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## Expert System For Personal Computer Mendiagnosa kerusakan Method Using Certainty Factor

Yunus Simare-mare<sup>1</sup>, Fristi Riandari<sup>2</sup>

<sup>1,2</sup>Informatics Engineering Study Program, STMIK Pelita Nusantara, Jl. Iskandar Muda No. 1 Medan, North Sumatra, Indonesia 20154

E-mail:lhoyunus@gmail.com

***Abstract**—Along with the development of information technology, computers today have developed rapidly so that they require a higher technology world. Nowadays computers can be made in the category of human needs, Because they can help or human Facilitate work in various fields. The use of computer laboratories at Sei Bamban YAPIM Private Vocational School is very dense, so the level of computer damage is greater, both in terms of hardware and software. Here the author will discuss Expert Systems to Diagnose Damage to Personal Computers, the Certainty Methods Method is one of the Expert System Methods to Be Able to diagnose damage to a Personal Computer. In this case the Certainty Factor method is used to diagnose damage to the Personal Computer through existing symptoms. The damage is taken from symptoms that may occur and then given a decision and provide Appropriate solutions to Overcome damage to the Personal Computer. The symptoms of damage to the Personal Computer will then be changed in the form of applications. To create an application the author uses Microsoft Visual Studio 2010. This thesis will explain the damage report and solutions for Personal Computer.*

*Keywords: Expert System for Diagnosing Personal Computer Damage, Certainty Factor Method,*

### 1. Introduction

The development of Information Science and Technology is currently very influential in the world of education, business and in everyday life. many benefits from the development of Science and Information Technology as the ease of accessing information quickly, a medium of learning for education, and so on. Expert System (Expert System) is a computer-based system that uses knowledge, facts and techniques in solving problems that normally can only be solved by an expert in the field. Vocational School (SMK) Private YAPIM Sei Bamban Having a computer lab that is used as a proposition for Teaching and Learning Activities (KBM). The use of computers in the lab are also very solid in accordance with the schedule of teaching, so the risk of damage to the Personal Computer (PC) becomes larger. Diagnosing damage to personal computer (PC) using the method of Certainty Factor can help identify damage to the PC based on the symptoms that arise and provide solutions for damage tersebut. Metode this is a method to prove the uncertainty of thinking of a master,

### 2. Theory

#### A. Certainty Factor Method

Certainty factor method is a method used to resolve cases of uncertainty, where the size is based on a fact or rule. Certainty Factor is a numerical value of an evidence received as a conclusion.

Certainty Factor (CF) is a clinical parameter values given MYCIN to show how much confidence. CF indicates the size of the certainty of the fact or rule. CF uses an assumed value for the degree of belief in an expert to the data. Certainty factor introduces the concept of confidence and uncertainty are then formulated in the basic formula. There are two ways to get the level of confidence (CF) of a rule, the method of "Belief Net" proposed by EH Shortliffe and Buchanan BG and interview an expert.

As for the formula of certainty factor method is as follows:

$$CF(\text{Rule}) = MB(H, E) - MD(H, E)$$
$$MB(H, E) = \frac{\max(P(H|E), P(H) - P(H))}{\max(1, 0 - P(H))} \text{lainnya}$$
$$MD(H, E) = \frac{\min(P(H|E), P(H) - P(H))}{\max(1, 0 - P(H))} \text{lainnya}$$

Information:

CF : *certainty Factor*

MB (H, E): Measure of Belief (ukuran trust) against hypothesis H, if given evidence E (between 0 and 1)

MD (H, E): Measure of Disbelief (a measure of distrust) towards evidence-H, if given evidence E (between 0 and 1)

P (H) : *probability* (The probability of the truth of the hypothesis H)

P (H | E): The probability that H is really due to the fact E,

### 3. Results and Discussion

#### A. Problem analysis

Analysis is very berpengaruh terhadap stage next process, where the goal is for systems that already exist today that will be developed later. The process for diagnosing damage to personal computer (PC) dibahas in the application of expert systems using certainty factor.

#### B. Discussion

In the operation of a personal computer, of course, we often encounter the problem of damage in use or operate a personal computer, as often happens very long loading, keyboard / mouse dead at a blank error monitor, and so on. This can be caused by a lack of care on a personal computer or the components of the personal computer has begun to weak or damaged, then it needs to do analysis on a personal computer proficiency level if necessary dilakukan maintenance and repair. Personal computers in the damage analysis method used is the certainty factor method. The stages were carried out to analyze the damage to personal computer are as follows:

##### a) Data analysis

The data analysis consists of three, namely, as following:

###### 1) Research Sites

In a research settlement expert system for diagnosing damage to the personal computer (PC) is done in private vocational YAPIM Sei Bamban.

As for the things which the authors observed in this study are as following:

- symptoms of Damage
- type of Damage
- Damage Solutions

##### b) System Requirements Analysis

In systems engineering and software engineering system needs analysis include the determination of the needs of the jobs or conditions to be fulfilled in a new product or product changes, which take into consideration the various needs that intersect between the various stakeholders. The need of the results of this analysis should be carried out, measured, tested related to the needs identified and defined to the level of detail sufficient for system design. As for the necessity of the system is as follows:

###### a. Functional Requirements

Functional requirements is a description of the activities and services that must be provided by the system. Things become functional requirements are asfollowing:

- *input*

Data inputs are used in expert systems of a predicament is the symptom data damage the personal computer.

- *Process*

To produce output, the expert system will process the data with certainty factor method.

- *output*

Processes performed by the expert system to diagnose damage to personal computer (PC) will produce output in the form of damage along with damage solutions.



Fig 1. Functional Requirements.

#### b. Non-Functional Requirement

Non-functional requirements are requirements by sistem yang aims to support the functional requirements that have been determined.

- performance  
A system built to provide accurate results.
- Easy to use  
The system is built easily used by anyone, without having to go through an expert.
- Economical  
With this system, can reduce the cost of care as well as improvements on the personal computer.

**c) Built Systems Analysis**

Analysis carried out by the system built several steps:

- Identifying the symptoms of damage to the personal computer.
- Diagnose or determine the type of personal computer damage.
- Providing solutions or advice against such damage.

To build this system, the author uses the method certainty factor in the decision. This system can make the diagnosis of damage to the symptoms of damage on the personal computer. This uncertainty can be a probability that depends on the results of a symptom. Mengmasukkan dalah fault symptom will result in the kind of damage that is not certain.

**C. Certainty Factor Analysis Method**

In this study, to build an expert system application authors use the programming algorithm Visual Basic application using Microsoft Visual Studio 2010 for the design of the system and Microsoft Office Access 2007 as the medium used to build a database, which will be used as a medium for data storage of symptoms -gejala damage, type of damage and damage diagnostics solutions for personal computers, as well as input and output media on the design of the system.

The technique used to download diagnosis of damage to the personal computer is using a technique or method for menggunakan metode certainty factor is very appropriate to look for a certainty, and this technique can also be used for other research such as diagnosing heart diseases, diseases of animals / livestock, and so forth. Here is the algorithm of the system at the completion of the expert system to diagnose damage to personal computers, namely:

- 1) Inserting a PC damage symptoms.
- 2) Enter the type of damage to the PC.
- 3) Including the value of MB (measure of Increased belief) the size of the increase kepercayaan MD (measure of Increased disbelief) the size of the increase in distrust.
- 4) Determining the production rule (rule).
- 5) Calculation methods certainty factor (CF).
- 6) The calculation result and diagnosis of damage.

**d) Inserting a PC Damage Symptoms**

Here are the symptoms of damage to the PC:

**Table 1**  
Symptoms Damage to the PC.

Symptoms code	Symptoms name
G01	Lamp power die
G02	Alarms do not live
G03	CPU fan occasionally spinning / sometimes not
G04	There is no display on the monitor / no signal
G05	Dirty RAM / loose
G06	Reading system motherboard RAM installed
G07	processor heat
G08	Bad sectors on the disk
G09	There is a faulty electronic components on the motherboard
G10	Power supply is not stable
G11	VGA gross / loose
G12	Operating system damaged
G13	Over load in the operation of computer
G14	Chipset motherboard or VGA too hot (over)
G15	Processor heatsink fan death
G16	Lock heatsink loose or broken

