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HYBRITE METODE OF ANALYSIS IN GYNECOLOGY DIAGNOSIS

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Abstract

Gynecological disease (gynecology) or the uterus is a muscular organ that forms a pear that is located between the bladder and rectum. Most women often make changes in the uterine area but sometimes women assume about the facts that appear as facts that are common to women, even though this problem is a symptom of a dangerous disease. Collection of diseases is a disease that can resolve death, so it needs to be diagnosed early. This research will develop the application of an expert system to detect early and diagnose diseases contained therein. Disease diagnosis analysis performed by expert system software development, software requirements analysis consisting of user needs analysis, system requirements analysis and complaints engineering design where in the making of this software engineering the data collected is represented as a knowledge base, rule base and machine design inference with the fuzzy mamdani method also takes decisions and the end result uses a weighted average value. Application developed using PHP and MySQL based, so that this application can be accessed from anywhere and delivering information about compilation disease is easier and faster.

Keywords: **Queue Systems, Bank, Customer, Visual Basic 6.0, Ms. Access**

1. Introduction

So many health problems that arise in women past and present, especially in the womb. The uterus is a pear-shaped muscular organ that is located between the bladder and rectum which functions as menstrual blood discharges with marked changes and release from the endometrium. Most women often experience disorders of the uterus but sometimes women assume that the symptoms that arise are common symptoms that often occur in women, even though these symptoms may be symptoms of a dangerous disease. Knowledge about the symptoms and types of uterine disease itself is still not widely known by women [6]. Women who experience disorders or abnormalities in the uterine area he will go to a specialist to consult, but in reality not everyone can do it. This can be due to economic factors that are insufficient or due to busy demands, there are also disadvantages such as doctor's working hours which are limited. The problems handled by an expert system not only rely on the algorithm, but sometimes also problems that are difficult to understand. These problems can be overcome by an expert with his knowledge and experience. Therefore an expert system is built not based on a particular algorithm, but based on knowledge base and rules [1].

According to [9] and [10] Expert System is part of artificial intelligence. Artificial Intelligence has several interrelated parts, namely; machine learning, expert systems,

fuzzy systems, metaheuristic algorithms, etc. especially in this case part of artificial

intelligence, namely expert systems using various virtues in knowledge, actions, and methods, to solve a problem. An expert is someone who has a lot of experience, basic knowledge and special expertise in a particular field.
Based on the statement above, it can be said that experts have special knowledge or expertise in certain fields that most people do not have [11]. According to [9] and [12] experts can solve problems that are rarely solved by others, and provide solutions or decision-making to problems easily and cheaply in solving these problems.Based on the description above, the authors conducted a study to diagnose uterine disease with an expert system and used the fuzzy method is the Mamdani method. According to the [13] and [14]

The application of fuzzy-Mamdani in an expert system aims to represent and display expert knowledge in an uncertain environment. It can be implemented in an integrated system both online and offline, incomplete, but very complex. so that they can be trusted to make decisions with valid and trustworthy presentations. Knowledge about the symptoms and types of uterine disease itself is not known by women. Because of this problem, the researchers built an expert system to help the community, especially women, to find out what types of uterine diseases would be known by the fuzzy mamdani method [15]. With the aim, this system can be useful to help women to detect early and diagnose uterine diseases and determine the types and symptoms faced by sufferers. The application will be developed using PHP and MySQL-based, so that this application can be accessed from anywhere and delivering information about uterine diseases is easier and faster.

2. Method

So many health problems that arise in women past and present, especially in the womb. The uterus is a pear-shaped muscular organ that is located between the bladder and rectum which functions as menstrual blood discharges with marked changes and release from the endometrium. Most women often experience disorders of the uterus but sometimes women assume that the symptoms that arise are common symptoms that often occur in women, even though these symptoms may be symptoms of a dangerous disease. Knowledge about the symptoms and types of uterine disease itself is still not widely known by women [6]. Women who experience disorders or abnormalities in the uterine area he will go to a specialist to consult, but in reality not everyone can do it. This can be due to economic factors that are insufficient or due to busy demands, there are also disadvantages such as doctor's working hours which are limited. The problems handled by an expert system not only rely on the algorithm, but sometimes also problems that are difficult to understand. These problems can be overcome by an expert with his knowledge and experience. Therefore an expert system is built not based on a particular algorithm, but based on knowledge base and rules [1].

According to [9] and [10] Expert System is part of artificial intelligence. Artificial Intelligence has several interrelated parts, namely; machine learning, expert systems, fuzzy systems, metaheuristic algorithms, etc. especially in this case part of artificialintelligence, namely expert systems using various virtues in knowledge, actions, and methods, to solve a problem. An expert is someone who has a lot of experience, basic knowledge and special expertise in a particular field.Based on the statement above, it can be said that experts have special knowledge or expertise in certain fields that most people do not have [11]. According to [9] and [12] experts can solve problems that are rarely solved by others, and provide solutions or decision-making to problems easily and cheaply in solving these problems.Based on the description above, the authors conducted a study to diagnose uterine disease with an expert system and used the fuzzy method is the Mamdani method. According to the [13] and [14] the application of fuzzy-Mamdani in an expert system aims to represent and display expert knowledge in an uncertain environment.

It can be implemented in an integrated system both online and offline, incomplete, but very complex. so that they can be trusted to make decisions with valid and trustworthy presentations. Knowledge about the symptoms and types of uterine disease itself is not known by women. Because of this problem, the researchers built an expert system to help the community, especially women, to find out what types of uterine diseases would be known by the fuzzy mamdani method [15]. With the aim, this system can be useful to help women to detect early and diagnose uterine diseases and determine the types and symptoms faced by sufferers. The application will be developed using PHP and MySQL-based, so that this application can be accessed from anywhere and delivering information about uterine diseases is easier and faster.

Variable	Variable Himpunan	Range
Vagina Bleeding Variable During or After Sex	Low	12– 14,5
	Normal	14 – 17,5
	High	17 - 20

RESULTS AND DISCUSSION

In conducting data analysis, the data will be grouped into several groups, some of the data needed is the patient's name, symptoms of uterine disease, name of the uterine disease and range of symptoms that arise. From some of the data that has been collected, an analysis is carried out so that the data will be grouped into fuzzy sets that can process using the Mamdani Fuzzy system.

This stage begins by specifying input variables that will be used to determine the type of uterine disease as its output. Simple Moving Average Forecasting Method.

Fuzzyfication

There are 19 main variables for input and 5 output variables to determine the type of uterine disease. As seen in table 1.

	Variable Symptoms of Gynecology	*Semesta*
Input	Disease or pressure during urination	1 - 6
	Vaginal bleeding during / after sex	12 - 20
	Pain in the pelvic area	45 - 63
	Bleeding during menstruation or outside menstruation	1 - 6
	Pain in the bladder or other pelvic organs	7 – 11
	At the bottom of the stomach the uterus feels rubbery	1 – 6
	Urinary pain or lower abdominal pain	20 – 46
	Headache and often tired	1 – 6
	Pain or pressure during urination	16 - 27
	No appetite, Progassive weight loss	7 – 16
	Swelling in the legs	1 – 6
	Pathogonic vaginal discharge	20 – 46
	Is there dirt (vaginal discharge)	24 – 50
	Pink or brown vaginal discharge	9 – 18
	Light bleeding	1 - 6
	Pain in the vaginal area regularly	1 – 6
	Pain when it comes to sex	57 – 65
	Pubic itching, burning sensation 55	50 – 68
	Redness or lower abdominal pain	20 - 36
Output	Cervical cancer	1 - 99
	Miyoma Uteri	1 - 99
	Cervical cancer	1 - 99
	Servistis	1 - 99
	Leucorrhoea	1 - 99

Table 1.Fuzzyfication

1. Analysis for pain or pressure during urination variable

Pain variable or pressure during urination variable has a value that expressed as low, normal, and high conditions. Where each condition has a predetermined range of values from the doctor. The specified value ranges from values 1 - 6. The fuzzy set for input 1 is shown in table 4.

Table 4. Fuzzy Set Pain or Pressure During Urination

Variable	Variable Himpunan	Range
Pain or pressure during urination	Low	1 – 2,5
	Normal	2 – 4,5
	High	4 - 6

2. Analysis for vagina bleeding during / after sex variable

Vagina bleeding during / after sex variable has a value that expressed as low, normal, and high conditions. Where each condition has a predetermined range of values from the doctor. The specified value ranges from values 12 - 20. The fuzzy set for input 2 is shown in table 5.

Table 5. Fuzzy Set Vagina Bleeding During / After Sex

1. Analysis for Pain in the pelvic area variables

Vaginal bleeding varible during / after sex has a value expressed as low, normal, and high conditions. Where each condition

has a predetermined range of values from the doctor. The specified value ranges from values 45 - 64. The fuzzy set for input 3 is shown in table 6.

Table 6. *Fuzzy Set* Pain Variables in The Pelvic Area

Variable	Variable Himpunan	Range
Pain Variables in The Pelvic Area	Low	45 – 51
	Normal	49 – 58
	High	56 - 63

2. Analysis for Bleeding during menstruation / outside the menstrual period Variable

Bleeding during menstruation Variable or outside the menstrual period has a value expressed by the conditions of few, medium, and many. Where each condition has a predetermined range of values from the doctor. The specified value ranges from values 1 - 6. The fuzzy set for input 4 is shown in table 7.

Table 7. *Fuzzy Set* Bleeding During Menstruation / Outside The Menstrual Period

Variable	Variable Himpunan	Range
Bleeding during menstruation / outside the menstrual period	Few	1 - 3
	Medium	2 - 5
	Many	4 - 6

3. Analysis for Pain in the bladder or other pelvic organs variables

Pain in the bladder variable or other pelvic organs has a value expressed in conditions of low, normal, high. Where each condition has a predetermined range of values from the doctor. The specified range of values is from 7 to 11. The fuzzy set for input 5 is shown in table 8.

Table 8. *Fuzzy Set* Pain In The Bladder Or Other Pelvic Organs

Variable	Variable Himpunan	Range
Pain In The Bladder Or Other Pelvic Organs	Low	7 - 9
	Normal	8,5 - 10
	High	9,5 - 11

4. Analysis for At the bottom of the stomach the uterus feels rubbery variables

At the bottom of the stomach the uterus feels rubbery variables has a value expressed in conditions of low, medium, and high. Where each condition has a predetermined range of values from the doctor. The specified value ranges from values 1 - 6. The fuzzy set for input 6 is shown in table 9.

Table 9. *Fuzzy Set* At The Bottom Of The Stomach The Uterus Feels Rubbery

Variable	Variable Himpunan	Range
At the bottom of the stomach the uterus feels rubbery	Low	1 – 3,7
	Normal	3 – 5,3
	High	4,7 - 6

5. Analysis of urinary pain or lower abdominal pain variable

Urinary pain or lower abdominal pain variable has a value expressed in conditions of low, normal, and high. Where each condition has a predetermined range of values from the doctor. The specified value ranges from values 20 - 46. The fuzzy set for input 7 is shown in table 10.

Table 10. *Fuzzy Set* Urinary Pain Or Lower Abdominal Pain

Variable	Variable Himpunan	Range
Urinary Pain Or Lower Abdominal Pain	Low	20 – 34,3
	Normal	30 – 43
	High	42 - 46

6. **Analysis for Headaches and fatigue Variable**

Headaches and fatigue variable have valuesexpressed as low, normal and high conditions. Where each condition has a predetermined range of values from the doctor. The specified value ranges from values 1 - 6. The fuzzy set for input 8 is shown in table 11.

Table 11. *Fuzzy Set* Headaches and fatigue

Variable	Variable Himpunan	Range
Headaches and fatigue	Low	1 – 3,7
	Normal	3 – 5,3
	High	4,7 - 6

7. **Analysis for pain or pressure during urination variable**

Pain or pressure during urination **variable** has a value expressed as less, normal, and strong. Where each condition has a predetermined range of values from the doctor. The specified value ranges from values 16-27. The fuzzy set for input 9 is shown in table 12.

Table 12. *Fuzzy Set* Pain Or Pressure During Urination

Variable	Variable Himpunan	Range
Pain Or Pressure During Urination	Low	16 – 18,3
	Normal	18 – 24
	High	20 - 27

8. **Analysis For No Appetite, Progassive Weight Loss Variables**

Not appetite, Progasif weight loss v**ariables** has a value expressed by the conditions of a little, normal, and a lot .. Where each condition has a predetermined range of values from the doctor. The specified value ranges from values 7 - 16. The fuzzy set for input 10 is shown in table 13.

Table 13. *Fuzzy Set* No Appetite, Progassive Weight Loss

Variable	Variable Himpunan	Range
No Appetite, Progassive Weight Loss	Low	7 – 10
	Normal	9 – 14
	High	13- 16

9. **Analysis For Swelling In The Legs Variable**

The swollen on the foot variable has a value expressed as rare, normal, Often conditions. Where each condition has a predetermined range of values from the doctor. The specified value ranges from values 1 - 6. The fuzzy set for input 11 is shown in table 14.

Table 14. *Fuzzy Set* Swelling In The Legs

Variable	Variable Himpunan	Range
The swollen on the foot	Rare	1 – 3,2
	Normal	3 – 4,8
	Often	4,5 - 6

10. **Analysis For The Pathogenic Leucorrhoea Variable**

Pentagonic leucorrhoea variables have values that are expressed in low, medium, and high conditions. Where each condition has a predetermined range of values from the doctor. The specified value ranges from values 20 - 46. The fuzzy set for input 12 is shown in table 15.

Table 15. Fuzzy Set The Pathogenic Leucorrhoea

Variable	Variable Himpunan	Range
The Pathogenic Leucorrhoea	Low	20 – 34
	Normal	31 – 41
	High	40 - 46

11. **Analysis for The presence of dirt variables (vaginal discharge)**

The presence of impurities (leucorrhoea) variable has a value expressed as low,medium, and high. Where each condition has a predetermined range of values from the doctor. The specified value

ranges from values 24 - 50. The fuzzy set for input 13 is shown in table 16 .

Table 16. Fuzzy Set The Presence Of Dirt (Vaginal Discharge)

Variable	Variable Himpunan	Range
The Presence Of Dirt (Vaginal Discharge)	Low	24 – 34
	Normal	26 – 45
	High	38 - 50

12. Analysis for Vaginal discharge is pink or brown Variabel

Pink / brown vaginal discharge **variable** has values expressed as mild, moderate, severe. Where each condition has a predetermined range of values from the doctor. The specified value ranges from values 9-18. The fuzzy set for input 14 is shown in table 17.

Table 17. *Fuzzy Set* Vaginal Discharge Is Pink Or Brown

Variable	Variable Himpunan	Range
Vaginal discharge is pink or brown	Mild	9 – 13
	Moderate	11 – 17
	Severe	15 - 18

13. Analysis For Minor Bleeding Variable

The light bleeding variable has a value expressed by a little, normal, a lot. Where each condition has a predetermined range of values from the doctor. The specified value ranges from values 1 - 6. The fuzzy set for input 1 is shown in table 18.

Table 18. Fuzzy Set Minor Bleeding

Variable	Variable Himpunan	Range
Minor Bleeding	Little	1 – 3,2
	Normal	3 – 5,4
	A Lot	5 – 6

14. Analyze For Pain In The Vaginal Area Regularly Variable

Pain in the vaginal area regularly Variable has low, normal and high stated values. Where each condition has a predetermined range of values from the doctor. The specified value ranges from values 1 - 6. The fuzzy set for input 16 is shown in table 19.

Table 19. *Fuzzy Set* Pain In The Vaginal Area Regularly

Variable	Variable Himpunan	Range
pain in the vaginal area regularly	Low	1 – 3,2
	Normal	3 – 5,4
	High	5 - 6

15. Analysis For Pain When it Comes To Sex Variable

Pain when it comes to sex variable has a value expressed as low, medium, and high. Where each condition has a predetermined range of values from the doctor. The specified value range from values 57 - 65 The fuzzy set for input 17 is shown in table 20.

Table 20. Himpunan Fuzzy Pain When It Comes To Sex

Variable	Variable Himpunan	Range
Pain When It Comes To Sex	Low	57 – 60,7
	Medium	59 – 63,4
	High	62 - 65

16. Analysis For The Pubic Feels Itching And Burning Variable

The Pubic feels itchy and burning variable has a value expressed as mild, normal, severe. Where each condition has a predetermined range of values from the doctor. The specified value ranges from values 50 - 62. The fuzzy set for input 18 is shown in table 21.

Table 21. *Fuzzy Set* Feels Itching And Burning

Variable	Variable Himpunan	Range
Feels Itching And Burning	Mild	50 – 54,2
	Normal	53 – 59
	Severe	55 - 62

17. Analysis For Pain During Urination Or Pain In The Lower Abdomen Variabel

Pain during urination or pain in the lower abdomen variable has a value expressed as mild, moderate, severe. Where each condition has a predetermined range of values from the doctor. The specified value range is from values 20 -36. The fuzzy set for input 19 is shown in table 22.

Tabel 22. ***Fuzzy Set***

Pain During Urination Or Pain In The Lower Abdomen

Variable	Variable Himpunan	Range
Pain During Urination Or Pain In The Lower Abdomen	Mild	20 – 24
	Moderate	23,8–31.3
	Severe	30 - 36

Data Processing Expert Based

Manual data processing is performed in analyzing bone disease. The following is reviewed from the range of data used as a reference set of bone disease output:

	Cervical Cancer		Range Disease
	a.	Low	= 1 - 45
	b.	Severe	= 46 – 99
	Miyoma Uteri		
	a.	Low	= 1 - 45
	b.	Severe	= 46 - 99
	Serviks Cancer		
	a.	Low	= 1 - 45
	b.	Severe	= 46 - 99
	Servistis		
	a.	Low	= 1 - 45
	b.	Severe	= 46 - 99
	Leucorrhoea		
	a.	Low	= 1 - 45
	b.	Severe	= 46 - 99

In the fuzzy method there are four basic steps to do the fuzzy logic process, there is fuzzyfication, rule formation, inference engine, and defuzzyfication. Following the elaboration of the steps of the fuzzy method with an example where the input is:

a. Input

	Disease or pressure during urination	
	Vaginal bleeding during / after sex	6
	Pain in the pelvic area	2
	Bleeding during menstruation or outside menstruation	
	Pain in the bladder or other pelvic organs	
	At the bottom of the stomach the uterus feels rubbery	
	Urinary pain or lower abdominal pain	4
	Headache and often tired	
	Pain or pressure during urination	2
0	No appetite, Progassive weight loss	0
	Swelling in the legs	
2	Pathogonic vaginal discharge	0
3	Is there dirt (vaginal discharge)	8
4	Pink or brown vaginal discharge	1
5	Light bleeding	
6	Pain in the vaginal area regularly	
7	Pain when it comes to sex	0
8	Pubic itching, burning sensation 55	1
9	Redness or lower abdominal pain	8

b. Output

Types of uterine disease ?

a. Cervical cancer
b. Miyoma uteri
c. Cervical cancer
d. Servistis
e. Leucorrhoea

1.Fuzzification

Fuzzyfication is the first phase of fuzzy calculation, is the conversion of firm values to fuzzy values, where each fuzzy variable is calculated in terms of the degree of membership of each fuzzy set. There are 19 variables that are modeled, that is :

a. Pain or pressure during urination G001. Consists of low, normal, and high.

μLow [4] = $\frac{2,5-4}{0,5}$ = -3

μNormal [4] = $\frac{4,5-4}{4,5-2,5} = 0,25$

μHigh [4] = $\frac{4-4}{4,5-2,5} = 0$

b. Vaginal bleeding during / after sex G002, consisting of low, normal and high

μLow [16]= $\frac{14,5-16}{14,5-14} = -5$

μNormal [16]= $\frac{17,5-16}{17,5-14,5}$ = 0, 16

μHigh [16]= $\frac{16-17}{17,5-14,5} = -0,333333$

c. Pain in the G003 pelvic area, consisting of low, medium, high.

μLow [52]= $\frac{49-52}{49-51} = -1,5$

μMedium [52]= $\frac{58-52}{58-51}$ = 0, 85

μHigh [52]= $\frac{52-56}{58-51} = -0,57$

d. Bleeding during menstruation or outside the menstrual period G004, consisting of a little, medium, a lot .

μLittle [4]= $\frac{2-4}{2-3}$ = -2

μMedium [4]= $\frac{5-4}{5-3}$= 0, 5

μA Lot [4] = $\frac{4-4}{5-3}$ = 0

e. Pain in the bladder or other pelvic organs G005, consisting of low, normal, high.

μLow [9]= $\frac{8,5-9}{8,5-9}$ = 0

μNormal [9]= $\frac{10-9}{10-9}$ = 1

μHigh [9]= $\frac{9-9}{10-9}$ = 0

f. At the bottom of the stomach the uterus feels rubbery G006, consisting of low, medium, high.

μLow [3]= $\frac{3-3}{3-3,7}$= 0

μmedium [3]= $\frac{5,3-3}{4,,7-3,7}$ = 1

μHigh [3]= $\frac{3-4,7}{5,3-3,7}$ = 0

g. Urinary pain or lower abdominal pain G007, consisting of low, normal, high.

μLow [24]= $\frac{30-24}{30-34,3}$ = 1

μNormal [24]= $\frac{42-24}{43-34,3}$= 0

μHigh [24]= $\frac{24-42}{43-34,3}$= 0

h. Headache and fatigue often G008, consisting of less, normal, strong.

μLess [3]= $\frac{3-2}{3-3,7}$= 0

μNormal [3]= $\frac{5,3-2}{4,,7-3,7}$=1

μStrong [3]= $\frac{2-4,7}{5,3-3,7}$= 0

i. Pain or pressure during urination G009, consisting of, Less, normal, strong.

μLess [22]= $\frac{18-22}{18-18,3}$ = 0

μNormal [22]= $\frac{20-22}{20-18,3}$ =0

μStrong [22]= $\frac{22-20}{24-18,3}$ = 1

j. No appetite, weight loss progressively G010, consisting of little, normal, lots.

μLittle [10]= $\frac{9-10}{9-10}$ = 0

μNormal [10]= $\frac{13-10}{13-10}$ = 1

μA Lots [10]= $\frac{10-13}{14-10}$ = 0

k. Swelling in the foot of G011, consisting of rare, normal, often.

μRare [2]= $\frac{3-2}{3-3,2}$= 0

μNormal [2]= $\frac{4,5-2}{4,5-3,2}$ = 1

μOften [2]= $\frac{2-4,5}{4,8-3,2}$ = 0

l. Pathogonic vaginal discharge G012, consisting of low, medium, high.

μLow [30]= $\frac{31-30}{31-34} = 0,33$

μMedium [30]= $\frac{40-30}{40-34}$= 1

μHigh [30]= $\frac{30-40}{41-34}$ = 0

m. The presence of impurities (leucorrhoea) G013, consisting of low, medium, high.

μLow [48]= $\frac{26-48}{26-34}$ = 0

μMedium [48]= $\frac{38-48}{38-34}$ =0

μHigh [48]= $\frac{48-38}{45-34}$ = 1

n. Vaginal discharge pink or brown G014, consisting of Low, medium, severe.

μLow [11]= $\frac{11-11}{11-13}$ = 0

μMedium [11]= $\frac{15-11}{15-13}$= 0

μSevere [11] = $\frac{11-15}{17-13}$ =0

o. G015 mild bleeding, consisting of little, medium, A Lots.

μLittle [3]= $\frac{3-3}{3-3,2} = 0$

μMedium [3]= $\frac{5-3}{5-3,2} = 0, 90$

μA Lots [3]= $\frac{3-5}{5,4-3,2}$ - 0

p. Pain in the vaginal area regularly G016, consisting of low, normal, high.

μLow [4]= $\frac{3-4}{3-3,2} = 0$

μNormal [4]= $\frac{5-4}{5-3,2} = 0,45$

μHigh [4]= $\frac{4-5}{5,4-3,2} = 0$

q. Pain when it comes to sex G017, consisting of low, medium, high

μLow [60]= $\frac{59-60}{59-60,7} = 0$

μMedium [60]= $\frac{62-60}{62-60,7} = 1$

μHigh [60]= $\frac{60-62}{63,4-60,7} = 0$

r. Pubic itching, burning sensation G018, consisting of low, normal, severe.

μLow [51]= $\frac{53-51}{53-54,2} = 1$

μNormal [51]= $\frac{55-51}{55-54,2} = 1$

μSevere [51]= $\frac{51-55}{59-54,2} = 0$

s. Redness or lower abdominal pain G019, consisting of Low, moderate, severe.

μLow [28]= $\frac{23,8-28}{2,3,8-24} = 0$

μModerate [28]= $\frac{30-28}{30-24} = 0, 33$

μSevere [28]= $\frac{28-30}{31,3-24} = 0$

3.4 Rule Formation and Inference Machine

Out of the 40 rules, there are only 8 fuzzy rules that will be processed (Rule 9), (Rule 10), (Rule 11), (Rule 12), (Rule 13), (Rule 14), (Rule 15), and (Rule 16). The rule process can be seen as follows:

1. Rule [9] If G04 "Moderate" And G05 "Low" And G06 "High" And G07 "High"Then P02 "Severe" = Min (0,5; 0; 0; 0) = 0
2. Rule [10] If G04 "Moderate" And G05 "Normal" And G06 "Low" And G07 "Low"Then P02 "Low" = Min (0,5; 1; 0; 1) = 0
3. Rule [11] If G04 "A Lot" And G05 "Low" And G06 "Moderate" And G07 "Low"Then P02 "Severe" = Min (0; 0; 1; 1) = 0
4. Rule [12] If G04 "A Lot" And G05 "Low" And G06 "High" And G07 "Low"Then P02 "Severe" = Min (0;0; 0; 1) = 0
5. Rule [13] If G04 "Moderate" And G05 "Normal" And G06 "Low" And G07 "Low"Then P02 "Low" = Min (0, 5; 1; 0; 1) = 0,5
6. Rule [14] If G04 "A Lot" And G05 "High" And G06 "Moderate" And G07 "Moderate"Then P02 "Low"= Min (0; 0; 1; 1) = 0
7. Rule [15] If G04 "Moderate" And G05 "Normal" And G06 "High" And G07 "Low"Then P02 "Severe" = Min (0,5; 1; 0; 1) = 0
8. Rule [16] If G04 "Moderate" And G05 "High" And G06 "High" And G07 "Low"Then P02 "Severe" = Min (0,5; 0; 0; 1;) = 0

3.5 *Defuzifikasy*

The final step in this process is defuzzification or also called the affirmation stage. The method used is the centroid method. The following changes the fuzzy set to real numbers:

[Rule 9] μSevere (x) = 0, then the value of x is ;

Miyoma Uteri (*Severe*) = (*x* – 46) / 99 - 46 = 0

= 46 + (0 x 53) = 46

[Rule 10] μLow (x) = 0, then the value of x is ;

Miyoma Uteri (*Low*) = (*x* – 45) / 45-1 = 0

= 45 - (0 x 44) = 45

[Rule 11] μSevere (x) = 0, then the value of x is ;

Miyoma Uteri (*Severe*) = (*x* – 46) / 99 - 46 = 0 = 46 + (0 x 53) = 46

[Rule 12] μSevere (x) = 0, then the value of x is ;

Miyoma Uteri (*Severe*) = (*x* –56) / 99 - 46 = 0 = 46 + (0 x 43) = 46

[Rule 13] μSevere (x) = 0,5 , then the value of x is ;*Miyoma Uteri* (*Low*) = (*x* – 45) / 45-1 = 0= 45 - (0,5 x 44) = 23,00

[Rule 14] μLow (x) = 0, then the value of x is ;

Miyoma Uteri (*Low*) = (*x* – 45) / 45-1 = 0

= (0 x 44) + 45 = 45

[Rule 15] µSevere (x) = 0, then the value of x is ;

Miyoma Uteri (*Severe*) = (x – 46) / 99 - 46 = 0= (0 x 53) + 46 = 46

[Rule 16] µSevere (x) = 0, then the value of x is ;

Miyoma Uteri (*Severe*) = (x – 46) / 99 - 46 = 0= (0 x 53) + 46 = 46

So, using the defuzzy weighted average method, the value of Disease 2 (Miyoma uteri) in diagnosing uterine disease is: Defuzyfication of Gynecological Diseases (Miyoma Uteri).

$$Z_1 = \frac{(0*45)+(0*45)(0*46)+(0*46)+(0,5*23)+(0*45)+(0*46)+(0*46)}{0+0+0+0+0,5+0+0+0}$$

$$= \frac{11,5}{0,5} = 23,00$$

From the above process, it can be concluded that the patient has a uterine disease (Miyoma Uteri) 'Low' with a value of 23.00. With this method, the types of uterine diseases in humans can be identified

Interface Testing

User Home Page

The user's home page is the initial appearance on the main menu form. On the Home page there are several menus including registration, consultation, disease info, how to use the system, admin login. Display the home user menu form can be seen in Figure 3 below :

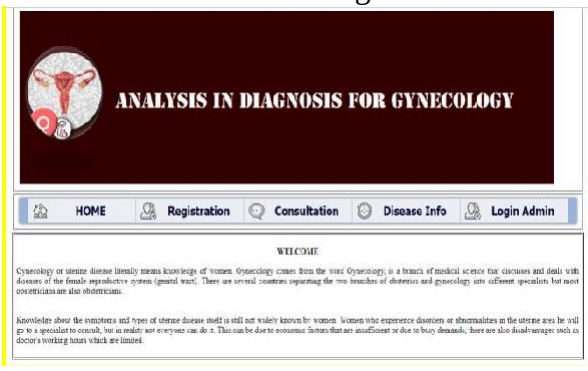

Figure 1. User Home Page

2. Display Consult Login Form

In the consultation view the user can enter the consultation menu after inputting the username and password entered in the registration form. Display the user consultation login can be seen in Figure 2 below:

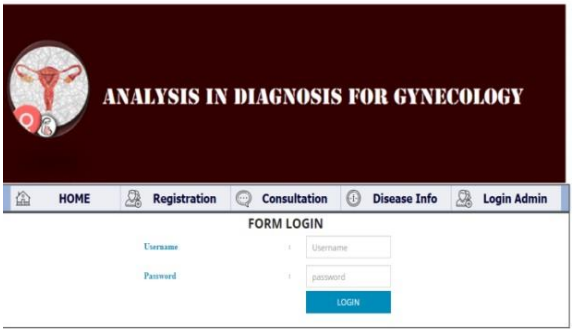

Figure 2. Display Consult Login Form

3. Consultation Form Page

On the consultation form page the user can see and input the range values that have been determined on the system. Display the user consultation form can be seen in Figure 3 below.

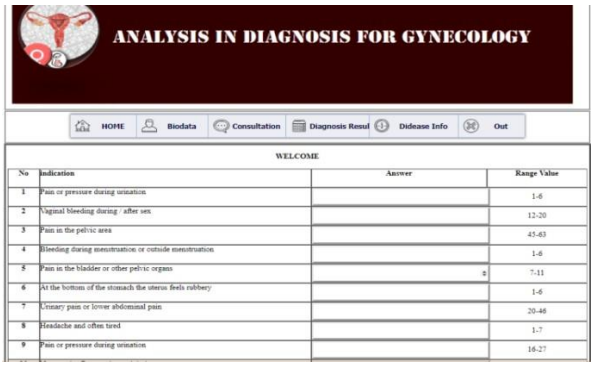

Figure 3. Consultation Form Page

After inputting the range value, click the consultation button, the user or patient diagnosis will appear

CONCLUSION

From the results of the study, it can be concluded that the analysis of uterine diseases can be processed by making an expert system design to identify diseases by means of the user or patient inputting the number of symptoms that exist in the system in the form of the web, so that they get the results of uterine disease, and afterwards it is processed using the mamdani fuzzy method. The result of this process is in the form of a diagnosis of uterine disease, which is a mild or severe uterine disease suffered by the patient. With the design of expert systems using PHP and

MySQL programming languages can facilitate the user or patient in determining the facts and symptoms of uterine ailments.

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