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Performance Analysis of Network Selection Using ELECTRE Method

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Abstract

In this type of networks, overall network stability, utilization of resources, User satisfaction and most conducive to quality of service and selecting a Trusted access network (AN) is network in HWN (ANS) paper Proposes plan proposed project user, Can consider operator and/or quos perspectives general multicriteria software assistant (SA) was used to present and design. In imperfect wireless networks Bayesian information on the network selection problem we make it a game. Generally, a mobile user's preference (i.e., usage) is personal information. Therefore, each user provides others an optimal network selection decision must be made. Bayesian Nash equilibrium is assumed to be the solution of this game, also between the Bayesian Nash equilibrium and the equilibrium distribution of aggregate dynamics there is a one-to-one mapping. This is a Bayesian network selection game Integration of overall optimal response dynamics Numerical results. Show that Referring to the notification, the current paper is called Exams presents a review on the application of MCDM to determine the best PC architecture among three PC architectures, i.e.: A, B&C using ELECTRE technique based on four criteria. Provides a dynamic response to the problem. Henceforth this strategy is incorporated in this study. Arrangements obtained by AHP and ELECTRE technique are considered in the present study. Alternatives represent attributes such as Network Selection 1, Network Selection 2, Network Selection 3, Network Selection 4, and Network Selection 5. Delay (msec), Jitter (msec), BER (• 10), Throughput (kbps), Cost (units) is an evaluation method. In this type of analysis, Gray Correlation Analysis (GRA) methods determine the best solution for a short distance to negativity and a long distance to solution. As a result, Wireless Network 5 ranked first and Wireless Network 4 ranked lowest.

Keywords: Network Selection, ELECTRE, SEMA, Fuzzy logic.

Introduction

There are various possible network selection strategies or policies for the user. For example, regardless of the current characteristics of a particular network User can choose to stick with it or always choose Cheap network or Go to random network selection. However, the user's we believe that an intelligent choice should be made. In heterogeneous wireless networks, various wireless access technologies, and Coverage area Mobility support in terms of bandwidth and cost are coordinated to complement each other. Because of this diversity, scheme is required to support load balancing. In heterogeneous wireless networks Network selection can be classified into two approaches, ie network driven and User-driven selection. With a network-driven approach, the selection result is taken from the network side. Therefore, a central controller is suitable for a tightly integrated environment that distributes traffic between different networks. In detail, the specialized and fundamental leadership of AHP science presents several strategies under MCDM techniques. ELECTRE is one of the MCDM techniques. SEMA and the European Consultative Organization are the start of the ELECTRE strategy. An examination panel at SEMA dealing with complex factual issues including multiple criteria. A hypothesis on multi-criteria strategy, out-positioning method and establishment of ELECTRE technique for selection support was elucidated by B. Roy9, 10. Previously, this advanced system was grouped into categories, but there is no problem in determining the best PC architecture among the three systems, A, B&C corresponding to four criteria.

Network Selection

The network selection problem is considered as a problem, because constant and Sometimes of conflicting parameters/criteria many combinations are involved in the process. Effect of criterion weights design strategies Establishment of A joint A multi-use function is proposed. According to design strategies, Design requirements we present. A multi-criteria utility function. Then, several relevant criteria are the utility function properly designed Detailed evidence is provided. For connected vehicle applications Network selection Multi-constraint optimization intricately designed. In a heterogeneous system, to determine mechanism should be developed. User Dynamics of behavior and Used to investigate for calculating subjective weights these traditional methods. Fuzzy logic-based uses a very basic framework without coupling to any other theory, which eliminates the repetitive part. In their scheme, three input fuzzy variables (i.e., short-interference probability, radio handover failure probability, and amount unsent messages) are considered, at the same time for network selection we can certainly consider additional attributes as input fuzzy variables. At the beginning of the process, Fuzzy variables are fuzzy and by a singleton fusilier are transformed into fuzzy sets. A dynamic system for selecting such as Quos and cost attributes Based on current market conditions a service delivery network is described in [3]. Using the proposed framework, the user can select the delivery network for the call. Active multi-mode terminal between changed. Obviously, network selection and vertical handover decision Integrated wireless and There are two important processes in mobile networks. To increase throughput, Data call as much as possible the authors proposed that it should be placed in a high-bandwidth network. Network selection Driven by user preferences of the handover process becomes the main component. In fact, the collateral selection includes the enables. Traditionally, selection from different neighboring access nodes.

ELECTRE Method

The ELECTRE method is used for three main reasons. First, under each criterion between different alternatives (PIs). by summing the small differences (scores) in unique superior relationships can be established between the different PIs. Second, between all PIs Based on established relationships Network diagrams (included in assessment process) they provide an opportunity to add critical elements to start the PA process and adding network diagrams still contain PIs that are not important from the point of view of specific application or decisions made; Third, the by the ELECTRE method Based on the overall dominant structure To create final ranking performance indices For PIs during the detailed PA process Importance is used to assign weights. Uses logic determine most suitable cosmetics for facial skin type. Differences in research conducted on skin care product recommendations and ranking of methods used. The use of the ELECTRE method has several advantages, such as multi-criteria decision based on a priori concept using pair wise comparisons of alternatives based on each relevant criterion [26] so it is suitable for cases with many alternatives but only a few criteria. ELECTRE method and recommend skin care product selection. ELECTRE was developed the shortcomings of existing. This is the philosophy of decision support – a philosophy that Roy discusses at length. ELECTRE has evolved through several editions (I to IV); it should be noted that the ELECTRE "best" result is not provided as an aid. This is a proven approach. The latter includes the ELECTRE TRI assistant. Several priority methods are considered. Also suitable for decision making. ELECTRE method in 70s Developed by Bernard Roy and aimed at creating a multi-criteria decision support method than the French method. From a set of actions decision makers to choose the best course of action it allows. Here, it is the best alternate path among the set of paths. (Intermediate route or not) is the 'best alternative route' with lower Low transportation costs and such as travel time Social and environmental impacts.

TABLE 1. Data Set for Network selection

	Delay(msec)	Jitter(msec)	BER(10)	Throughput(kbps)	Cost(units)
Network 1	9.823	12.098	12.785	16.507	7.908
Network 2	8.789	11.347	19.895	18.897	13.904
Network 3	18.905	13.689	10.987	12.643	12.878
Network 4	12.908	8.512	13.89	11.098	12.507

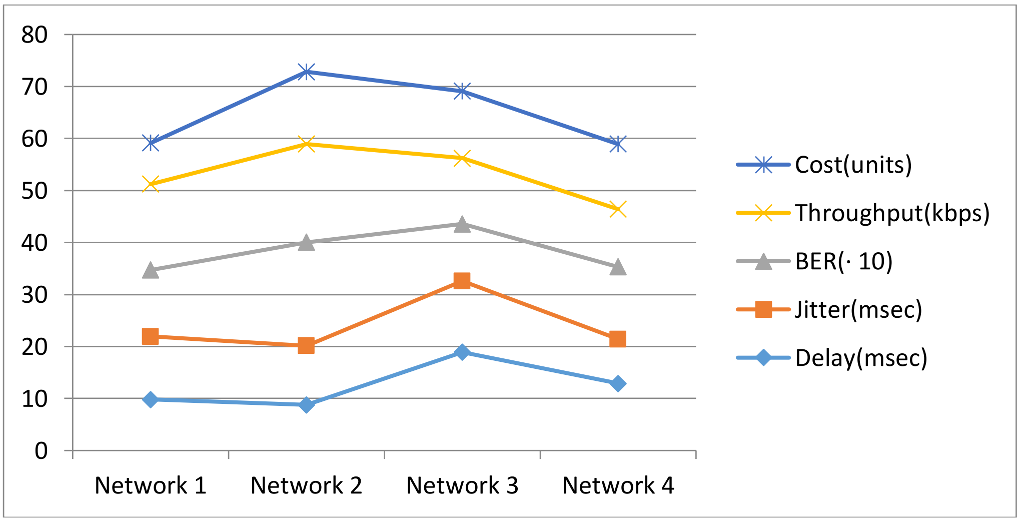

FIGURE 1. Network Selection

TABLE 2. Network selection for SUM & SQRT

	Delay(msec)	Jitter(msec)	BER(· 10)	Throughput(kbps)	Cost(units)
Network 1	96.49133	146.3616	163.4562	272.481	62.53646
Network 2	77.24652	128.7544	395.811	357.0966	193.3212
Network 3	357.399	187.3887	120.7142	159.8454	165.8429
Network 4	166.6165	72.45414	192.9321	123.1656	156.425
SUM	697.7533	534.9589	872.9135	912.5887	578.1256
SQRT	26.41502	23.12918	29.54511	30.20908	24.04424

Table 2. Shows the Autonomous Maintenance SUM & SQRT value of Alternative: Network 1, Network 2, Network 3, and Network 4. Evaluation Parameter: Delay (msec), Jitter (msec), BER (• 10), Throughput (kbps), Cost (units). This table mention the SUM & SQRT value Delay (msec) SUM=697.7533, SQRT=26.41502. Jitter (msec) SUM=534.9589, SQRT=23.12918. BER (• 10) SUM=872.9135, SQRT=29.54511. Throughput (kbps) SUM=912.5887, SQRT=30.20908. Cost (units) SUM=578.1256 SQRT= 24.04424.

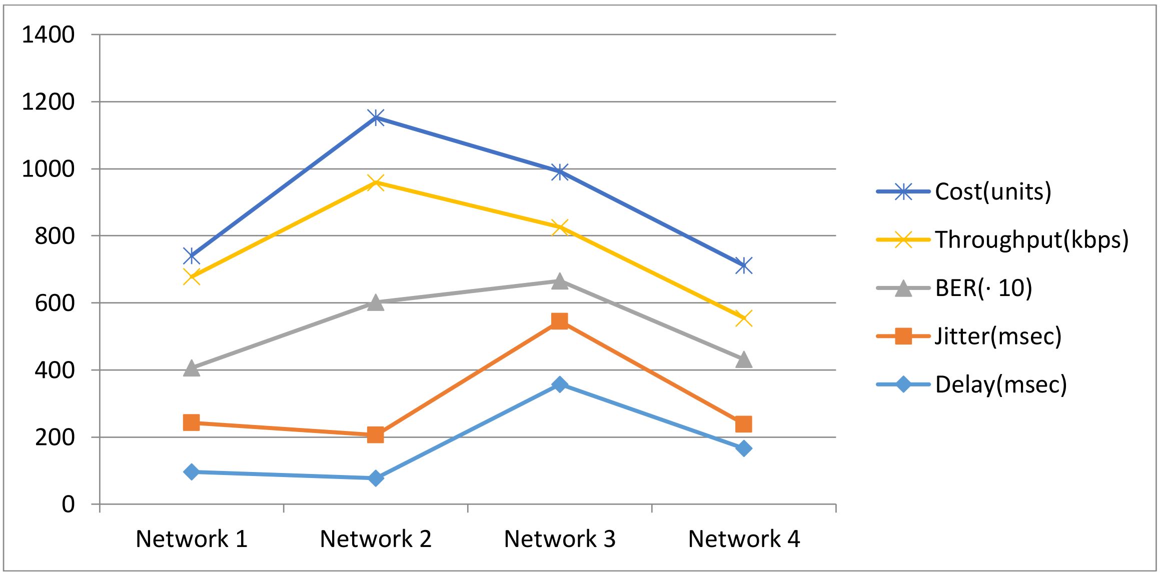

FIGURE 2. Network selection for SUM & SQRT

TABLE 3. Normalized Data Matrix

	Delay(msec)	Jitter(msec)	BER(· 10)	Throughput(kbps)	Cost(units)
Network 1	0.371872	0.523062	0.432728	0.546425	0.328894
Network 2	0.332727	0.490592	0.673377	0.62554	0.578267
Network 3	0.715691	0.59185	0.371872	0.418517	0.535596
Network 4	0.488661	0.36802	0.470129	0.367373	0.520166

Table 3. Shows the Normalized Data Matrix of Alternative: Network 1, Network 2, Network 3, and Network 4. Evaluation Parameter: Delay (msec), Jitter (msec), BER (• 10), Throughput (kbps), Cost (units).

TABLE 4. Weighted Normalized matrix

	0.2336	0.1652	0.3355	0.1021	0.0424
	Delay(msec)	Jitter(msec)	BER(· 10)	Throughput(kbps)	Cost(units)
Network 1	0.086869	0.08641	0.14518	0.05579	0.013945
Network 2	0.077725	0.081046	0.225918	0.063868	0.024519
Network 3	0.167185	0.097774	0.124763	0.042731	0.022709
Network 4	0.114151	0.060797	0.157728	0.037509	0.022055

Table 4. Shows the Weighted Normalized matrix value of the Delay (msec) =02336, Jitter (msec) =0.1652, BER (• 10) =0.3355, Throughput (kbps) =0.1021, Cost (units) =0.0424. Normalized Data Matrix multiplication criterion Weights this will be going to multiply again will be constant Weighted Normalized matrix value.

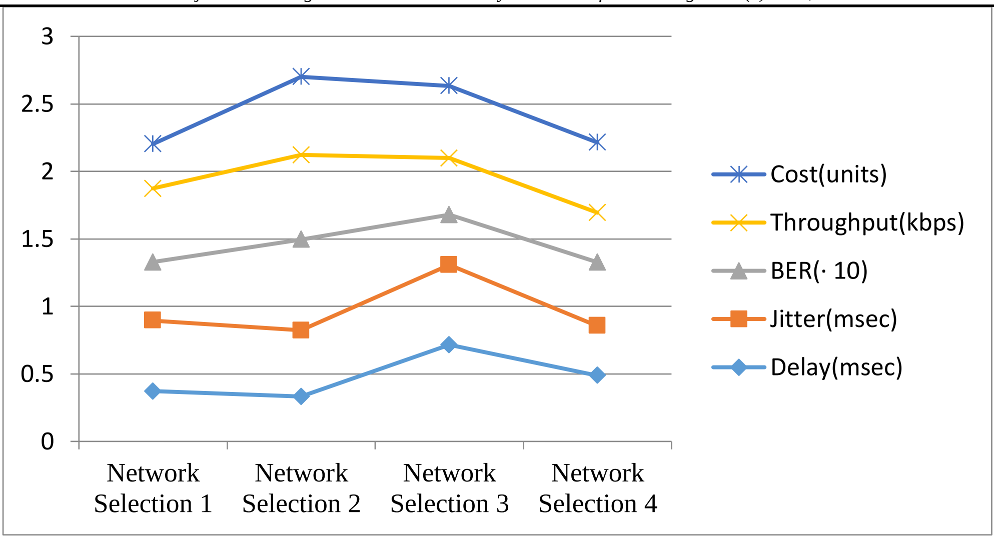

FIGURE 3. Network selection for Normalized Data Matrix

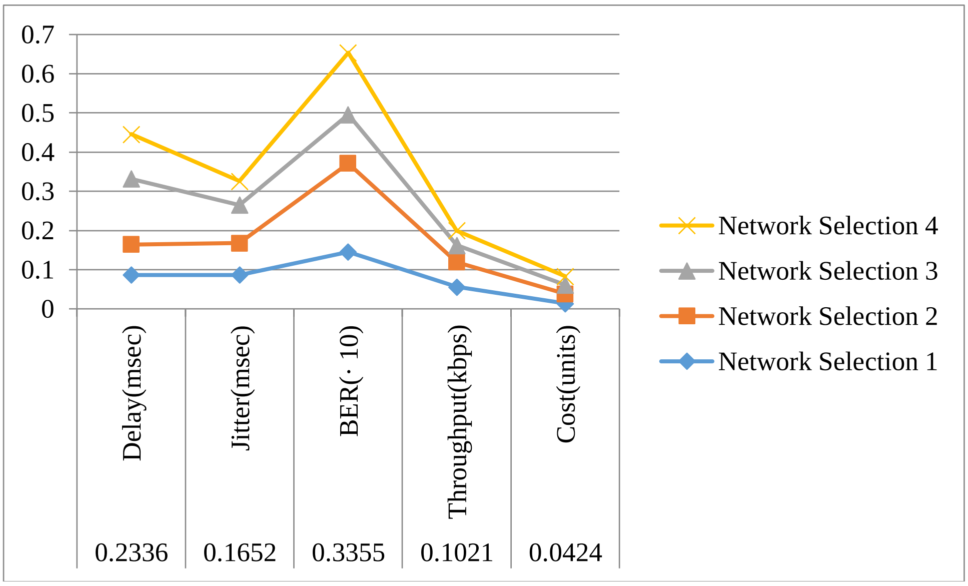

FIGURE 4. Network Selection for Weighted Normalized matrix

FIGURE 4. shows the graphical representation Weighted Normalized matrix Network 1 is highest value. Network 4 is lowest value. Network 3 and Network is Normalized value.

TABLE 4. Concordance Interval Matrix & Discordance Interval Matrix

C12 ={2}	D12 = {1,3,4,5,6}
C13 = {3,5}	D13={1,2,4,6}
C14 = {2}	D14={1,3,4,5,6}
C21={1,3,4,5,6}	D21={2}
C23={1,3,5}	D23={2,4,6}
C24={1,4}	D24={2,3,5,6}
C31={1,2,4,6}	D31={3,5}
C32={2,4,6}	D32={1,3,5}
C34={1,2,4,6}	D34={3,5}
C41={1,3,4,5,6}	D41={2}
C42={2,3,5,6}	D42={1,4}
C43={3,5}	D43={1,2,4,6}

Table 4.Shows the concordance and discordance sets A= {a,b,c,...} can denote a finite alternative set, the following formula divides the attribute sets into two different sets concordance interval set (Cab) and discordance interval set (Dub).

TABLE 5. Concordance

1	1	0	0	0
0	0	1	1	0
0	1	0	1	0
0	0	1	1	1
0	0	1	1	1
0	1	1	1	1
1	1	0	0	1
1	1	0	0	0
1	1	0	1	1

Table 5Shows the Concordance =IF (I12>=I13, 1, 0).

TABLE 6. Network selection for Concordance Interval Matrix

	M1	M2	M3	M4	
Network selection 1	0	0.1652	0.3779	0.1652	0.7083
Network selection 2	0.7136	0	0.6115	0.3357	1.6608
Network selection 3	0.5009	0.2673	0	0.5009	1.2691
Network selection 4	0.7136	0.5431	0.3779	0	1.6346
SUM	1.9281	0.9756	1.3673	1.0018	6
	c bar				0.5

TABLE 7. Concordance Index Matrix

	M1	**M2**	**M3**	**M4**
M1	0	0	0	0
M2	1	0	1	0
M3	1	0	0	1
M4	1	1	0	0

TABLE 8. Discordance

	Delay(msec)	**Jitter(msec)**	**BER(· 10)**	**Throughput(kbps)**	**Cost(units)**
D12	0.009144	0.005364	0.080738	0.008078	0.010574
	1				
D13	0.080316	0.011364	0.020417	0.013059	0.008764
	1				
D14	0.027282	0.025613	0.012548	0.018281	0.00811
	1				
D21	0.009144	0.005364	0.080738	0.008078	0.010574
	0.066437				
D23	0.08946	0.016728	0.101155	0.021137	0.00181
	0.208957				
D24	0.036426	0.020249	0.06819	0.026359	0.002464
	1				
D31	0.080316	0.011364	0.020417	0.013059	0.008764
	0.254208				
D32	0.08946	0.016728	0.101155	0.021137	0.00181
	1				
D34	0.053034	0.036977	0.032965	0.005222	0.000654
	0.621582				
D41	0.027282	0.025613	0.012548	0.018281	0.00811
	0.938824				
D42	0.036426	0.020249	0.06819	0.026359	0.002464
	0.534184				
D43	0.053034	0.036977	0.032965	0.005222	0.000654
	1				

TABLE 9. Discordance Interval Matrix

	M1	M2	M3	M4	
Network selection 1	0	1	1	1	3
Network selection 2	0.066437	0	0.208957	1	1.275394
Network selection 3	0.254208	1	0	0.621582	1.87579
Network selection 4	0.938824	0.534184	1	0	2.473008
SUM	1.259469	2.534184	2.208957	2.621582	8.624192
				d bar	0.718683

TABLE 10. Discordance Index matrix

	M1	M2	M3	M4
Network selection 1	1	0	0	0
Network selection 2	1	1	1	0
Network selection 3	1	0	1	1
Network selection 4	0	1	0	1

TABLE 11. Net superior value & Net Inferior Value Rank

	Net superior value (Concordance Interval Matrix)	**Rank**	**Net Inferior Value** (Discordance Interval Matrix)	**Rank**
Network selection 1	-1.2198	4	1.740531	1
Network selection 2	0.6852	1	-1.25879	4
Network selection 3	-0.0982	3	-0.33317	3
Network selection 4	0.6328	2	-0.14857	2

Table 11. Shows the Net superior value & Rank (Concordance Interval Matrix) Rank the Network 1 is in Lowest Rank, Network 2 is in First Rank, Network 3 is in Third rank, and Network 4 is in Second rank. Net Inferior Value (Discordance Interval Matrix) Network 1 is in First rank, Network 2 is in lowest rank, Network 3 is in Third rank, and Network 3 is in Second rank.

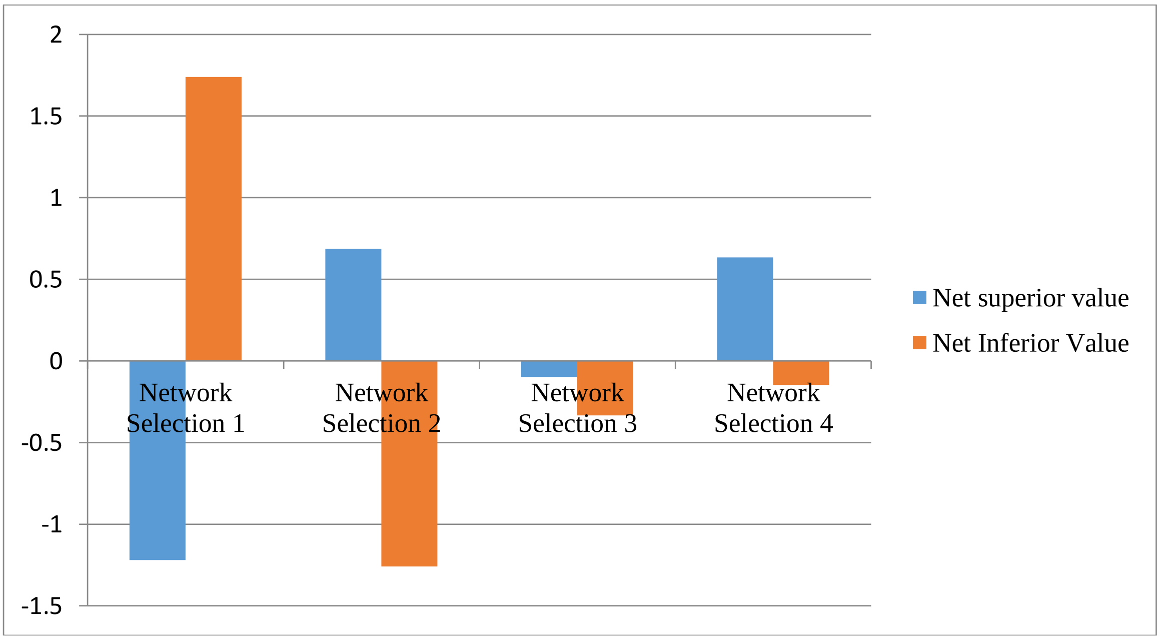

FIGURE 5. Net superior value & Net Inferior Value Rank

Figure 5 shows the graphical representation Net superior value and Net Inferior value (Concordance Interval Matrix) Network 1 Value -1.2198, Network 2 value 0.6852, Network 3 value -0.0982, Network 4 Value 0.6328. Net Inferior Value (Discordance Interval Matrix) Network 1 value 1.740531, Network 2 value -1.25879, Network 3 value -0.33317, Network 4 Value -0.14857.

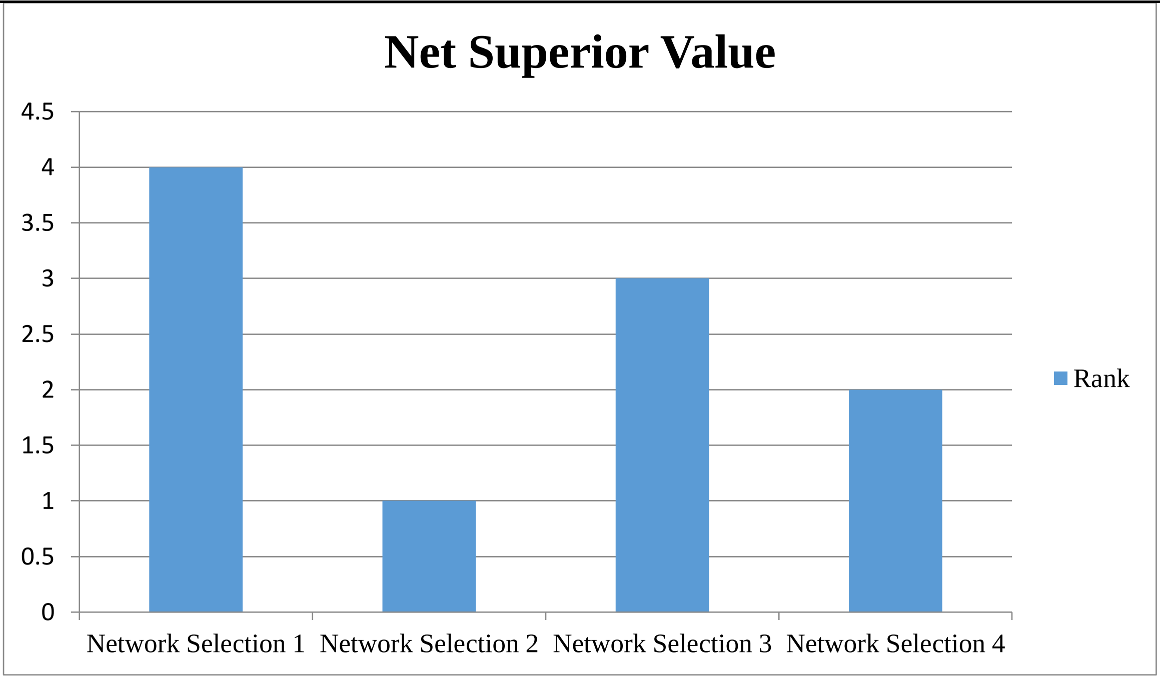

FIGURE 6. Net Superior Value

Figure 6 shows the graphical representation Net Superior Value Rank value of the Network 1 is in Lowest Rank, Network 2 is in First Rank, Network 3 is in Third rank, and Network 4 is in Second rank.

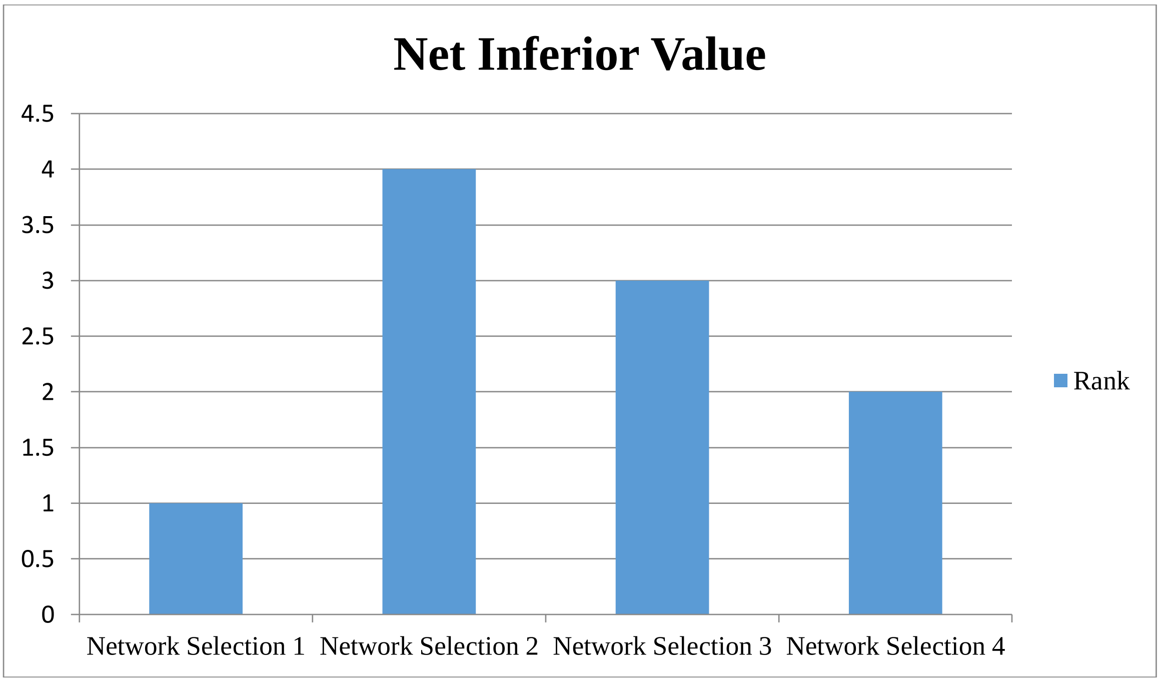

FIGURE 7. Net Inferior Value

Figure 7. Shows the graphical representation Net Inferior Value Rank value of the Network 1 is in First rank, Network 2 is in lowest rank, Network 3 is in Third rank, and Network 3 is in Second rank.

Conclusion

Complexity of network choice NP-hard optimization Recognized as problematic [10]. Because each user has their own preferences, there is no universally optimal solution in the context of network selection. Since some conditions may conflict, it may be difficult to select an access network that meets all conditions. One may want to choose a cheaper access network, while another may want to connect to one with higher performance. Therefore, multiple criteria based on user preferences become a means to overcome the complexity of the decision-making process. User preferences represent an evaluative relationship between a set of criteria considered and the degree of importance of a criterion in a network selection strategy.

Prioritizing and evaluating appropriate Renewable Energy Policy is In the field of energy Considered a complex decision-making process. For this purpose, under conditions of uncertainty In addition, modified option to select alternative, Different information and Conflicting evaluation criteria may be considered. To overcome this problem, MODIFIED-ELECTRE, in practice of the proposed soft computing approach, A reluctantly ambiguous conclusion by matrix and linguistic variables Rating of delivered power and the relative importance of criteria are then converted into non-hesitant vague elements. In addition, modified option coding system in a non-hesitant fuzzy system is Professional energy the experts weigh in Proposed to be determined. Finally, to select optimal network with correlation matrix obtained by ELECTRE we combine optimal weights. The simulation results show that the ELECTRE algorithm alone does not reduce ELECTRE is based on a cumulative function representing "closeness to ideal" generated by a compromise programming system. As a result, Net superior value Rank network 2 has the highest ranking, while network 1 has the lowest ranking and Net Inferior Value network 1has the highest ranking network 2 as the lowest ranking.

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