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Sustainable assessment of Heterogeneous Wireless Network Using WASPAS Method

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Abstract

Heterogeneous Wireless Network, Device-to-device (D2D) and heterogeneous networks are key to the success of 5G networks. Multimodal networks consist of fixed location base stations/small cells, each of which may have a different range and type of connection to a mobile network operator (MNO). Wireless networks in our environment use Different access technologies, via wireless LAN Wireless network and cellular that provide the service Services can be maintained while switching to a network It is called a wireless multicast network. WASPAS Method Weighted Sum Model (WSM) and Advantages of Weighted Product Model (wpm) uses. Integrating WSM and WPM, Ranking of WASPAS alternatives increases accuracy. That at the stage, WASPAS is an optimum calculates the additive parameter, it will be given in detail later. The WASPAS method of analysis is excellent the best solution. Short distance and negative-best is more than solution the long-range solution determines, but a comparison of these distances not considered significant Alternative: VoIP (protocol), Streaming, Web Browsing, and Transmission Control Protocol (TCP). Evaluation Preference: Allowed bandwidth, usage, Packet delay, packet jitter, packet Loss to calculate the final value. The result it is seen that Utilization is got the first rank where as is the Packet delay is having the lowest rank. The value of the dataset for Range of Heterogeneous Wireless Network in WASPAS (Weighted Aggregated Sum Product Assessment) method shows that it results in Utilization and top ranking.

Keywords: MCDM, Allowed Bandwidth, Utilization, Packet delay, Packet Jitter and Packet Loss.

1. Introduction

MCDM involves multi-criteria decision making and Concerned with formulating and solving planning problems contains Face such problems Its purpose is to support decision makers. Multi-criteria decision analysis, etc and that the criteria are decision-making called,is the process of making decisions when several criteria must be considered together to rank or choose between alternatives.A fuzzy MCDM model is used to evaluate alternatives against criteria selected by a decision-making group, where the relevance of alternatives and criteria and the criteria's importance weights can be evaluated in linguistic values represented by fuzzy numbers.Multiple using multi-attribute value tree analysis Criterion decision analysis is stakeholder groups And many and often of decision makers Complex decision-making with conflicting objectives A generic term for methods that support scenarios. Value differently.Fuzzy analysis refers to a method for solving problems associated with uncertainty and ambiguity; It is engineering Used in many areas such as and Decision problems, planning and applications contains manufacturing.Multi-Criteria Evaluation (MCE) in GIS is A variety of selected areas for a specific purpose based on characteristics It is a study of allotment of land. MCE became of compromise alternatives and alternatives according to their attractiveness Makes it possible to create rankings.A computer network where all computers are the same or have the same or similar architecture, i.e. all network nodes have the same computer. A similar Homogeneous network. Heterogeneous Information Networks Rich semantics on nodes and connections Contains information. For example, a bibliography In information networking, teachers, conferences and By different types of nodes like headers Documents are linked to each other.

2. Heterogeneous Wireless Network

A fuzzy-logic-based multi- Scale decision making system Access Network Implementation Selection is described in a heterogeneous network context in. across heterogeneous wireless networks A Simple Policy-Enforced Handoff System Provided, users have the best wireless system at any time, the policies on what is trading Exchanges can be made between Network characteristics and cost, performance and dynamics such as power consumption. [1] Help us integrate diversityMuch emphasis has been placed on wireless networks such as Cellular networks, WLANs and more MANETs include interface devices.[2] SDN- A radio resource in based wireless NFV Slicing architecture has three main advantages Contains: Spectrum Sharing is achieved in Heterogeneous wireless infrastructures are physically overwhelming In a software-based way instead of using With increased CapEx and OpEx SBSs; A central controller keeps global information on the physical network, Facilitates resource sharing without distributed information, heterogeneity QoS isolation for coexistence of different services needed. of different types Service Types. Resource for various service groups QoS isolation by creating fragments A promising approach to achieving this is resource slicing is [3]. In heterogeneous wireless networks, a critical task for mobile

terminals is anytime, anywhere Choosing the best network for various communications. which is called network selection. The latest Over the years, this topic has been the subject of various mathematical theories is widely studied using Theory used Optimization determines the scope of complexity and efficiency, and hence the mathematical potential Understand the principles and get the best result Choosing the right one is important.[4] There is a Wireless Communication Research Society Incorporated Robust next-generation communications for vehicles Wi-Fi, WiMAX and LTE information to provide networking Combinations of DSRC with communication technologies investigates.Also, DSRC roadside units are expected to At key locations such as junctions and interchanges will be installed. Hence, limited coverage of DSRC and existing Wi-Fi, WiMAX and LTE Consolidation of networks is CVT A heterogeneous wireless network for applications create [5] IoT types based on D2D communication are Bluetooth, Wi-Fi and ZigBee. Across the network, devices with human intervention or can be handled autonomously. Thus to avoid human intervention, adaptive MAC and physical Based on the signal strength obtained by layering mechanism An intelligent heterogeneous wireless network is emerging.Multi-hop wireless network for IoT applications Efficiently handle between BLE and HaLow Becomes smarter. of the received signal Basically the strength between these technologies Switching and Switching Physical and MAC layer two Methods are proposed. [6]. This will create A heterogeneous wireless access environment. Network congestion and performance degradation. Evolution games In a heterogeneous wireless network using theor Network selection dynamics. Size bandwidth is designed as a dynamic evolution game in wireless access networks where Groups of users in different service areas are available to share competitively defined, [7]. Battery-efficient devices and integrated power requirements Management tools, electronic in heterogeneous wireless network environment Both adaptive multimedia delivery and network selection to reduce consumption It is tempting to propose a hybrid adapter-handover solution that uses Each element of the proposed solution is for Jack's best ride have a role in helping connection ever'. [8] Heterogeneous Wireless Networks. We want to know that instead of placing base stations connected to each other by a wire network, how to improve the uniformity capacity by using some more powerful wireless ad hoc networks auxiliary nodes. Note that most of the previous research assumes that the capacity network area is a square and trafficSymmetry refers to the number of raw nodesSame as the number of target nodes. However, those Special cases only [9]. Although there is previous work that considered wireless cachingAlgorithms do Don't consider layered video content and the relationship between different layers. This paper is layered video in a heterogeneous wireless network examines the content placement optimization problem of streaming, Its purpose is to average over a distributed caching network Reducing user download time. [10].

3. WASPAS (Weighted integrated sum product evaluation)

effective selections approximately the powerful use in their poor assets and make accurate selections. , Including Slicing Fluid, Electroplating System, Forging Level, Arc Welding Technique, Commercial Robot Various Multi-Criteria Decision Making (MCTM) Techniques currently help teams choosing the standard decisive route. In this paper, the compatibility of the Weight Total Product Assessment (WASPAS) technique is a powerful MCDM As the tool is explored, eight product choices are made at the same time Fixes issues, grinding situations, items Machining performance and electro-discharge micromachining along with the process. parameters. The acknowledged MCD map is a totally precise combination of cockroaches. The linear normalization Weighted Sum Model (WSM) and Weight Product Model (WPM) starting the selection matrix and the relevant selection All options considering issues should be evaluated. Evaluation of the WASPAS approach The effect of _ parameter on performance is also investigated. Application of the WASPAS method calls for two properly-being. Evaluating the providers within the chain and figuring out hierarchical pleasant with environmental requirements will enable us to obtain this objective of GSCM. This evaluation is normally the primary goal of inexperienced supply chain management (GSCM) with some options and a few standards to decrease detrimental environmental impacts on all functions and bounds of the deliver chain. Because of the content, Green Dealer Selection (GSS) can be taken into consideration As a multi-criteria decision-making (MCTM) problem. Hard idea understand units is a powerful tool to display the uncertainty of facts in the MCDM trouble. Break Type-2 Obscure Sets (IT2FSs), a brand new incorporated approach of the usage of Type-1 Obscurity using a c-language language time period membership characteristic, is proposed to address the troubles of selecting more than one scale entities with IT2FS. Look at this, based on the Weighted Total Product Assessment (WASPAS) technique, This approach is based on the operators of IT2FS, with some modifications of the classical WASPAS gadget and a brand new approach to calculating public weight. standard Subjectivity expressed by selectors in the machine for calculating weights of the entropy approach to obtain weights, more realistic weights We integrate the resulting target weights. FirstUncertainty is inevitable in MCDM problems feature, the proposed method selects one It will be a useful device unsure environments. According to the assessment of the literature, WASPAS does not consider the traits of preceding trials and tribulations for the improvement challenge in corporations till the release of the projects. The single analytics method isn't always used if there are variations (alternatives) within a restricted variety. Techniques recognized inside the literature may be used to decide the uncertainty of experiments and using Multiple Attribute Decision Making Techniques (MADM) as a branch MCDM. An advent to the approach is given within the ‘WASPASS Method’ section. At the degree of ‘risk identity and standards weights’, the rankings (values) of the requirements for every variant of the member of the family are regularly provided within the shape of a choice matrix. WASPASS risks and criterion weights are identified. A communicate to evaluate a careful method with distinctive studies is primarily Based on the approximate findings and effects of the proposed method on the degree ‘hazard evaluation and numerical example’, the possibility evaluation concludes with a case evaluation of the street construction task in Iran. In the ‘Discussion’ phase, the method starts with trouble detection and then the choice of the choice. Have been stated. Then, in the 'Inventions and Conclusions' section, its predominant conclusions and obstacles are regarded. Once the criteria and alternatives are decided, the CRITIC method is used to decide the weight of the requirements and the WASPAS technique is used to evaluate alternatives. CRITIC and WASPAS methods are connected to the choice trouble. The MCDM is done with the proposed decision-makers HFS, and the modifications are finished inside the normalized and weighted production mode. Next, the motive of the examination is to reveal a GSS harassment approach and to introduce an added technique based totally

at the WASPAS method and truth measures to assess issues. To enlarge the WASPAS method with HFSs, it changed into also taken to illustrate the overall effectiveness of the approach evolved by using HF-aggregation operators on sensible MCDM issues. Sensitivity evaluation is carried out by way of converting the parameter. Finally, the evolved method is in comparison with previous approaches to demonstrate the consequences, the dimensions weights and the electricity of the effects made by the superior WASPAS method.Allowed bandwidth.

4. Analysis and Discussion

Table 1. Hetereogeneous Wireless Networkthe VoIP(protocol)it is seen that Packet Loss is showing the highest value for Packet Jitter is showing the lowest value. Streaming influence it is seen that Utilization is showing the highest value for the Allowed Bandwidth is showing the lowest value. Web Browsing it is seen that Packet delay is showing the highest value for Utilization is showing the lowest value. Transmission Control Protocol (TCP)it is seen that Utilization is showing the highest value for Allowed Bandwidth is showing the lowest value.

Table 1 - Heterogeneous Wireless Network in **Data** Set

	VoIP(protocol)	**Streaming**	**Web Browsing**	**Transmission Control Protocol (TCP)**
Allowed Bandwidth	51.08000	239.53000	40.15000	33.05000
Utilization	49.12000	342.97000	39.69000	44.30000
Packet delay	44.08000	322.58000	49.18000	43.10000
Packet Jitter	43.17000	328.28000	44.60000	37.59000
Packet Loss	53.33000	286.41000	47.96000	38.89000

Table 1 shows the Heterogeneous Wireless NetworkAlternative: VoIP(protocol), Streaming,Web Browsing, and Transmission Control Protocol (TCP).Evaluation Preference:Allowed Bandwidth, Utilization, Packet delay, Packet Jitter, Packet Loss to calculate the final value.

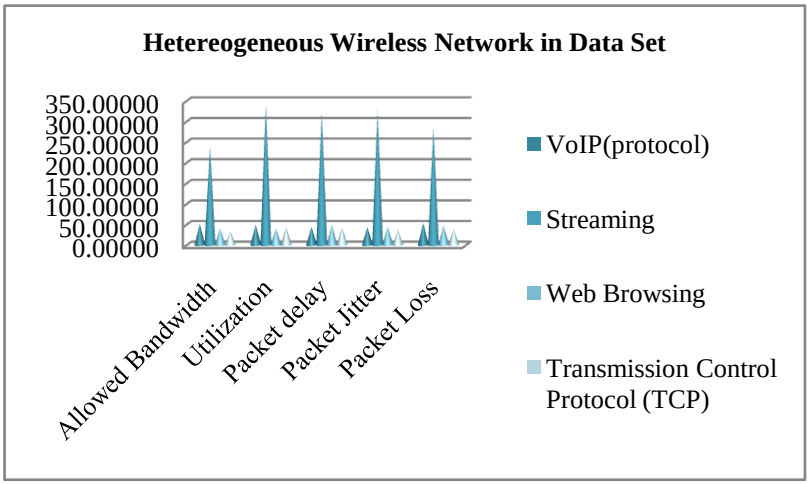

Figure 1 - Hetereogeneous Wireless Network in **Data** Set

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Table 2 - Hetereogeneous Wireless Network in Performance value

	Performance value			
Allowed Bandwidth	0.95781	0.698399	0.988543	1
Utilization	0.921058	1	1	0.74605
Packet delay	0.826552	0.940549	0.807035	0.766821
Packet Jitter	0.809488	0.957168	0.88991	0.879223
Packet Loss	1	0.835088	0.827565	0.849833

Table 2 shows the Performance value is divided by the maximum of the given value

Table 3 - Hetereogeneous Wireless Network in Weight age

Weight			
0.25	0.25	0.25	0.25
0.25	0.25	0.25	0.25

0.25	0.25	0.25	0.25
0.25	0.25	0.25	0.25
0.25	0.25	0.25	0.25

Table 3 shows the weight of the Hetereogeneous Wireless Networkthe weight is equal for all the value in the set of data in the table 1. The weight is multiplied with the previous table to get the next value.

Table 4 -Hetereogeneous Wireless Network in Weighted normalized decision matrix (WSM)

	Weighted normalized decision matrix			
Allowed Bandwidth	0.239452	0.1746	0.247136	0.25
Utilization	0.230264	0.25	0.25	0.186512
Packet delay	0.206638	0.235137	0.201759	0.191705
Packet Jitter	0.202372	0.239292	0.222478	0.219806
Packet Loss	0.25	0.208772	0.206891	0.212458

Table 4 shows the weighted normalization decision matrix it is calculated by multiplying the weight and performance value in table 2 and table 3

Table 5 - Hetereogeneous Wireless Network in Weighted normalized decision matrix (WPM)

	Weighted normalized decision matrix			
Allowed Bandwidth	0.989281	0.914168	0.997123	1
Utilization	0.979652	1	1	0.929377
Packet delay	0.953493	0.984794	0.947814	0.93578
Packet Jitter	0.948533	0.989116	0.971262	0.968333
Packet Loss	1	0.955945	0.953785	0.960137

Table 5 shows the weighted normalization decision matrix it is calculated by multiplying the weight and performance value in table 2 and table 3

Table 6 - Preference Score (WSM) (WPM)

Preference Score	WSM Weighted Sum Model	**Preference Score**	WPM Weighted Product Model
0.91119		0.90177	
0.91678		0.91047	
0.83524		0.83284	
0.88395		0.88239	
0.87812		0.87542	

Table 6 shows the preference score of WSM Weighted Sum Model it is calculated by the sum of the value on the row of weighted normalized decision matrix. the preference score of WPM Weighted Product Model it is calculated by the product of the value on the row on weighted normalized decision matrix.

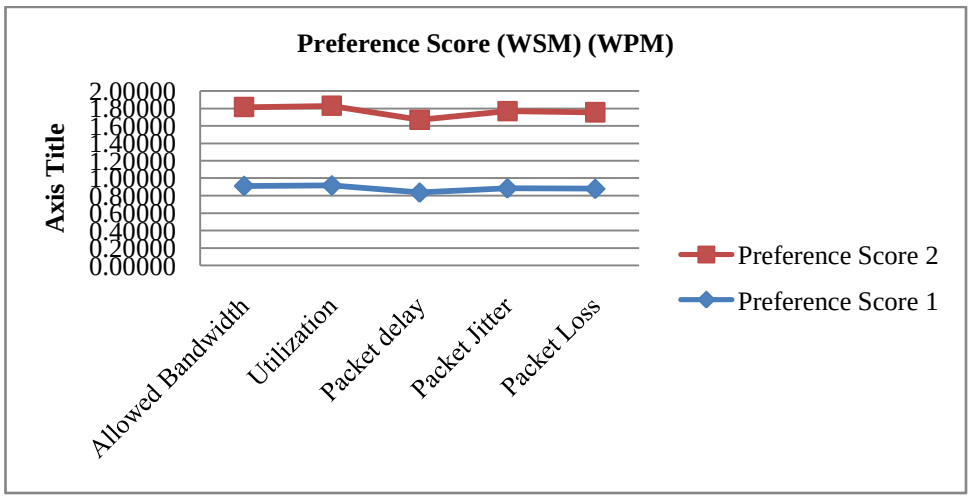

Figure 2 -Preference Score (WSM) (WPM)

Figure 5 shows the preference score of WSM Weighted Sum Model it is calculated by the sum of the value on the row on weighted normalized decision matrix. Government unity of leadership to plan (WSM) (WPM) is the highest and the value the calculation of the WPM Weighted Product Model and WSM Weighted sum Model.

Table 7 - WASPAS Coefficient

lambda	**WASPAS Coefficient**
0.5	0.906478
	0.913621
	0.834038
	0.883169

	0.876771

Table 7 shows the WASPAS Coefficient valuelambda 0.5

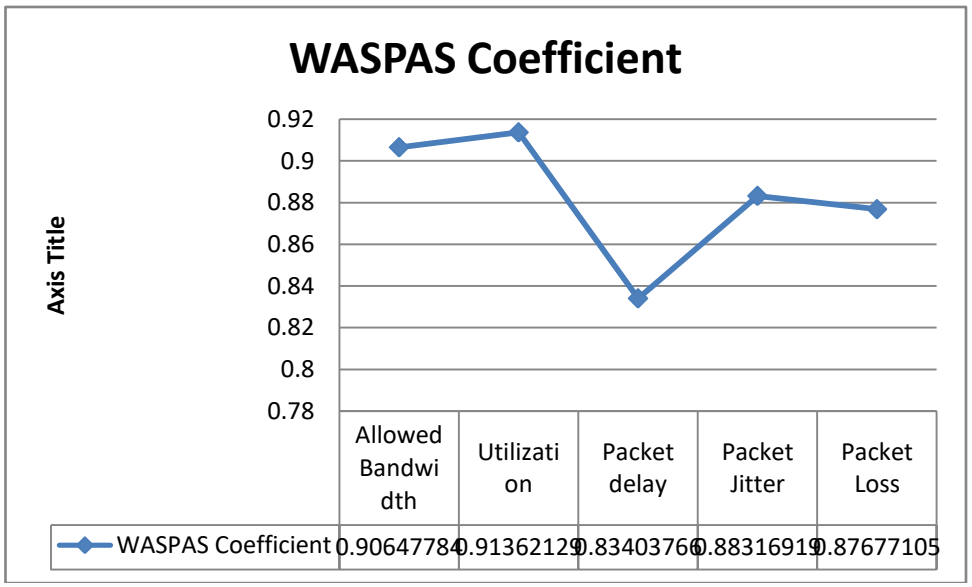

Figure 3 - WASPAS Coefficient

Table 8 - WASPAS Coefficient

	RANK
Allowed Bandwidth	2
Utilization	1
Packet delay	5
Packet Jitter	3
Packet Loss	4

Table 8 shows the Hetereogeneous Wireless Network the final result of this paper the Allowed Bandwidth 2nd rank. Utilization 1st rank. Packet delay 5th rank, Packet Jitter 3rd rank, Packet Loss 4th rank. The final result is done by using the WASPAS method.

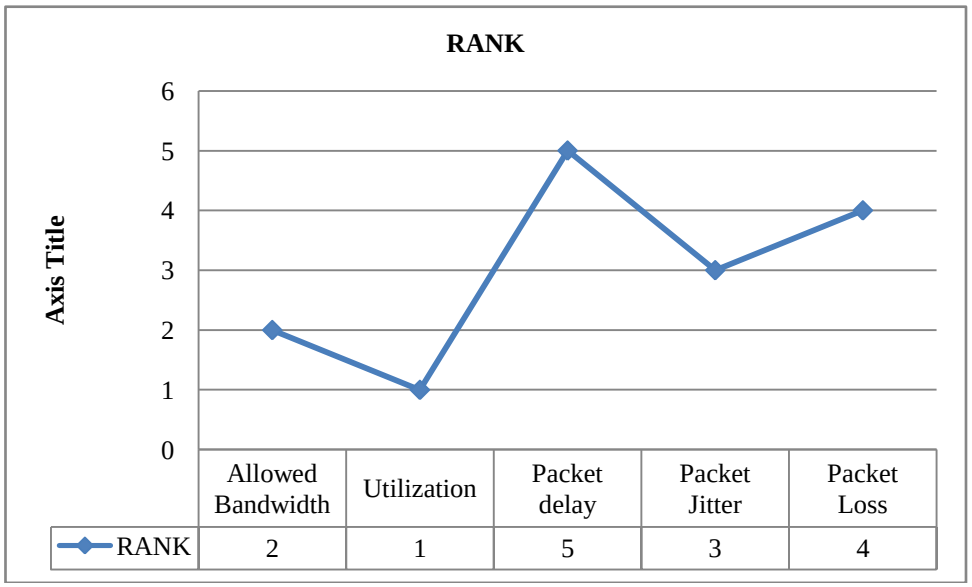

Figure 4 - Rank

Table 8 shows the Hetereogeneous Wireless Network the final result of this paper the Allowed Bandwidth 2nd rank. Utilization 1st rank. Packet delay 5th rank, Packet Jitter 3rd rank, Packet Loss 4th rank. The final result is done by using the WASPAS method.

5. Conclusion

Hetereogeneous Wireless Network, Device-to-device (D2D) and heterogeneous networks are key to the success of 5G networks. Multimodal networks consist of fixed location base stations/small cells, each of which may have a different range

and type of connection to a mobile network operator (MNO).MCDM involves multi-criteria decision making and Concerned with formulating and solving planning problems contains Face such problems Its purpose is to support decision makers.Multi-criteria decision analysis, etc and that the criteria are decision-making called,is the process of making decisions when several criteria must be considered together to rank or choose between alternatives.The WASPAS method of analysis is excellent the best solution. Short distance and negative-best is more than solution the long-range solution determines, but a comparison of these distances not considered significant Alternative: VoIP (protocol), Streaming, Web Browsing, and Transmission Control Protocol (TCP). Evaluation Preference: Allowed bandwidth, usage, Packet delay, packet jitter, packet Loss to calculate the final value. The result it is seen that Utilization is got the first rank where as is the Packet delay is having the lowest rank. The value of the dataset for Range of Hetereogeneous Wireless Network in WASPAS (Weighted Aggregated Sum Product Assessment) method shows that it results in Utilization and top ranking.

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