

Published by: IOCSCIENCE

Journal of Intelligent Decision Support System (IDSS)





Expert System for Diagnosis of Sexual Diseases (Paraphilia) Using Method Dempster Shafer

Nince Rianto Gulo¹, Bosker Sinaga²

^{1,2}Informatics Engineering, STMIK Pelita Nusantara, Sumatera Utara, Indonesia

Article Info

Article history:

Received Dec 10, 2021 Revised Dec 22, 2021 Accepted Jan 13, 2022

Keywords:

Expert System; Data Mining; Dempster Shafer; Sexual Diseases

ABSTRACT

Sexual behavior disorder (paraphilia) is sexual behavior that is unacceptable in society. The lack of knowledge and the many obstacles to getting information about early and independent detection of the community about sexual deviations and ignorance of the community in responding to deviations are also factors that cannot be handled early The main symptoms of this paraphilia disease are repeated childhood traumatic, coming from a family that is too restrictive or too disruptive to children in sexual behavior, and has a disorder in sexual relations since childhood. There are several types of sexual disorders (paraphilia) including Voyeuristic, Exhibitionistic, Frotteuristic, Sexual Masochim, Sexual Sadism, Pedophilic, Fetishistic and Transvestic. The Dempster Shafer method provides space for the expert in providing the value of trust in his knowledge. Based on the problems above, a Webbased system will be built that functions to help the community conduct independent consultations about disturbances that can be accessed with a wide range and unlimited time. The system built using PHP and MySQL programming as a database. The method used for tracing is the dempster shader. While the results of the diagnosis will inform about the results of the diagnosis containing a list of symptoms entered, information on the results of the rules about the disorder suffered and information about possible treatments that can be done.

This is an open access article under the **CC BY-NC** license.



Corresponding Author:

Bosker Sinaga, Informatics Engineering, STMIK Pelita Nusantara Medan, Jl. Iskandar Muda No. 1 Medan, 20154, Indonesia. Email: boskersinaga@gmail.com

1. Introduction

In accordance with the development of the times both in terms of science and information technology today. The rapid development of information technology today encourages people to use this technology in diagnosing a disease, one of which is a sexual disorder (Paraphilia). Technological progress is something that we cannot avoid in life, because technological advances will increasingly run in accordance with scientific advances.

The role of the system in diagnosing sexual disorders (Paraphilia) is very important to provide fast, precise and accurate information. The public in general does not know much about sexual disorders (paraphilia) so that in order to carry out treatment of sexual disorders (Paraphilia) in detail experienced by sufferers, it is necessary to have the help of an expert in order to obtain accurate and reliable diagnostic results for the sexual disorder (Paraphilia) experienced, especially people who come from rural areas who lack knowledge about what is meant by sexual disorder (Paraphilia) and

how to diagnose and treat it. For this reason, in diagnosing the disease, an expert system is used using the Dempster Shafer method.

The term Paraphilia comes from the Greek, para meaning "On the Other Side" and Philos meaning "Love", so paraphilia is defined as sexual activity that is not in general, or experiencing sexual perversion (Daud, 2016). Sexual disorders (Paraphilia) refer to sexual behavior that is considered deviant or violates the rules that have been set in a country such as legal norms, religious norms, and customs. Paraphilia is a type of sexual disease disorder that is included in an emotional disorder that involves behavior, urges, or fantasies so that it spreads into a mental disorder, this is due to continuous and intense deviant sexual desires.

Dempster Shafer is a theory developed by Arthur P. Dempster and Glenn Shafer which is generally written in an interval. So the Dempster Shafer method is a mathematical theory to perform proofs based on belief functions and plausible reasoning (Utomo & Suprapto, 2017).

This study aims to assist the general public in diagnosing sexual disorders (paraphilia), how to apply the Dempster Shafer method in expert system applications, and how to design and build a webbased expert system to diagnose sexual disorders using the Dempster Shafer method (Bhaskara, Hidayat, & Muflikhah, 2019).

This study uses a literature review from several previous research journals. The research journal is in the form of an expert system for diagnosing sexually transmitted diseases in men with the Dempster Shafer method. Then the research that uses the Dempster Shafer method with the title Expert System for Diagnosing Children's Mental Disorders Using the Dempster Shafer Method, this study diagnoses metal disorders in children. Types of mental disorders in children are divided into schizophrenia, dynamic disorder, social phobia, posttraumatic stress disorder, separation anxiety disorder, generalized anxiety disorder, autism spectrum disorder, and manic episode (Hastari & Bimantoro, 2018).

The next research journal is the Dempster Shafer Method for Detecting Mental Disorders: Schizophrenia and Psychotics (Gozali & Jollyta, 2019). This study diagnoses mental illness specifically schizophrenia and psychotic. Research entitled Dempster-Shafer Method for Early Diagnosis of Schizophrenia Mental Disorders Based on Expert Systems. This study diagnoses schizophrenic mental disorders, which consist of six types of diseases, namely paranoid, heberphrenic, catatonic, simplex, post-schizophrenic depression, and residual with forty-three types of symptoms (Hairani, Kurniawan, Abd Latif. & Innuddin. 2021).

Then a research journal in the form of the application of the Dempster Shafer method to diagnose diseases caused by the bacterium Treponema pallidum. This disease is caused by the bacterium Treponema pallidum (Sembiring & Sinaga, 2017). Furthermore, in the study entitled Expert System Diagnosis of Personality Disorders Using the Dempster Shafer Method. This study diagnoses human personality disorders using the Dempster Shafer method. The type of personality disorder of a person consists of paranoid, schizoid, histrionic, schizotypal, narcissistic, antisocial, borderline, avoidant and obsessive-compulsive disease caused by thirty-nine symptoms of the disease (Yuwono, Fadlil, & Sunardi, 2019). Next is a research journal entitled Expert System for Diagnosing Personality Disorders Using the Web-Based Dempster Shafer Method. This study diagnoses a person's personality disorder consisting of paranoid, schizoid, schizotypal, histrionic, narcissistic, antisocial, borderline (threshold), avoidan (avoiding), dependent, and obsessive-compulsive disorder caused by seventy-five symptoms (Rahmadhani, Fauziah, & Aningsih, 2020).

System for Diagnosis of Sexually Transmitted Diseases in Men Using Forward Chaining and Dempster Shafer Methods. This study compares two methods, namely forward chaining and demspter shader. Based on the comparison of the two methods, it produces a very high accuracy of 94.2% (Wiyandra, 2019). Next is a research journal entitled Expert System for Diagnosing Personality Disorders Using the Web-Based Dempster Shafer Method. This study diagnoses a person's personality disorders consisting of paranoid, schizoid, schizotypal, histrionic, narcissistic, antisocial, borderline (threshold), avoidan (avoiding), dependent, and obsessive-compulsive symptoms caused by seventy-five symptoms. System for Diagnosis of Sexually Transmitted Diseases in Men Using Forward Chaining and Dempster Shafer Methods. This study compares two methods, namely forward chaining and demspter shader. Based on the comparison of the two methods, it produces a very high accuracy of

94.2%. Expert System Application To Diagnose Neurological Disorders With Android-Based Dempster Shafer Method. This expert system specifically diagnoses neurological disorders such as epilepsy, meningitis, trigeminal neuralgia, Parkinson's, stroke, migraine, vertigo with thirty-four types of symptoms. The last research journal used in this study is the Implementation of the Dempster Shafer Method for Detecting Diabetes Mellitus. In this study, three types of diabetes mellitus were detected.

2. Method

2.1 Research Framework

To assist in the preparation of this research, it is necessary to have a systematic research framework arrangement.

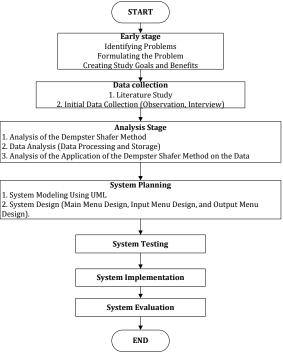


Fig 1. Research Framework

2.2 Research Framework

The description of the framework is a further explanation regarding the description of the process of the research framework carried out, along with the explanation:

- a. Early Stage
 - 1) Identifying Problems

 This stage aims to find out what are the problems that arise in the diagnosis of sexual disorders (paraphilia).
 - 2) Formulating the Problem Formulate problems that will be developed and will be discussed in research for an expert system for diagnosing sexual disorders (paraphilia) using the Dempster Shafer method.
 - 3) Creating Study Goals and Benefits
 This stage aims to build an expert system for diagnosing sexual disorders and what are the benefits for the general public who suffer from sexual disorders (paraphilia).
- b. Data Collection

At this stage of data collection is done by means of observation, namely observing directly the activities of diagnosing sexual disorders (paraphilia) that are running and conducting interviews with respondents. The respondents of this study were Mr. dr. Muhammad Anwar

Lubis, Sp. KK (K) at the "Zaskia Husada" Inpatient Primary Clinic in Lubuk Pakam, Deli Serdang Regency, North Sumatra Province.

c. Analysis Stage

1) Analysis Dempster Shafer Method

This stage analyzes whether the Dempster Shafer method is appropriate to use in solving problems in building an expert system for diagnosing sexual disorders (paraphilia) using the Dempster Shafer method.

2) Data Analysis (Data Processing and Storage)

The stage for manipulating data into information, where the information will be stored data until the final result of processing because information is the result of processing data in a certain form that is more meaningful than an activity or event.

3) Analysis of the Aplication of the Dempster Shafer Method on the Data
This stage analyzes the application of the Dempster Shafer method with the aim of describing the initial design of the system to be used as a reference in system design.

d. System Planningg

This stage is designing the system using UML (Unified Modeling Language) modeling and also designing the interface of the system to be built later, such as the main menu design, data input menu design and information output menu design as well as HIPO (Hierarchy Input Process and Output) from the existing system built.

e. System Testing

Testing the system to determine whether the designed system is in accordance with user needs or not

f. System Implementation

At this stage, the new information system is placed into the existing system (old system). At this stage, the existing database and network will be created.

g. System Evaluation

Stage to assess / measure against the system designed whether the system is designed in accordance with the objectives of system design. If the system is in accordance with the desired design, the system is ready for operation and system maintenance is always carried out.

3. Result and Discussion

In designing this expert system by taking sources from experts or doctors, books and journals.

a. Type of Disease

TABLE 1TYPES OF SESXUAL DISORDERS (PARAPHILIA)

	TIFES OF SESMOAL DISORDERS (FARAFIILIA)				
Code	Disease Name	Definition of Disease			
P001	Voyeuristic Disorder	Sexual disorder characterized by sexual arousal when			
		observing naked people or sexual activity.			
P002	Exhibitionistic Disorder	This sexual deviation is characterized by when a person			
		achieves satisfaction by showing his genitals to give a shock,			
		surprise, and even impression to the viewer.			
P003	Frotteuristic Disorder	Patients with this sexual disorder become sexually aroused			
		when rubbing their genitals on other people in public places in			
		a condition where the victim is not concentrating.			
P004	Sexual Masochim	This type of sexual deviation is indicated by the characteristics			
	Disorder	of getting sexual satisfaction when he is tortured or humiliated			
		during sexual intercourse.			
P005	Sexual Sadism Disorder	This type of sexual deviance disorder is feeling satisfied when			
		he sexually abuses other people.			
P006	Pedophilic Disorder	Sexual disorders characterized by disturbances in the form of			
		impulses			
P007	Fetishistic Disorder	Fetishistic is a sexual disorder that desires inanimate objects,			
		for example: clothes, shoes, or underwear.			
P008	Transvestic Disorder	This sexual deviance means a heterosexual man who prefers to			
		wear women's clothes for sexual gratification.			

b. Solution and Treatment

TABLE 2 SOLUTION AND TREATMENT

		SOLUTION AND TREATMENT
Code	Disease Name	Solution and Treatment
P001	Voyeuristic Disorder	 Therapy: Develop control over impulses that occur, seek and find a healthier channel of stimulation and curiosity, reverse negative thought patterns, identify locations and situations that can increase the possibility for them to re-engage in the habit of voyeurism.
		 Treatment: Giving antidepressant drugs and antiandrogen drugs.
		 Psychotherapy, namely by doing cognitive behavioral therapy, reconditioning orgasm by changing sexual fantasies to other fantasies, and family therapy.
P002	Exhibitionistic Disorder	 Treatment: drugs that inhibit the action of sex hormones, thereby reducing sexual drive, such as SSRI (Selective Serotonin Reuptake Inhibitor) drugs, Medroxy- progesterone Acetate (MPA), Luteinizing Hormone-Releasing Hormone (LHRH) agonists.
		- Therapy: biofeedback, covert sensitization, and aversive formation therapy with
P003	Frotteuristic	the help of spraying unpleasant odors, for example: ammonia into the air.
	Disorder	- Treatment: Antiandrogens to reduce male hormone levels, SSRI (Selective
		Serotonin Reuptake Inhibitor) drugs such as fluoxetine. Therapy, talk therapy is carried out, namely therapy to understand past patterns.
		 Therapy: talk therapy is carried out, namely therapy to understand past patterns that are detrimental and damaging to the heart, and behavioral therapy, which is
		to help patients be aware of the triggers of the disorder and how to respond in
D004	Sexual	ways that are not self-defeating, such as: dealing with anxiety, inner criticism, take
P004	Masochim	the patient's personal responsibility, and help to forget the past.
		- Treatment: Parents treat by providing space for patients to express themselves
		and provide support, and provide mental encouragement when patients experience failure or difficulties.
		- Therapy: Practicing social skills, or there is also training to regulate conditions in
	Sexual Sadism Disorder	which a sadist is passionate. This is expected to reduce the desire to act sadistically
P005		in sex.
		 Treatment: Drugs are given to a sadist who is more severe and has the possibility of harming others. The drugs given are usually hormones that reduce testosterone
		levels, as well as serotonin drugs.
		 Therapy: Psychotherapy, namely the patient will be asked to undergo counseling
		with a psychologist or psychiatrist, a behavioral approach, namely facilitating
P006	Pedophilic	adequate social interaction with fellow adults and increasing sexual desire for
F000	Disorder	adults
		 Medication: Medications to lower testosterone levels, specific serotonin reuptake
		inhibitors such as sertraline, fluvoxamine, or fluoxetine.
		- Theraphy:
P007	Fetishistic Disorder	 Cognitive behavioral therapy (CBT) Acceptance and commitment therapy (ACT)
		Psikoterapi psikodinamik
		- Medication : drug of <i>antidepresan</i> , sedative, anti androgen drugs.
		 Therapy: Blocking serotonergic transmission to the presynaptic terminal, talking
	Transvestic Disorder	about psychoanalysis for patients, support therapy, CBT, and conditioning about
P008		behavioristics.
		- Treatment: Use drugs belonging to the SSRI (Selective Serotonin Reuptake
		Inbibitor).

c. Disease Symptoms

TABLE 3 SISEASE SYMPTOMS

	SISEASE STMPTOMS	
Code	Symptoms Disease	Diseases
G001	Experiencing intense and repeated sexual arousal from peering at others who are undressed, undressed, or engaged in sexual activity for six months as a manifestation of fantasies, urges or actions.	P001
G002	Usually will peek while fantasizing sexually and masturbating, but is not interested in having sex with the person he is peeking at.	
Code	Symptoms Disease	Diseases

Code	Symptoms Disease	Diseases
G003	Usually will peek while fantasizing sexually and masturbating, but is not interested in having sex with the person he is peeking at.	P002
G004	Fantasy, sexual urges, or behavior cause significant impairment or impairment in social, occupational, or other important functions.	
G005	Sometimes masturbates when exposing himself, or when fantasizing about exposing himself	
G006	Intense sexual fantasies, desires, and arousal centered on touching other people's body parts without consent or rubbing body parts, especially the genitals, on another person and usually from behind.	P003
G007	The act of froteurism is usually repeated and occurs in crowded public spaces, such as trains, buses, elevators, and even crowded streets.	
G008	When committing this act of sexual harassment, the perpetrator usually imagines having a personal relationship based on affection with the victim, but will run away afterward.	
G009	Work to exhaustion, be hard on yourself when you push yourself to the limit and exceed it	P004
G010	Feeling humiliated inside, but never showing it to others	
G011	Feeling unloved and having to work hard to be accepted by those around you, and feeling that the effort you put in is never enough	
G012	The inner voice or criticism attacks no matter what	
G013	Feeling unable to say no or to assert yourself, instead agreeing with grumbling inside	
G014	Having complaints about lots in life, but never doing anything about it and rejecting people who try to help.	
G015	Interested in abusive relationships in which the patient may be abused and humiliated. Tend to hold back and show no pain.	
G016	Feeling trapped in an endless cycle of self-loss. Feeling unable to feel pleasure without guilt/shame and feeling hopeless about the future patient may be abused and humiliated.	
G017	Sexual fantasies about hurting adults, children, or animals. This fantasy will last for a long period of time, which is about 6 months.	P005
G018	In their sexual fantasies, the sufferer acts as a dominant who acts to hurt his sex partner	
G019	In a more advanced phase, the sufferer will try to do the hurtful act for real, no longer a fantasy in his mind	
G020	Sexually hurting for gratification is done by hitting, cutting, burning, biting, and whipping.	
G021	From time to time, the level of hurting their sex partners will increase to get more sexual satisfaction	
G022	Intense and frequent fantasies or sexual urges toward children 13 years of age or younger	P006
G023	Feeling uncomfortable and unable to move smoothly due to the conditions experienced. For example, difficulties in work, family relationships, or interacting with other people.	
G024	Sufferers also generally manifest their sexual desires by taking action on victims who still have a relative or close relationship with them, including nephews, stepchildren, and so on.	
G025	The fetish lasts for more than 6 months and occurs continuously.	P007
G026	Sexual urges don't just exist in the mind, they have been put into practice.	
G027	Sexual urges are hard to control	
G028	Sexual behavior interferes with daily life	
G029	Feeling intense and repeated arousal when wearing clothes of the opposite sex	P008
G030	Fantasy wearing opposite sex clothes	
G031	It's called a disorder when you feel depressed and can't perform social functions and work well	

Code	Symptoms Disease	Diseases
G032	Experiencing this condition for 6 months or more	

d. Rule Base

TABLE 4RULE BASE

No	IF	THEN
1	G001, G002	Voyeuristic Disorder (P001)
2	G003, G004, G005	Exhibitionistic Disorder (P002)
3	G006, G007, G008	Frotteuristic Disorder (P003)
4	G009. G010, G011, G012, G013, G014, G015, G016	Sexual Masochim Disorder (P004)
5	G017, G018, G019, G021	Sexual Sadism Disorder (P005)
6	G022, G023, G024	Pedophilic Disorder (P006)
7	G025, G026, G027, G028	Fetishistic Disorder (P007)
8	G029, G030, G031, G032	Transvestic Disorder (P008)

3.1 Case Examples

An example of an analysis of the diagnosis of sexual disorders (paraphilia) entered by the user is as follows:

- a. Determine the Symptoms Experienced by the Patient
 - Suppose a patient chooses some of the symptoms of the disease he is experiencing, namely:
 - 1) G001: Experiencing intense and repeated sexual arousal from peering at others who are undressed, undressed, or engaged in sexual activity for six months as a manifestation of fantasies, urges or actions, supports disease P001
 - 2) G002 : Usually will peek while fantasizing sexually and masturbating, but not interested in having sex with the person being peeked at, supports disease P001
 - 3) G013: Feeling unable to say no or to assert oneself, instead of agreeing with grumbling
- b. Application of the Dempster Shafer Method

After selecting or inputting several types of symptoms of sexual disorders experienced by the user (patient), the next step for the system is to analyze the calculation by applying the Dempster Shafer method, which is as follows:

1) For Symptom Choice 1 (G001) Then: M1 {P001} = 0.80

 $\theta = 1-0.80 = 0.2$

2) For Symptom Choice 2 (G002)

Then: $M2 = \{P001\} = 0.70$

 $\theta = 1-0.70 = 0.3$

TABLE 5DETERMINATION OF INITIAL DENSITY (M)

No	C	Disease -	Densitas (m)	
NO	Symptoms	Disease	Belief	Plausability
1	Experiencing intense and repeated sexual arousal from peering at others who are undressed, undressed, or engaged in sexual activity for six months as a manifestation of fantasies, urges or actions, supporting illness	P001	0.80	0.2
2	Usually will peek while fantasizing sexually and masturbating, but not interested in having sex with the person being peeked at, supports disease	P002	0.70	0.3

c. For Symptoms Option 3 (G013)

If the symptom selected by the user is more than 2 (two) symptoms, then the next step is to look for the combination of symptoms of the disease. To facilitate the calculation, the subsets formed are entered into the table. The first column is filled with the first symptom (M1). While the first line is filled with the second symptom (M2). So that the value of M3 is obtained as a result of the combination of M1 and M2.

TABLE 6
COMBINATION RULES FOR M3

	{P001}	(0.7)	θ	(0.3)
{P001} (0.80)	{P001}	(0.56)	{P001}	(0.24)
ө (0.2)	{P001}	(0.14)	θ	(0.06)

$$\begin{split} &M_{3}\{P001\} = \frac{0.56 + 0.14}{1 - 0.06} = \frac{0.7}{0.94} = 0.744 \\ &M_{3}\{P001\} = \frac{0.24}{1 - 0.06} = \frac{0.24}{0.94} = 0.255 \\ &M_{3}\left\{\theta\right\} = \frac{0.06}{1 - 0.06} = \frac{0.06}{0.94} = 0.063 \end{split}$$

From the calculation results of the combined M3 density value above, it can be seen that the $\{P001\}$ value is higher than the other symptoms with a density of 0.744. If then there are other symptoms, namely: Feeling unable to say no or to assert oneself, instead of agreeing by grumbling inwardly (M4 $\{P001,P002,P003,P004\}$), then a calculation must be made for the new density of M5. M4 as a function of density. So that the value of M5 is obtained as a result of M combination. $M_4 \{P001,P002\} = 0.40$

$$M(\theta) = 1-0.40 = 0.6$$

TABLE 7
COMBINATION RIILES FOR M5

		{P001,P002}	(0.4)	θ	(0.6)
{P001}	(0.744)	{P001}	(0.297)	{P001}	(0.446)
{P001,P002,P003,P004)		{P001,P002}	(0,102)	{P001,P002,P003,P004}	(0.153)
θ ((0.063)	{P001,P002}	(0.25)	θ	(0.0378)

Based on the calculation of the combination rules for M5 above, it can be obtained:

$$\begin{aligned} & \text{M}_{5}\{\text{P001}\} = \frac{0.297 + 0.446}{1 - 0.0378} = \frac{0.743}{0.9622} = 0.772 \\ & \text{M}_{5}\{\text{P001}, \text{P002}\} = \frac{0.102 + 0.025}{1 - 0.0378} = \frac{0.127}{0.9622} = 0.131 \\ & \text{M}_{5}\{\text{P001}, \text{P002}, \text{P003}, \text{P004}\} = \frac{0.153}{1 - 0.0378} = \frac{0.153}{0.9622} = 0.159 \end{aligned}$$

From the results of the calculation of the combined M5 density value above, it can be seen that the results of sexual disorders (paraphilia) with the type of Voyeuristic Disorder (P001) with a probability value or confidence value of 0.772 or if the percentage becomes 77.2%. This research was conducted at MTS Swasta YPII Kotarih, this study used passive particion observations. The data obtained from the data of class VII students in the odd semester of the 2020/2021 academic year, the number of student data taken as a sample is 142 people. The output in this study is divided into two categories, namely Excellent Students and Not. Based on the output to be generated, the authors use classification techniques.

4. Conclusion

Based on the results of the decision tree above, there are 19 rules that were tested, the data testing was based on the 19 rules that had been set, from 142 data tested 73.94%: 26.06%, 105 data were appropriate and 37 data did not match. Application of the C4.5 Algorithm in classifying using a decision tree. The C45 algorithm is used to analyze student assessments in semester 7 of 2020/2021, the student data is applied to the KDD stages starting from data selection, Pre-Processing, Transformation, Data Mining, and Evaluation, by classifying which students are superior students, so that placement students who enter the superior class according to the achievements achieved.

References

- Bhaskara, K., Hidayat, N., & Muflikhah, L. (2019). Sistem Diagnosis Penyakit Kelamin Pada Pria Menggunakan Metode Forward Chaining Dan Dempster-Shafer. Jurnal Pengembangan Teknologi Informasi Dan Ilmu Komputer E-ISSN, 2548, 964X.
- Daud, F. K. (2016). PARAFILIA: NATURE ATAU NURTURE? TINJAUAN TEOLOGIS DAN PSIKOLOGIS. Al-A'raf: Jurnal Pemikiran Islam Dan Filsafat, 13(2), 283–311.
- Gozali, S. A., & Jollyta, D. (2019). Metode Dempster Shafer untuk Mendeteksi Penyakit Mental Disorder: Skizofrenia dan Psikotik. Jurnal Mahasiswa Aplikasi Teknologi Komputer Dan Informasi (JMApTeKsi), 1(2), 104–109.
- Hairani, H., Kurniawan, K., Abd Latif, K., & Innuddin, M. (2021). Metode Dempster-Shafer untuk Diagnosis Dini Jenis Penyakit Gangguan Jiwa Skizofrenia Berbasis Sistem Pakar. Sistemasi: Jurnal Sistem Informasi, 10(2), 280–289.
- Hastari, D., & Bimantoro, F. (2018). Sistem pakar untuk mendiagnosis gangguan mental anak menggunakan metode dempster shafer. Jurnal COSINE, 2.
- Rahmadhani, A., Fauziah, F., & Aningsih, A. (2020). Sistem Pakar Deteksi Dini Kesehatan Mental Menggunakan Metode Dempster-Shafer. SISFOTENIKA, 10(1), 37–49.
- Sembiring, N. S. B., & Sinaga, M. D. (2017). Penerapan Metode Dempster Shafer Untuk Mendiagnosa Penyakit Dari Akibat Bakteri Treponema Pallidum. CSRID (Computer Science Research and Its Development Journal), 9(3), 180–189.
- Utomo, D. W., & Suprapto, N. H. (2017). Pemodelan Sistem Pakar Diagnosis Penyakit pada Sistem Endokrin Manusia dengan Metode Dempster-Shafer. Jurnal Pengembangan Teknologi Informasi Dan Ilmu Komputer E-ISSN 2548. 964X.
- Wiyandra, Y. (2019). SISTEM PAKAR GINEKOLOGI DENGAN METODE FORWARD CHAINING DAN CERTAINTY FACTOR. JOISIE (Journal Of Information Systems And Informatics Engineering), 3(2), 71–78.
- Yuwono, D. T., Fadlil, A., & Sunardi, S. (2019). Comparative Analysis of Dempster-Shafer Method and Certainty Factor Method On Personality Disorders Expert Systems. Scientific Journal of Informatics, 6(1), 12–22.