP. and *Corticium solani* (Semangun, 2000).
- b. Heading Disease Leaves
Young plants are diseased leaves have many bends down in the middle pelepahnya. At this bend there is no child or a child leaves small leaves, or shredded. These symptoms begin to appear on the leaf. In here children are still folded leaves it looked rotten at the corner or the middle. For a while plants stunted but will eventually heal itself. However there are times when the plants are recovered had become a sore back, which will be cured permanently. Its Countermeasures namely by selecting sires that do not have the nature of this disease Karie but using a more healthy broodstock
- c. foul buds
This disease can attack oil palm trees with symptoms mence-
ring the shoots and when cleaved will emit a foul odor. The disease attacks a plant that went into production and has production. This disease can lead to death of the plant, and when the attack took place very quickly into the growing point. The cause of the disease the same as the cause of rot and fall fruit buds on the plant oil that is *Phytophthora* sp. (Semangun, 1990). Birds that by cutting the buds are attacked, and also be able to use fungicides and herbicides, but more effective is the cutting diseased buds.

2.2. Certainty Factor (Certainty Factor)

Factor indicates the level of confidence in the certainty of an event (fact or hypothesis) based on expert judgment. Certainty factor can be represented by a range of values from 0 to 100. The different certainty factors with probability (Turban, 2005).

Results diagnosis expert system in the form of a percentage of the disease. Percentage of disease is used for diagnosis is the largest percentage. Percentage acquired disease of certainty factor value calculation based on symptoms chosen by the user. Certainty factor value calculation as follows.

- a. Calculating the value CF
$$CF [H, E] = MB [H, E] - MD [H, E]. \dots \dots \dots (1)$$

Information :

- CF (H, E) : *certainty factor* of the hypothesis H that are affected by symptoms (evidence) E. The amount of CF ranging from -1 to 1. A value of -1 shows the absolute distrust, while a value of 1 indicates absolute confidence.
- MB (H, E) : Measure of confidence (*Increased measure of belief*) Against hypothesis H that are affected by the symptoms of E.
- MD (H, E) : Size distrust (*Increased measure of disbelief*) Against hypothesis H that are affected by the symptoms of E.

- b. Calculating the Value CFcombine
$$CF_{combine} CF [H, E] 1.2 = CF [H, E] 1 + CF [H, E] 2 * [1 - CF [H, E] 1]. \dots \dots \dots (2)$$

3. Research methods

The research design used by the author during a study at PTPN IV Adolina Perbaungan Bedagai Serdang is using descriptive analysis method. In the first stage the author conducted by collecting data and materials required in advance, and at a later stage writer process and discuss come to a conclusion that, ultimately, make a report to attach all the activities carried out during the research in PTPN IV Adolina Perbaungan District Serdang Bedagai.



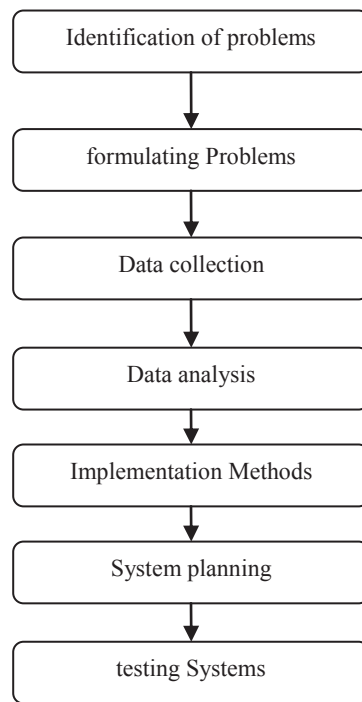


Figure 1. Flowchart of Research Methods

4. Analysis

Pests and diseases. Besides influenced by environmental factors such as climate also caused by some other factor that is the lack of education and lack of technical guidance to farmers in giving initiative and motivation in managing their garden which resulted in a decline in production.

4.1 analysis Methods

The method used so that users' needs can be met by using certainty factor method. Certainty factor method is one method of certainty on the symptoms experienced. To ensure the certainty of the symptoms are described in the weights certainty.

Table 1.
Weight of Certainty

Term certainty	Value CF User
Sure	≥ 0.8
Enough	0.4 to 0.8
Less	≤ 0.4

4.2 Calculating the value of Certainty Facor

The order of the process undertaken in diagnosing pest on oil palm trees on this expert system is to first determine the value of expert and user whose aim is to get the value of CF for each symptom as in the following table:

table 2
The value of expert and user weight

Code	Disease symptoms	CF Expert	Value	Value CF User
G001	Young leaves rolled	0.4		0.6
G002	Yellow leaves dry up	0.5		0.8
G003	Decay bunches of flowers	0.5		0.4
G004	Bunches of flowers do not open	0.5		0.6
G005	The leaves change color to the color of bronze lightning	0.7		0.6
G006	Nurseries damaged	0.6		0.8