



# Analysis of Operating System Using TOPSIS MCDM Method

\*<sup>1</sup>A. Pon Bharathi, <sup>2</sup>M. Ramachandran, <sup>2</sup>Sathiyaraj Chinnasamy, <sup>2</sup>Malarvizhi Mani

<sup>1</sup>Amrita College of Engineering and Technology, Nagercoil, Tamilnadu, India.

<sup>2</sup>REST Labs, Kaveripattinam, Krishnagiri, Tamil Nadu, India.

\*Corresponding author Email: [bharathpon@gmail.com](mailto:bharathpon@gmail.com)

**Abstract.** Operating systems are computer software a user and a computer is between Communications an operating system. Operating system is most people are using the very difficult situation solving the problem in computer. TOPSIS (Technique for Order of Preference by Similarity to Ideal Solution) analysis using the Operating system 1, Operating system 2, Operating system 3, Operating system 4, Operating system 5 Alternative value and Memory management, Process management, Storage management, protection and security, Software Features Evaluation Parameters in value. Operating system 5 is got the first rank whereas is the Operating system 4 has the Lowest rank.

## 1. Introduction

An operating system (OS) is everything else on a computer Application programs are loaded into the computer through the boot program Then is the program to manage. Application programs through a defined application program interface (API). By making requests for services operating system uses. Running Ubuntu 18 and the latest version of Linux 5.0, obviously there are no performance weaknesses. Kernel functions are visible faster on patch operating systems than on all Operating systems or use a GUI (pronounced gooey). Congruence to Ideal Solution (TOPSIS) By means of the technique of priority order Multi-criteria outcome analysis method, it was first developed. Based on several criteria in the 1980s Ideal Solution as a Decision Making System (TOPSIS) through came the technique of order priority. TOPSIS is a short form ideal solution A negative ideal for Euclidean distance Selects alternatives further away from the solution. TOPSIS technique for solving decision problems commonly used.

## 2. Operating System

Operating system is multiplex and shrinking Physical Resources Software. We believe in the definition ESP. Its view Short for OS Hardware crashes and misdirects the basis behind our arguments intuitively, any OS abstraction not suitable for all applications [19]. Operating system portability addresses a very common problem with minicomputers. Unless considerable time and resources Software are earmarked for development, the to get a new minicomputer the result is mostly available to the machine to be predicted by software. Also, the main task is to develop software for a new machine Manufacturer. Thoth is a new one Porting to the machine is a substantial computer Software and machine-independent application Also offers a growing collection of programs [20]. Operating system services database management their applicability to supporting activities are examined for character. Buffer pool management among these services Includes; file system planning Process management and communication stops; and consistency control [1]. One of the reasons for the difficulty in performing such scheduling transplants the operating system and multimedia it's planning to support applications is that knowledge about the scheduler's characteristics often migrating to other elements the outcome of transplantation is unpredictable makes this consistent with our view [15]. A run on that app scheduler is not the only important feature of the system. An operating system kernel with a specific process isolation specification, and mechanically verifying the source to correctly implement that specification at the machine code level. We chose Boer-Moore logic for two reasons: first, our previous expertise in logic, and second, the Boer-Moore theorem was proved [16]. Operating Systems (OS) OS Almost every computer it is also at the heart of the organization there are also microkernels. Towards the latest in operating systems the trend is to check the size of the program. at about 10,000 locations. The properties to consider are Very compounds, which solve the industry considered impossible. Published Given the amount of case studies is the capabilities of the field No need to reflect [2]. A Working system for mod-elegance sensor nodes A very dynamic factor Occupy the design spectrum SOS is dynamically-loaded Blocks and unusual Contains the kernel, which other offerings may be co-programmed and haven't any reminiscence safety However, typed access factors Monitoring timers and primitive resource rubbish computer commonplace the usage of series like techniques Protects against blocking errors. Personal Modules with minimal setup can be added and removed [14]. As the operating system continues to be decentralized coming overall system performance Effective communication is key. Log in to the operating system and simulated engine. Operating systems boot Workloads run under steady-state conditions many transient effects occur in systems can express. To avoid these transient

effects File cache and file system name Kernel-resident such as translation cache Data structures are typically hot we confirm in our tests. A Working machine can only have a completely small number of variations, all of which might be almost identical, giving a very coherent subspace with few factors which are very carefully connected. Therefore, it best takes some guesswork to determine which version of the running device is in use, and this isn't always important for plenty of assaults. Any part of a program that performs any movement is straight away seen to a knowledgeable attacker, operating structures are not pressured. For this motive, a low-stage operating machine assault could be very smooth. The hassle for defenders is to find a manner to boom the complexity of the running system [9]. Operating machines give various services associated with vital assets like CPU, important reminiscence; storage and all enter and output devices. Integration of discrete and non-stop multimedia statistics needs extra services from running device components, mainly real-time processing of non-stop media statistics. This survey specializes in the simple ideas and inner workings of a multimedia running gadget, on the grounds that utility interfaces are often applied and product-precise and change hastily, even as the underlying mechanisms remain the same at least in the future [6]. Operating systems must specifically, they must handle the following: Heterogeneity Communication Environments: Mobile devices are many, varied changing communication technologies Handle and use accordingly be prepared. Exhibiting Latency, bandwidth, connectivity and Spread of utility cost Different characteristics [3]. Operating System - Processes the request laptop carrier via executing machine calls trapped within maximum excessive-degree components of pc provider practices aren't privy to the community. Within the system of a system call requiring a foreign provider, the working gadget compiles a message and sends it to the corresponding overseas website online [13]. Memory management Controls and integrates memory is the process. Operating system (OS), applications and other running processes and their functions in order to have the memory needed to do Blocks of memory space exactly this ensures that it is managed and assigned. Process management is a company strategy Aligning processes with goals; process Designing and implementing structures, Process measurement that is consistent with organizational goals Establishing systems and educating managers and Indicates regulation. Storage management is the storage of data resources Performance enhancing software and Refers to processes. Network virtualization, Replacement, reflection, protection, contraction, reduction, Traffic analysis, process automation Storage allocation and memory management these include. Security is the main task for a company to provide certain security measures so that no external user can access the knowledge of the company.

### 3. TOPSIS

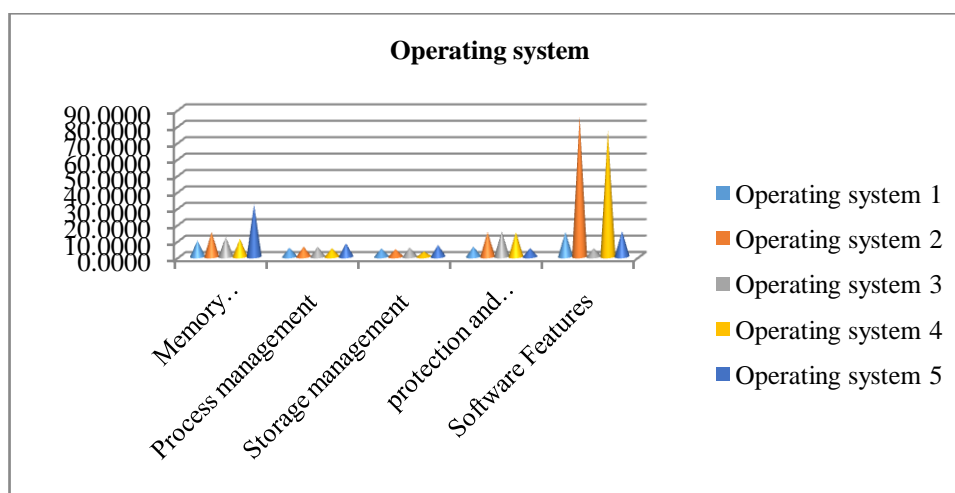
TOPSIS method of ranking evaluated based on enhanced ambiguity comparison with weighted average. One of the typical approaches Multiple response in the process used in TOPSIS to improve problems, reduce uncertainty can be used as a performance measurement index determining the weight of each response and manageable at the same time A global approach continuously [11]. The TOPSIS process is an advanced and simple ranking engine used. The state-of-the-art TOPSIS technique tries to simultaneously choose alternatives with very short of the best-correct solution far and far from the worst-case-scenario solution. A better superior response increases the benefit criteria and lowers the price criterion, while a worse superior response raises the price Criterion and Advantage Reduces criteria TOPSIS makes full use of the attribute records [1].TOPSIS method, two fuzzy respectively membership functions and a census sheet. this title Basic attributes of FMCDM Motivations for use, open challenges and constraints to its use, and recommendations for researchers to increase FMCDM acceptance and use [9]. TOPSIS is another mead because of its characteristics More effective than heuristics Fewer parameters, more stability multiple response values when the value changes contain The TOPSIS algorithm was developed[23].TOPSIS rankings are given by five distance measurements, different Random problems of sizes are created are calculated in the numerical example. We conduct a comprehensive comparative study of preference ranking orders, including consistency ratio, odds ratio of best alternatives, and mean Spearman correlation coefficients. Finally, the Spearman Correlation the number of alternatives over the mean of the coefficients Number and distance of attributes the second is to realize the influence of measurements Row regression will be implemented."Proximity to ideal" is developed by a compromise programming system. It is the "majority" and the minimum Provides maximum "group utility" for the individual grievance to "opponent". TOPSIS method for ideal solution Short range and negative-optimal Determines the solution with these distances Not considered significant [8].The TOPSIS (of the optimal solution Order by unity technique for option) technique offered to indicate TOPSIS, a multi-criteria technique for identifying selected opportunity need to most from the grand perfect solution Shorter distances worse at best Stay away from the solution [12]. TOPSIS may also seem reasonable however it's far undoubtedly now not. One complaint is that the relative significance of the 2 separations is not considered, the hassle taken into consideration, and they amplify TOPSIS to solve the multi-goal selection-making (MODM) hassle. PIS Short distance from and NIS longest distance), then a "satisfiability condition" for each criteria is delivered, followed through max-min operator for those criteria Eliminate conflict between uses Ultimately "harmony is solution where the satisfaction [10].TOPSIS (A Technique for Optimal Solution-like Regulatory Performance) is an effective technique for dealing with real-world multi-attribute or multi-criteria choice (MADM / MCDM) problems. Perform analysis, comparisons and rating of options. Accordingly, appropriate alternative(s) could be selected. However, many decision-making problems inside corporations can be a collaborative effort. Therefore, this take a look at will amplify TOPSIS to actual assignment-oriented group decision-making surroundings. A whole and efficient selection-making procedure is then supplied [3].TOPSIS has been carried out. First, based on a big range of statistics and theoretical evaluation, the consequences of EW at the system of attribution in decision-making or assessment are analyzed. Then from the perspective of specific and

bilateral stage selection-making or assessment effects, the consequences of EW on TOPSIS are similarly analysed. E-TOPSIS is used to regulate the function of EW in selection-making or assessment [14].

**TABLE 1.** Operating System

	Memory management	Process management	Storage management	protection and security	Software Features
Operating system 1	10.0000	5.5800	5.1500	6.1500	15.1500
Operating system 2	15.0500	6.1100	4.6300	15.0600	85.6500
Operating system 3	12.2300	6.0500	5.6400	15.7000	5.0500
Operating system 4	11.0200	5.1200	3.1500	15.0500	76.8500
Operating system 5	32.0500	8.1500	7.1500	5.1400	15.7500

Table 1 shows the Operating System for Analysis using the TOPSIS Method. Memory management, Process management, Storage management, protection and security, Software Features. Operating system 1, Operating system 2, Operating system 3, Operating system 4, and Operating system 5.



**FIGURE 1.** Operating System

Figure 1. Shows Operating System like Operating system 1, Operating system 2, Operating system 3, Operating system 4, Operating system 5. From the figure 1 and table 1 it is seen that Operating system 5 is showing the Highest Value for Memory management and Operating system 4 is showing the lowest value. Operating system 5 is showing the Highest Value for Process management and Operating system 4 is showing the Lower value. Operating system 5 is showing the Highest Value for Storage management and Operating system 4 is showing the lowest value. Operating system 3 is showing the Highest Value for protection and security and Operating system 5 is showing the lowest value. Operating system 2 is showing the Highest Value for Software Features and Operating system 3 is showing the lowest value.

$$X_{n1} = \frac{X1}{\sqrt{(X1)^2+(X2)^2+(X3)^2 \dots}} \quad (1).$$

**TABLE 2.** Normalized Data

	Memory management	Process management	Storage management	protection and security	Software Features
Operating system 1	0.2481	0.3968	0.4340	0.2225	0.1292
Operating system 2	0.3734	0.4345	0.3902	0.5448	0.7306
Operating system 3	0.3034	0.4303	0.4753	0.5680	0.0431
Operating system 4	0.2734	0.3641	0.2655	0.5445	0.6555
Operating system 5	0.7951	0.5796	0.6025	0.1860	0.1343

Table 2 shows the various Normalized Data for Memory management, Process management, Storage management, protection and security, Software Features. Normalized value is obtained by using the formula (1).Table 3 shows Weight ages used for the analysis. We have taken same weights for all the parameters for the analysis.

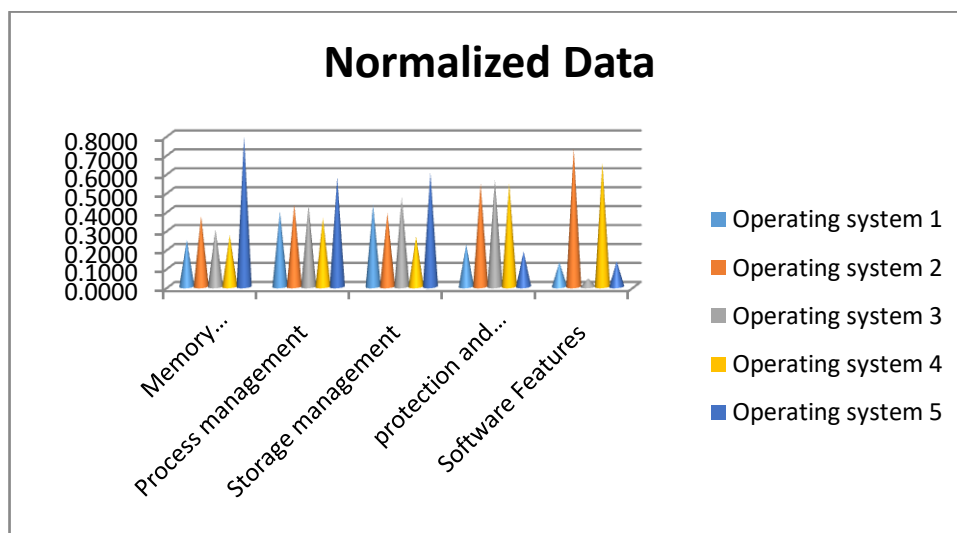


FIGURE 2. Normalized Data

Figure 2 Shows the Normalized Data for Operating system. Operating system 1, Operating system 2, Operating system 3, Operating system 4, Operating system 5 Memory management, Process management, Storage management, protection and security, Software Features is Normalized value.

TABLE 3. Weight ages

	Memory management	Process management	Storage management	protection and security	Software Features
Operating system 1	0.25	0.25	0.25	0.25	0.25
Operating system 2	0.25	0.25	0.25	0.25	0.25
Operating system 3	0.25	0.25	0.25	0.25	0.25
Operating system 4	0.25	0.25	0.25	0.25	0.25
Operating system 5	0.25	0.25	0.25	0.25	0.25

$$X_{wnormal1} = X_{n1} \times w_1 \tag{2}.$$

TABLE 4. Weighted normalized decision matrix

	Memory management	Process management	Storage management	protection and security	Software Features
Operating system 1	0.0620	0.0992	0.1085	0.0556	0.0323
Operating system 2	0.0933	0.1086	0.0975	0.1362	0.1826
Operating system 3	0.0759	0.1076	0.1188	0.1420	0.0108
Operating system 4	0.0683	0.0910	0.0664	0.1361	0.1639
Operating system 5	0.1988	0.1449	0.1506	0.0465	0.0336

Table 4 shows weighted normalized decision matrix for Memory management, Process management, Storage management, protection and security, Software Features. To figure out the weighted normalized decision matrix, we used the formula (2).

TABLE 5. Positive and Negative Matrix

Positive Matrix					Negative matrix				
0.1988	0.1449	0.1506	0.0465	0.0108	0.0620	0.0910	0.0664	0.1420	0.1826
0.1988	0.1449	0.1506	0.0465	0.0108	0.0620	0.0910	0.0664	0.1420	0.1826
0.1988	0.1449	0.1506	0.0465	0.0108	0.0620	0.0910	0.0664	0.1420	0.1826
0.1988	0.1449	0.1506	0.0465	0.0108	0.0620	0.0910	0.0664	0.1420	0.1826
0.1988	0.1449	0.1506	0.0465	0.0108	0.0620	0.0910	0.0664	0.1420	0.1826

Table 5 shows Positive and Negative Matrix for Operating system 1, Operating system 2, Operating system 3, Operating system 4, and Operating system 5. In various Positive Matrix in Maximum value 0.1988, 0.1449, 0.1506, Minimum value 0.0465, 0.0108 is taken and for Negative matrix the Minimum value 0.0620, 0.0910, 0.0664 and Maximum value 0.1420, 0.1826 is taken.

**TABLE 6.** Final Result of Operating system

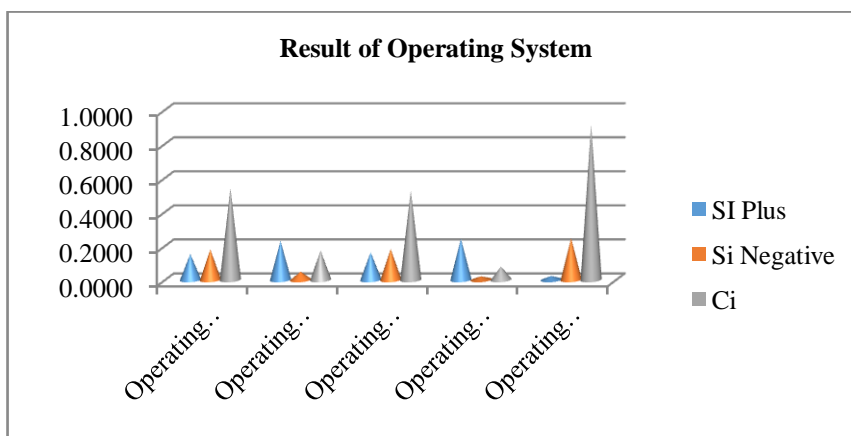
	SI Plus	Si Negative	Ci	Rank
Operating system 1	0.1520	0.1786	0.5402	2
Operating system 2	0.2299	0.0479	0.1725	4
Operating system 3	0.1632	0.1810	0.5258	3
Operating system 4	0.2419	0.0207	0.0787	5
Operating system 5	0.0228	0.2450	0.9148	1

Table 6 shows the final result of TOPSIS for Operating system. Figure 2 shows the TOPSIS Analysis Result of Operating system. In Table 6, Si positive is calculated using the formula (3). From figure 2, In Si positive, Operating system 4 is having is Higher Value and Operating system 5 is having Lower value. Si Negatives calculated using the formula (4). In Si Negative, operating system 5 is having is Higher Value Operating system 4 is having Lower value. Ci is calculated using the formula (5). In Ci, operating system 5 is having is Higher Value and Operating system 4 is having Lower value.

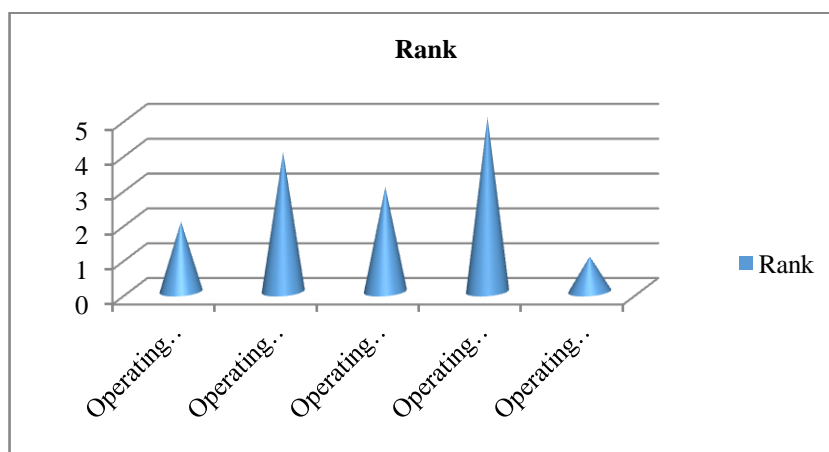
$$X_{si+1} = \sqrt{((X_{wn1} - X_{p1})^2 + (Y_{wn1} - Y_{p1})^2 + (Z_{wn1} - Z_{p1})^2)} \quad (3)$$

$$X_{si-1} = \sqrt{((X_{wn1} - X_{n1})^2 + (Y_{wn1} - Y_{n1})^2 + (Z_{wn1} - Z_{n1})^2)} \quad (4)$$

$$X_{ci1} = \frac{X_{si-1}}{(X_{si+1}) + (X_{s(i-1)})} \quad (5)$$



**FIGURE 2.**Result of Operating System



**FIGURE 3.** Shown the Rank

Figure 3 Shows the Ranking of Operating System. Operating system 5 is got the first rank whereas is the Operating system 4 is having the Lowest rank.

#### 4. Conclusion

Operating system is multiplex and shrinking Physical Resources Software. This we believe in the definition ESP. Its view Short for OS Hardware crashes and misdirects the basis behind our arguments intuitively, any OS abstraction not suitable for all applications [19]. Operating system portability addresses a very common problem with minicomputers. Unless considerable Time and Resources Software are earmarked for development, the to get a new minicomputer the result is mostly available to the machine to be predicted by software. Also, the main task of the to develop software of a new machine Manufacturer. The TOPSIS method is an improved fuzzy Compared to the weighted average basically based on ranking system is assessed. One of the most common approaches used TOPSIS is a multiple answer problem Performance measurement for improvement can be used as code the procedure is to weight each response Uncertainty of determination simultaneous succession. TOPSIS (Technique for Order of Preference by Similarity to Ideal Solution) analysis using the Operating system 1, Operating system 2, Operating system 3, Operating system 4, Operating system 5 Alternative value and Memory management, Process management, Storage management, protection and security, Software Features Evaluation Parameters in value. Operating system 5 is got the first rank whereas is the Operating system 4 is having the Lowest rank.

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