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Implementation of Expert System in Diagnosing Torch Disease Using The Certainty Factor Method

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ABSTRACT

The development of science and technology is currently very fast in line with the increasingly high human needs. Technology that develops in accordance with the demands of the times is a very supportive means of dealing with various problems that exist in hospitals, agencies and other organizations. TORCH disease is not a disease that cannot be cured but must be watched out for especially in pregnant women because of the consequences that can occur to the fetus such as physical disabilities, mental disabilities or spontaneous abortion. TORCH stands for Toxoplasma, Rubella, Cytomegalovirus and Herpes II. Expert system application to determine the TORCH virus using the certainty factor method.

1. Introduction

The development of science and technology is currently very fast in line with the increasingly high human needs. Technology that develops by the demands of the times is a very supportive means of dealing with various problems that exist in hospitals, agencies, and other organizations. Computers are electronic devices that function to process data by using certain programs to produce information[1]. In general, an expert system is a system that tries to adopt human knowledge to a computer, so that computers can solve problems as experts do[2]. A good expert system is designed to be able to solve a certain problem by imitating the work of the experts.[3]

TORCH disease is not a disease that cannot be cured but must be watched out for, especially in pregnant women because of the consequences that can occur in the fetus such as physical disabilities, mental disabilities, and spontaneous abortion. There were 225/100 live births of malformed children, partly due to the TORCH infection factor. Rubella infection is very dangerous for pregnant women, it can cause abnormalities in the baby, if the infection occurs in the first month of pregnancy, the risk is 50% of babies born with defects and if it occurs in the trimester, the risk is 25%. CMV infection is caused by the Cytomegalovirus and this virus belongs to the Herpes family of viruses. Like other herpes families, the CMV virus can live latently in the body and CMV is one of the causes of infection that is dangerous for the fetus if the infection occurs during pregnancy.

2. Methods

2.1 Problem Analysis

The analysis stage is intended to analyze the data that has been obtained which is then used to make an expert system application to diagnose the TORCH virus using the certainty factor method.

2.2 TORCHVirus Analysis

This is very important to do because it will determine the next knowledge that will be required in the system[4]. From the system structure we will find the problem, then find a conclusion to the problems faced.

2.3 TORCHVirus Identification

At this stage, we need to identify the type of TORCH virus for the input required to determine the type of TORCH virus using the certainty factor method.

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No	Virus Code	Type of Virus
1	P1	*Toksoplasma*
2	P2	*Rubella*
3	P3	*Cytomegalovirus/cmv*

2.4 Symptoms Identification OnTORCH Virus

At this stage, identify the symptoms of several types of TORCH virus using the certainty factor method that has been given by a doctor (expert) who is an expert in the field of the TORCH virus during an interview at a hospital. The following is data on the symptoms of the TORCH virus that have been analyzed:

a. Continuous spots when pregnant
b. Abnormal fetus development
c. Grape pregnant
d. The death of fetus between seven and eight months of pregnancy
e. Miscarriage
f. Babies born with glaucoma
g. Blindness
h. Low weight
i. Cloudy cornea
j. Damage or calcification of the brain
k. Harelip
l. Deaf
m. Endocrine disorders, eg. hypo
n. Difficult to speak
o. Continuous miscarriage
p. Enlargement of the head, reduction of the head, transparent body, or swelling on the legs and hands
q. Yellow skin
r. Inflammation on the lung
s. Cell damage in central nerve
t. Mental deterioration such as deafness and blindness

2.5 Determine the Quality of the Certainty Factor Value

The stages of determining the weight of the certainty factor (CF) are the steps to determine the value of trust and the value of distrust for each symptom of the TORCH virus.

2.6 These are the concept for determining CF quality.

a. By review from the results of the interviews with doctors at the hospital. The CF (Rule) value is obtained from the expert's interpretation of terms into a certain MD / MB value.
b. Provide the CF quality value for the symptoms of the TORCH virus

2.7 Decision Tree:

Although the rules can be directly generated from the decision table, to produce an efficient rule there is a step that must be taken[5], it was Decision Tree.

2.8 Decision Table

The analysis of the TORCH virus expert system according to the interview at the hospital was made into a decision table. So it is easier to read the symptoms of the virus and the type of TORCH virus.

2.9 Flowchart System Method

The flowchart on diagnosing the TORCH virus is carried out after the flowchart analysis is complete and clearly defined. Flowcharts are used to develop engine infrastructure machines using a certainty factor method to determine the diagnosis of the TORCH virus.

2.10 Certainty Factor Method

The Certainty Factor (CF) is a method used to solve cases of uncertainty[6], where the measure is based on a fact or rule. Expert system application was used to determine the TORCH virus using certainty factor methods.

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3. Result and Discussion

The interface can be described as follows

3.1 LoginForm

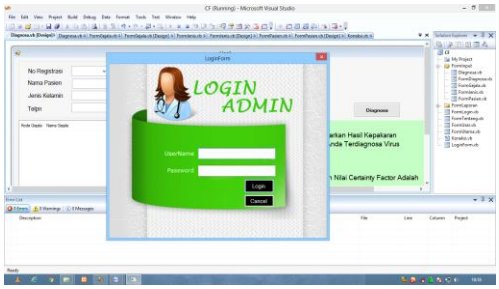

Fig 1. Login Form

Form Login is the first screen that will appear on the system to diagnose the Torch virus to enter the program.

3.2 Main Menu Form

Fig 2. Main Menu

*Main Menu Form*is a form that appears when the login form is successfully entered. In this form, you can find many menu or buttons that can be used to invoke the required forms.

3.3 Patient Input Form

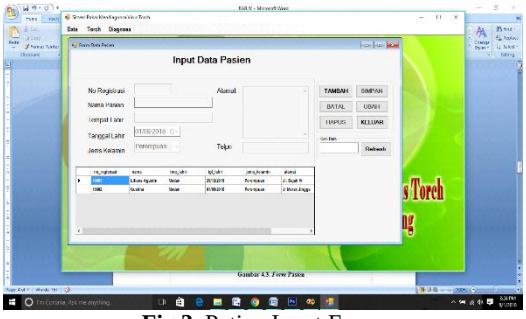

Fig 3. Patien Input Form

This form is intended for experts who will enter patient data for visiting patients. To enter data, we just need to click the add button, to fill in the data, after everything has been input, then press the save button if you want to save the data into the patient table..

To delete the data, click the delete button, but before that, click the patient's name on the listview to be deleted.

3.4 Disease Input Form

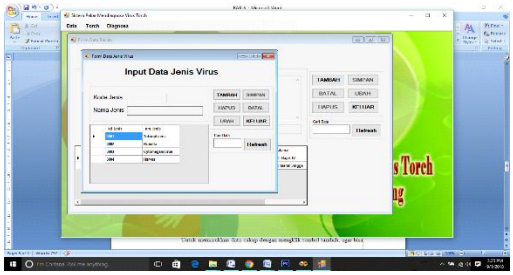

Fig 4. Disease Input Form

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This form is intended to enter data on the type of disease that is used as the material in determining the type of disease

To enter the data, we just need to click the plus button, so that you can fill in the data. After everything has been entered, then press the save button if you want to save the data into a table of disease types.

To delete data, click the delete button, but before that, click the patient's name on the listview to be deleted.

3.5 Symptoms Input Form

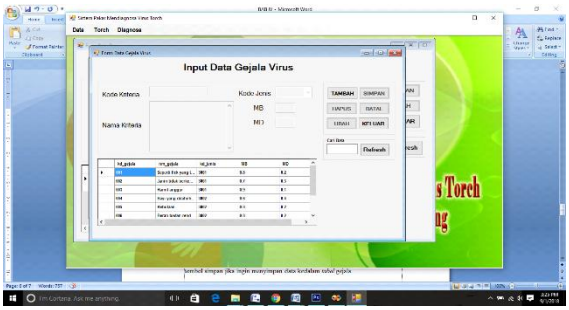

Fig 5. Symptoms Input Form

This form is intended to enter symptom data which is used as material in determining symptoms,

To enter data, we click the plus button, then we fill in the data to be input, after everything has been inputted, press the save button to save the data into the symptom table.

To delete the data, click the delete button, by clicking the patient's name on the listview to be deleted.

3.6 Diagnose Form

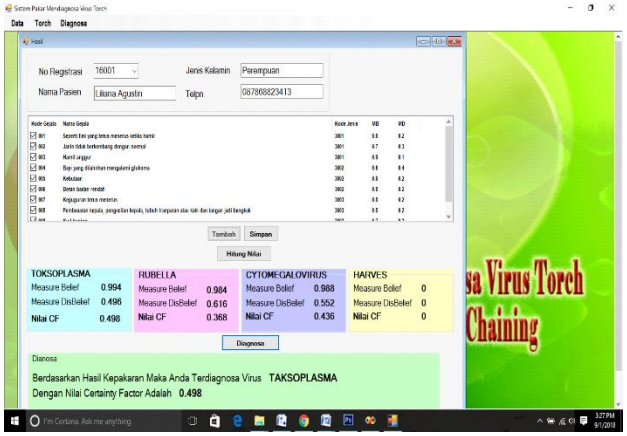

Fig 6. Diagnose Form

Symptom data is a more detailed description of factor data.

In the diagnosis form, we press the add button so that everything that is being inputted can function then click the registration number to find which patient will be diagnosed then give a checklist to determine what symptoms that being experienced by the patient, after the checklist is complete, then click the calculate button to calculate the certainty value of the certainty factor method, and the last step is to click the diagnosis button, it is useful to know what disease diagnosis the patient will experience, then press the save button so that all diagnoses are stored in the diagnosis table.

4. Conclusion

Based on the research and discussion conducted, the conclusion can be described as follows:

a. There are 3 parts of the TORCH virus. The part of the cause is obtained from the answers to the questions given by the system ,so a diagnosis will be made of what caused the TORCH virus.
b. This TORCH virus can also be classified according to the type of virus and the symptoms experienced by the patient.

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5. References

[1] Yulianti Paula Bria, Engelbertus Agung ST (2015), "Development of Web-based Tuberculosis and Dengue Diagnosis Expert System using the Certainty Factor Method" . KatolikWidyaMandira University, Kupang

[2] Putu Hendra S, (2012), " The essence of the rule-based system framework using Certainty Factors, with forward and backward sequences" .

[3] FeriFahrur R dan Ami Fauzijah (2008), "Expert System Application Build Design to Determine Types of Developmental Disorders in Children" , Islam University ,Yogyakarta.

[4] AsiamanSinurat dan Harvei Desmon H (2015), "Expert System for Diagnosis of Diseases in Cocoa / Cocoa Plants Using the Certainty Factor Method" , STMIK Budi Darma Medan

[5] I Made S, Ni Wayan W (2009), "Expert System Build Design To Repair Speed And Connection Failure Of External Equipment On Personal Computers" , Udayana University, Bali

[6] Sri Yastita, Yohana Dewi L dan Rika Perdana S, (2012), " Expert System of Skin Diseases in Humans Using Web-Based Certainty Factor Methods" , CaltexPolytechnic, Riau