



Vol.17 No.2 | June, 2023

Submit :

Accept :

**Publish :** 

05/06/2023

04/06/2023

21/10/2022

SEARCHING CERTAINTY FACTOR METHOD IN DIAGNOSIS OF SKIN DISEASES IN CHILDREN

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#### Abstract

**Background**: Skin diseases in Indonesia are generally caused by bacterial, fungal, viral infections, and due to allergies, in contrast to Western countries which are heavily influenced by degenerative factors. Other skin disease factors are people's habits and an unclean environment. The purpose of this research is to build a webbased expert system for diagnosing skin diseases in children. Calculation of uncertainty in the system can be done with several possible expert uncertainties. Method : One of them is to use the Certainty Factor method. CF is a method that defines a measure of facts or rules to describe an expert on the problem at hand. **Results**: The result of the implementation of the system is that the system provides options in the form of symptoms that must be answered by the patient based on the symptoms experienced by the patient and from the results of the process the system will provide information about what skin type the disease in children is experiencing to get a solution. Conclusion : The expert system application draws conclusions using the case based reasioning method based on the types and symptoms of children's skin diseases that can be selected by the user, the user also provides predictive values about gastric disease then the machine will search and issue the best diagnosis and solution results.

Keywords: Expert System, Diagnosis, Skin Diseases in Children, Certainty Factor, Web

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http://publikasi.lldikti10.id/index.php/jit

ISSN : 1979-9292



JURNAL IPTEKS TERAPAN Research of Applied Science and Education V17.i2 (252-260)

E-ISSN: 2460-5611

### INTRODUCTION

The development of technology is so rapid, especially in the field of computers, so it is not excessive if the computer is used as a tool to lighten the workload of humans. The development of technology causes more jobs that require certain skills. The period of child growth is where the growth of both physical, mental and thinking power, therefore stamina and health must be really maintained. Keeping the environment clean and providing nutritious food needs to be done so that children's health can be maintained properly. Skin diseases in Indonesia are generally caused by bacterial, fungal, viral infections, and due to allergies, in contrast to Western countries which are heavily influenced by degenerative factors. Another factor of skin disease is people's habits and an unclean environment. Patients who have skin infections caused by fungi. In the human body, fungi can grow in damp areas, such as in skin folds (eg armpits), between the fingers, and intimate organs. Fungi are organisms that can live in water, soil, air, or even in the human body (B. K. Asahan, 2021). It is hoped that the use of the Certainty Factor method can reduce uncertainty so that it can produce a valid diagnosis (T. F. Ramadhani et al., 2020). According to Muhammad Arhami, an expert system is a computer software package intended as a provider of aids in solving problems in certain specialist fields such as science, medicine, education and so on. Expert systems use the knowledge of an expert that is entered into a computer (D. Gusmaliza et al., 2022). According to Ahmad Husein, an expert system is a system that stores the knowledge of an expert in a knowledge database (knowledge

base) used by computer equipment to search for knowledge in solving a particular problem. Decision making on certain problems becomes faster, easier and more accurate when an expert system is used (A. Husin et al., 2018). The skin is an organ in the human body that is very important because it is located in the the outer part of the body that functions to receive stimuli such as touch, pain and other external influences (Dr. dr. Ago Harlim., 2017). Skin disease is one of the diseases that are often found in tropical countries such as Indonesia (D. D. Putri et al., 2018) However, it is very good if the child's parents read the right advice to help your child deal with bad times, when he catches the disease. Hopefully this article can help you recognize the common symptoms of diseases that are commonly faced by children and help them recover too, of course (Dr. dr. Ago Harlim., 2017). Prevent it with vaccination. To prevent the possibility of contracting or contracting chickenpox, vaccination can be given. Even if exposed after vaccination, it is usually not severe (Dr. dr. Ago Harlim., 2017).

#### **RESEARCH METHODS**

An expert system is a system that seeks to adopt human knowledge to computers, in order to solve problems as is usually done by experts. According to Ahmad Sucipto, Certainty Factor (CF) is a method that defines a measure of certainty against facts or rules to describe an expert's belief in the problem at hand. Certainty Factor (CF) shows a measure of the certainty of a fact (A. Sucipto., 2019). According to Rahman, Certainty Factor (CF) is a method to prove whether a fact is certain or uncertain in the

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E-ISSN: 2460-5611

form of a metric that is usually used in expert systems. This method is very suitable for expert systems that diagnose something that is not certain (R. Rachman et al., 2018). Based on the explanation the researcher makes above. an understanding that the Certainty Factor method is a method that defines a measure of certainty against facts or rules to describe an expert's belief in the problem at hand. Certainty Factor is defined by the equation (B. K. Asahan, 2021).

Where :

[h,]: Certainty Factor

[h, ]: A measure of confidence or level of confidence in hypothesis H, if given or influenced by evidence E (between 0-1).

[h, ]: A measure of distrust or the level of disbelief in hypothesis H, if given or influenced by evidence E (between 0-1.

There are three things that might happen to Certainy Factor, namely:

Some evidence is combined to determine the Certainty Factor of a hypothesis. If e1 and e2 are observations, then:

 $[h, e1 \land e2] = \{ 0 MB[h, e1] + MB[h, e2]$ ]. (1 - [h, e1]) MD[h, e1  $\land$  e2] = 1 lainnya MD[h, e1  $\land$  e2] =  $\{ 0 MD[h, e1]$ ] + MD[h, e2]. (1 - [h, e1]) [h, e1  $\land$  e2 ] = 1 lainnya

1. Certainty Factor is calculated from a combination of several hypotheses.

If h1 and h2 are hypotheses, then:

2. Several rules go hand in hand, the uncertainty of one rule becomes the input for other rules, then the equations see equation

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#### $[h, s] = MB' [h, s] * \max (0, [s, e])$

3. In the rule with single evidence e (single evidence e) and single hypothesis h, where the Certainty Factor formula can be seen the equation

#### [h, e] = (e)(rule)

Where:

CF (rule) is determined by experts or experts.

CF(e) is determined by the user when consulting the system(J. A. Widians & F. N. Rizkyani., 2020)

### **RESULTS AND DISCUSSION**

#### Data on Skin Diseases in Children

No.	Disease Code	Disease Name	Definition	Solution
1	p01	Roseo la Infant um	Roseola infantum is a disease caused by the herpes virus type 6. This virus is actually not dangerous,	In general, roseola is not a dangerous disease and does not require special treatment. Patients can recover with self- care at home, namely by:
			but can be transmitted easily through splashes of saliva when an infected	1. Get enough rest. Drink enough water.
			child coughs or sneezes. Roseola infantum virus most often affects infants aged 6 months to 1.5 years.	1. 2. Compress the forehead with a cloth dipped in warm water to reduce fever.

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3	p03	Impetigo		
			Impetigo is	Antibiotic
			a skin	ointments or
			infection	creams, such
			that often	as mupirocin,
			occurs in	are used if the
			children,	infection is
			often called	mild, affects
			pyoderma.	only one area
			Impetigo	of the body,
			generally	and has not
			affects	spread too
			children	widely.
			aged 2-5	Before
			years. The	applying an
			cause is the	antibiotic
			bacterium	cream or
			Staphyloco	cream, it is
			ccus aureus	recommended
			or also	to soak the
			Streptococc	wound with
			us	warm water or
			hemolyticu	a warm
			8	compress to
				soften the scab.
4	p04	Cacar air		The main
			It is a disease	preventive steps
			that is oftent	hat can be taken
			found ina	are:
			children.	
			Chickenpox or	
			chicken pox is	I. Maintain body
			caused by the	luid intake
			Varicella zoster	
			virus. This	
			virus attacks	Γo prevent
			the skin	

#### Table 1 Data on Skin Diseases in Children

### Data on Symptoms of Skin Diseases

No.	Symptom Code	Symptom
1	G001	Fever
2	G002	A pink rash appears when the body
		temperature returns to normal
3	G003	Itchy skin
4	G004	Cough, runny nose and sore throat
5	G005	Child has no appetite
6	G006	Mild diarrhea
7	G007	Swollen eyelids
8	G008	Swollen glands in the neck

-		
9	G009	Runny nose
10	G010	Respiratory disorders
11	G011	A red rash appears on the cheek like a slap
12	G012	Itchy red patches appear around the mouth and nose
13	G013	Wounds on the spots due to scratching
14	G014	Irritation of the skin around the wound
15	G015	Brownish yellow scabs around the wound
16	G016	Red marks on the skin due to missing scabs
17	G017	The appearance of red spots on the skin

Table 2 Data on Skin Diseases in Children

#### **Data Rule**

Code	Sympt	
Rule	om	
IF		
•	• G001   AND fever	
•	• G002   A pink rash appears when the body temperature returns to normal AND	
•	• G003   Itchy skin AND	
•	• G004   Cough, runny nose and sore throat AND	
•	G005   Child has no appetite AND	
•	• G006   Mild diarrhea AND	
•	• G007   Swollen eyelids AND	
•	G008   Swollen glands in the neck	
THEN		
•	p01   Roseola Infantum	
IF		
•	• G001   AND fever	
•	• G009   runny nose AND	
•	• G010   AND breathing problems	
•	• G011   A red rash appears on the cheek like	
THEN	a siap	
•	p02   Sindrom Pipi Merah (Parvovirus B19)	

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IF		
	•	• G012   Itchy red patches appear around the mouth and nose
	•	AND
	•	• G013   Wounds on the spots due to scratching AND
	•	• G014   Irritation of the skin around the wound AND
	•	• G015   Brownish yellow scabs around the wound AND
	•	• G016   Red marks on the skin due to
		missing scabs
TH	EN	
	•	p03   Impetigo
IF		
	•	• G001   AND fever
	•	• G005   Child has no appetite AND
	•	• G017   The appearance of red spots on the skin which eventually forms a liquid bubble AND
	•	• G018   Tired or feeling unwell AND
• G01	9   M	luscle or joint pain AND
• G02	$0 \mid Sy \\ 1 \mid A$	ymptoms such as runny nose or cough AND
• G02 THE • p04	2   A N   Chi	scab appears from the blisters due to the rash

Table 3 Data Rule

#### **CF** Production Rules

Kaidah Produksi CF

N	D Symptom	CF	Name Disease
1	G001Fever	Disease CF : 0.8	p01 Roseola Infatum
-	G002A red rash appears	CF Symptoms : 0.2	

G003young when body	CF Disease : 0.8
temperature returns to	CF Symptoms :
normal	0.2
G004Itchy skin	Disease CF : 0.8

#### G005Cough, runny nose CF Symptoms : and sore throat 0.4 G006Child has no appetite CF Disease : 0.6 CF Symptoms : 0.4 G007Mild diarrhea Disease CF: 0.4 G008Swollen eyelids CF Symptoms : 0.2 2 G001Swelling of the glands Disease CF: 0.4 p02 Sindrom in the Pipi Merah G009Neck CF Symptoms : (Parvovi 0.2 rus B19) G010Fever Disease CF: 0.4 G011Runny nose CF Symptoms : 0.2

Table 4 CF Production Rules

#### RESULT

#### 1. Homepage



2. Diagnosis Page Display

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3	G012	Itchy red patches appear around the mouth and	CF Disease : 0.8 CF Symptoms : 0.4	p03 Impeti go	
-	G013	Nose	Disease CF : 0.6		
-	G014	Wounds on the spots due to	o CF Symptoms : 0.6		
_	G015	scratched	Disease CF : 0.8		
-	G016	Irritation of the skin around the wound	d CF Symptoms : 0.6		
4	G001	Brownish yellow scabs around the wound	CF Disease : 0.6 CF Symptoms : 0.4	р 0 4 С	
_	G005	Red marks on the skin due to missing scabs	CF Disease : 0.4 CF Symptoms : 0.2	a c a r	
_	G017	Fever	CF Disease : 0.6 CF Symptoms : 0.2	ai r	
-	G018	Child has no appetite	CF Disease : 0.8 CF Symptoms : 0.4		
-	G019	The appearance of red spots on the skin which eventually form a liquid bubble.	CF Disease : 0.8 CF Symptoms : 0.2		
-	G020	Fatigue or feeling not	Disease CF : 0.6		
_	G021	Healthy	CF Symptoms : 0.4		
_	G022	Muscle or joint pain	Disease CF : 0.8		





# 4. Print Display of Disease Diagnosis Results

1 G016 Bekas kemerahan dikulit akibat koreng yang hilang Hampir pasti y			
1	6016	Bekas kemerahan dikulit akibat koreng yang hilang	Hampir pasti ya
2	6017	Munculnya bintik kemerahan pada kulit yang akhirnya membentuk sebuah gelembung cair.	Hampir pasti ya
3.	6018	Kebelahan atau merasa tidak sehat	Pasti ya
Deta	il ipakan per	syakit yang sering dijumpal pada anak-anak. Cacar ar atau chicke oster, Ving ini menyerang kuli dengan membentuk luka (lesi) ya	n pox disebabkan us berisi cairan.
virus			
Saran Lang men men	n kah pence cegah deh lui pembe gonsumsi i	gahan ulama yang dapat dilabukan ( 1, Manjaga asupan cairan tu nan air susa ibu (ASI), susa formula, atau air puth. Agabila Si kee makanan padat, Bunda bias memberikannya sup hangat.	buh Untuk asupan carannya si sudah
Sara Lang men mela men	n kuh pence cegah deh lui pembe gonsumsi i ungkinan l	ngehan udama yang dapat dilakukan (). Menjagg asupan odran tu fitnasi, berkan yang dapat dilakukan (). Menjagg asupan odran tu nan asu asu di Kulij asuka termida, aku as putih, dipatis di ke- makanan putih, kunda bisa membarikannya sugi hengen matanan putik, kunda bisa membarikannya sugi hengen.	buh Untuk atupan cairannya il sudah

5. Display User Diagnostic History

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<b>≭</b> SP Kulit Anak	Ξ					٩u
leru	_					
🕴 Beranda	Div	vavat Konsul	taci			
). Diagnosa	RIV	ayat Konsul	(45)			
) Riwayat	No	Tanggal	Penyakit	Nilai CF	Aksi	🖨 Grafik 🔷 🖛
) Keterangan	1	2022-09-29 22:14:44	Roseola Infantum	0.3600	@ Ortal	
Tentang	2	2022-09-29 23:44:41	Sindrom Pipi Merah (Parvovirus B19)	0.7629	@ Ortali	
	3	2022-10-04 21:30:54	Roseola Infantum	0.6800	@ Ortali	
	4	2022-10-04 21:31:42	Roseola Infantum	0.9685	@ Octail	<b>a</b>
	5	2022-10-04 21:32:52	Roseola Infantum	0.5424	@ Octali	635
	6	2022-10-04 22:22:51	Roseola Infantum	0.4112	@ Ortail	
	7	2022-10-04 23:04:18	Cacar Air	0.2400	@ Ortal	
	8	2022-10-05 00:16:11	Cacar Air	0.5840	@ Ortali	Roseola Infantum 63%
						Cacar Air 25%

# 6. Display of Disease Description



# 7. Display System



# **Admin View**



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# 3. Pages Manage Child Skin Disease Type Data

*SP Kulit Anak						
hinu .						1
# Beranda						
Admin		Turnhola Baranaki	Telli fan Irian carl			
it Peryokit						
🕫 Gojala		Nama				
L. Perinstahuan	No	Penyakit	Detail Penyakit	Saran Penyakit	Aksi	
Fost Keterangan	1	Roseola Infantum	Roseola infantum adalah penyakit yang disebahkan oleh virus herpes tipe 6. Virus ini sebenarnya tidak berbahaya, tapi dapat menular dengan mudah melalui percikan air kur saat anak vane teririfikaki tatuk atau	Pada umumnya, roseola bukan penyakit yang berbahaya dan tidak membuhahkan pengabatan khusus. Penderita dapat palih dengan perawatan mandiri di rumah, yaitu dengan L. Beristinabar una cukan Manum air pathi yang cukan 2.	(Pubah	
Tentang			bersin. Virus roseola infantum paling sering menyerang bayi berusia 6 bulan sampai 1,5 tahun.	Mengompres kening dengan kain yang dicelupkan ke air hangat untuk menurunkan demam,	_	
	2	Sindrom Pipi Merah (Parvovirus B19)	Paruovinus B13 adalah virus yang umumnya, dan hanya menimpa matusia. Sekitar separah orang dewasa pazi pemah terkera mungkin selama masa karak-kanak atau remajanya.	Perswatan besebut meliputi: L. Pakakan losion dengan rutis, Menusurya sentah mandi. Ganakan losion yang diformularikan hutusu sintah Jany yako tanga pesendi dan alehot 2. Jaki kult 5: Kecil canderung kering, Bunda bisa menceba mengdieskan petrokenuj lely di area piping sapnya tebh lembap dan melindung isih banier dari kerusakan.	(Pobuh Bilapus	
	3	Impetigo	Impetigo adalah infeksi kulit yang sering terjadi pada anak-anak, sering disebat pioderma. Impetigo	Salep atau krim antibiotik, seperti mupirocin, digunakan jika Infeksi yang terjadi tergolong ringan, hanya menyerang satu area	(Plubah	

# 4. Page Manage Information Regarding Disease



#### CONCLUSION

From writing this thesis, starting from the analysis stage, to testing the new system



E-ISSN: 2460-5611

application, several conclusions can be drawn, namely:

1. The system built can help the community in recognizing the types and disorders of children's skin diseases, by printing the results of the diagnosis after conducting the consultation so that the user can get data on the results of the consultation in the form of symptoms and solutions for handling children's skin diseases.

2. The expert system application can be used as a medium for early detection of children's skin diseases.

3. The expert system application draws conclusions using the case based reasioning method based on the type and symptoms of children's skin diseases that can be selected by the user, the user also provides a predictive value about gastric disease then the machine will perform a search and issue the results of the diagnosis and the best possible solution.

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ISSN : 1979-9292



JURNAL IPTEKS TERAPAN Research of Applied Science and Education V17.i2 (252-260)

E-ISSN : 2460-5611

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