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Understanding Indian Technical Institution using TOPSIS MCDM Method

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Abstract. In this from analysis EDAS method is the most ideal solution Short-distance and negative-best The solution with the longest distance from the solution Determines, but the comparison of these distances Does not consider importance. From the result it is seen that Faculty strength (FS) is got the first rank where as is the Campus area (CA) is having the lowest rank. The liberalization of the economy and many opportunities and Due to globalization there are challenges in Indian technical education. The performance of technology companies in many of these challenges in terms of criteria there is also how to evaluate Is one. Of the Indian Economy Liberalization and Due to globalization Indian Technical Education System Faces challenges. Many foreign multinational companies are focusing on job placement in India. Sophisticated technologies and techniques Many technology companies have foreign collaboration; national and private Are set by efforts. Due to liberalization, privatization and globalization, efficient recent corporate scandals of many The result is this special Demand has grown significantly foreign multinational companies are focusing on job placement in India. The liberalization of the economy and Due to globalization, in India Many opportunities in the field of technical education and there are challenges. Of many criteria basically of technology companies How to evaluate performance this is one of the challenges. Indian technical education, in recent times, has seen rapid growth, Alternative: Teacher Strength (FS), Student Admission (SI), Number of PhDs awarded (Ph.D.), Number of patents applied for (patent), Campus area (CA). Evaluation Preference: Computational time, Simplicity, Mathematical calculations involved, Flexibility which has led to a decline in the employment of engineering graduates. Thus the present devastation in India Many private techies on the edge the business performance of companies has been affected. TOPSIS (Technique for Order Performance through Integrity with Ideal Solution). Indian Technical Institution from TOPSIS method. From the result it is seen that Faculty strength (FS) and is got the first rank whereas is the Campus area (CA) got is having the lowest rank.

1. Introduction

Education and health for the development of a nation Education and Health for the Development of OP a Country Ingredients. The first area to focus on transforming India into a knowledge-based society is education. Approximately 1000 as imagined by Indian intellectual's years ago, education is endless from low light to light Travel. It is the expression of the wholeness that man already has. Twenty-one from the beginning of the century, the explosive development of knowledge and communication Due to the development of simple tools of technology and other scientific discoveries, Educators around the world are challenging the "new type of learning" Are facing. "New type of in this area Tools and techniques for improvement the use is exploratory. In the field of technical education Article in the literature Provides a comprehensive review, this review for the quality of technical education War the Faulty OP Techniques for example such as learning and current issues throughout life. Sources appearing in credible, third-party publications for this article or section Notes required. Of studies conducted in India, Indian universities and other educational institutions basically the issue of intellectual property is under recent scrutiny. Ray and Sasha provided data on patented drivers at primary technology and research institutes the nature and scope of the engineering field is subject to dramatic changes, especially high in technical areas. In old tools, techniques, technologies and work skills Obsolescence has had a major impact. Higher education is for the development of a country is also the backbone of economic growth. Because, the capacity required for a country in the long run Educational institutions are responsible for development plans One in terms of increasing its productivity The Education Especially the system it Is one of the pillars on which strategic plans can be effectively implemented. Engineering education is Variety of engineering Industries, which are practices related knowledge and Is the process of teaching principles. Elementary education to become must be an engineer and any advanced education or must have expertise. Engineering education is Additional exams for engineering course and with supervisory training requirements is a profession. To assist with selection at various criterion levels there are various criteria techniques. The abbreviation TOPSIS stands for the preferred technique of unity for the best solution. Hwang at the beginning of TOPSIS and provided by Yoon, from the decision makers to it requires limited subjective input.

2. Indian Technical Institution

Systematically upgrade human resources for the technical education system by providing the necessary orientation, training and development plan, Monitoring system for follow-up reporting to be on behalf of the government. Companies through networking and partnerships to be connected to each other and for short and long term change must be flexible to integrate

with any strategy. India divides sharply on the basis of caste and class a community with. Currently the country's GDP Although we expect the growth rate to be 8.5-9 per cent, 37 Although we expect it to be, arrange as follows in the next section for literary studies and group work TOPSIS Applications, the proposed panel is given in Section 3 of the TOPSIS model, Quality issues related to technical education have been frequently reported in print media and research articles in recent times. Research in technical education, especially related to quality issues, has recently gained prominence among researchers. The literature studied in this area highlights factors affecting the Literary Studies and Teamwork TOPSIS the next section for applications of the TOPSIS model, will not be as dependent on capital as on technology. Therefore, it was proposed to set up a Scientific and Industrial Research Council. To run those labs, the U.S. government under the Technical Cooperation Mission program was forced to award hundreds of Doctor Fellowships. However, after India gained independence, such measures were taken for the development of India Realizing that the idea of companies training such employees within the country emerged this is believed to be the first concept of IIT. Education is a social process and the form of education is community of the dialectic is very important and all in education Primary concerns of shareholders Fijenbaum (1994) Invisible 'The quality of education ' Is important for competition Believes to be the factor Engineers and economists of products and services of specialists Quality products and Quality of services Thinkers Managers, teachers, workers, engineers and The function of economists and Is determined by decision making. A is determined by the quality of higher education provided. High productivity and Ability to maintain quality the nature of the market is that those who have will survive the curriculum, the lesson, the transaction method and the assessments. The traditional practices of lecture and demo methods are the most author-centric approach; it should develop into a student-cantered approach to meeting current demands Indian engineering education is one of the largest education systems in the world. Today there are more than 2,300 engineer's companies in the country; there are more than 600,000 engineers each year

3. TOPSIS

Based on the predicted number of winners Provides results. As baseball has expanded significantly since 1961, Number of teams per season from four teams Varies up to ten per section. The term cases in Table 1 are played with that number of teams, it refers to the number of seasons, The ratio of the number of correct results. Therefore, the results are divided by the number of teams per division for example, eight in the period 1901-1905 There were ten matches in which the teams participated It involves dealing with the problems of unique alternatives, MADM Techniques Practice for solving real world problems Tools. To rank, select a specific number of actions DM Tools. To rank, select a specific number Hwang and Yoon provide taxonomy techniques Gives priority. Due to the many techniques involved, Types of information from DMs, key features of the information and key type methods. This classification actually refers to MADM techniques Provides clear direction for learning. Comparisons between companies should be conducted on a generally accepted basis. Considering the diversity of the problem in the septic environment, Partners' DMs or different interests "is a subjective weighing process by which an agreement can be reached on the relative importance of facial proportions. When these two dollars are appropriate DMs Will is updated. In addition, facial proportions Used are not completely independent "attached and to some extent are selected by the function of the company. Each article that meets the required criteria is included. Technology However, the TOPSIS method presents some drawbacks One of the problems that causes TOPSIS is that it causes an event called Rank Reversal In this case, when an alternative is added or eliminated in the decision-making problem Selection sequence changes of alternatives This can sometimes lead to a total rank reversal, Where the sequence of options is completely reversed, I.e. the replacement is considered optimal, adding or removing the substitute from the process and Adding or removing an alternative and so on. In many cases, such an event may be unacceptable. This is the structure of the rest of the paper, may be. This outlines the structure of the rest of the paper, outlining the theoretical foundations of the following section 2 new proposals, viz. Multiple criterion decision making techniques and systematic support for distance reduction The proposal for Taken from the literature The numerical example uses the results with the traditional approach And compares; Section 4, Applications of published literature And a proposal for a numerical example taken from the outlines the most important implications of traditional Section 5 work and refers to future research.

TABLE 1. Indian technical institution

	Computational time	Simplicity	Mathematical calculations involved	Flexibility
Faculty strength (FS)	24.08	229.53	20.15	17.05
Student intake (SI)	15.12	252.97	34.69	18.30
Number of Ph.D. awarded (Ph.D.)	37.08	232.58	25.18	14.10
Number of patents applied for (Patent)	39.17	238.28	35.60	13.59
Campus area (CA)	48.33	276.41	33.96	16.89

Table 1 Shows that various technical Indian Technical Institutions in highest value for campus area (CA) and student intake (SI) are the lowest value. Then highest value for campus area and faculty strength (FS) is the lowest value. Number of patents applied for (patent) is the highest value and Faculty strength (FS) is the lowest value. Student intake (SI) is the highest value and Number of patents applied for (patent) is the lowest value.

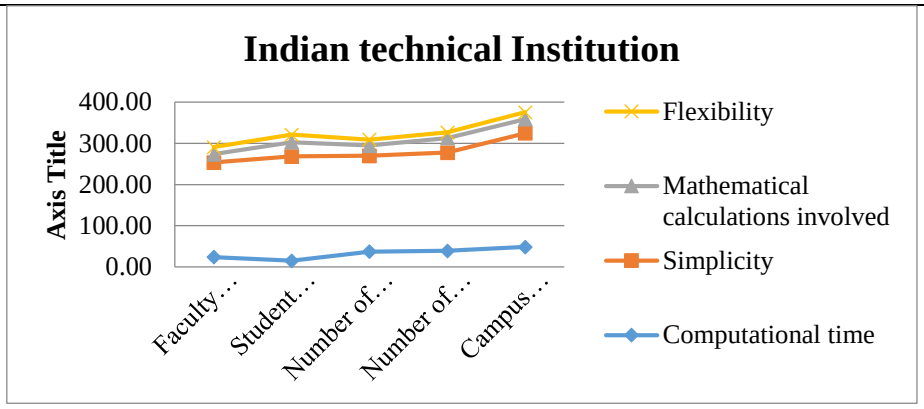

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TABLE 2. Normalized Data for Indian Technical Institution

	Computational time	Simplicity	Mathematical calculations involved	Flexibility
Faculty strength (FS)	0.3095	2.95	0.29505	0.4739
Student intake (SI)	0.1943	3.251	0.50795	0.5087
Number of Ph.D. awarded (Ph.D.)	0.4766	2.989	0.3687	0.3919
Number of patents applied for (Patent)	0.5034	3.063	0.52127	0.3777
Campus area (CA)	0.6212	3.553	0.49726	0.4695

Table 2 Number of patents applied for Facility Strength (FS), Student Admission (SI), and Number of PhDs awarded (PhD), (Patent), and Campus Area (CA). Obtained by default value. (1)

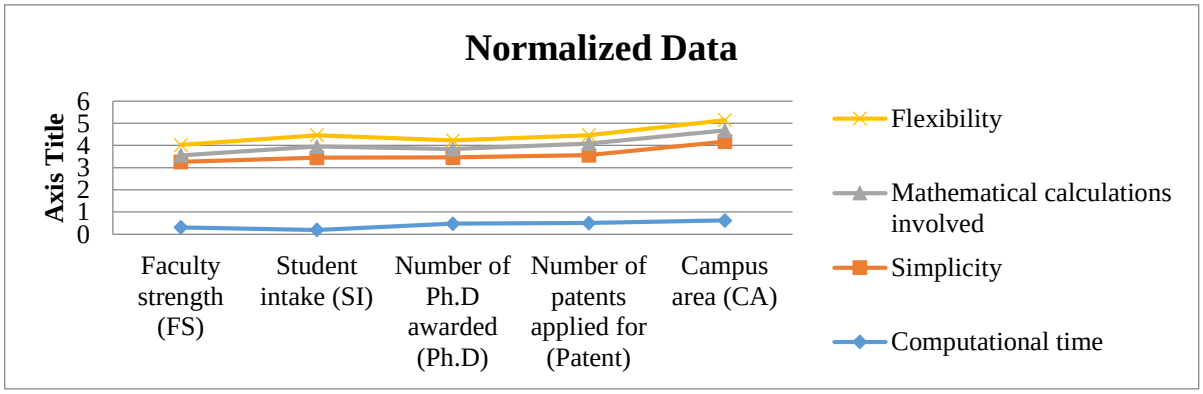

FIGURE 2. Normalized Data

FIGURE 2 Number of patents applied for Facility Strength (FS), Student Admission (SI), Number of PhDs awarded (PhD), (Patent), and Campus Area (CA). Obtained by default value. (1)

TABLE 3. Weighted Normalized decision matrix

	Computational time	Simplicity	Mathematical calculations involved	Flexibility
Faculty strength (FS)	0.077374	0.738	0.074	0.118
Student intake (SI)	0.048584	0.813	0.127	0.127
Number of Ph.D. awarded (Ph.D.)	0.119146	0.747	0.092	0.098
Number of patents applied for (Patent)	0.125861	0.766	0.13	0.094
Campus area (CA)	0.155294	0.888	0.124	0.117

Table 3. Shows weighted normalized decision matrix for Facility Strength (FS), Student Admission (SI), number of PhDs awarded (PhD), number of patents applied for (patent), campus area (CA) to figure out the Weighted normalized decision matrix, we used the formula (2).

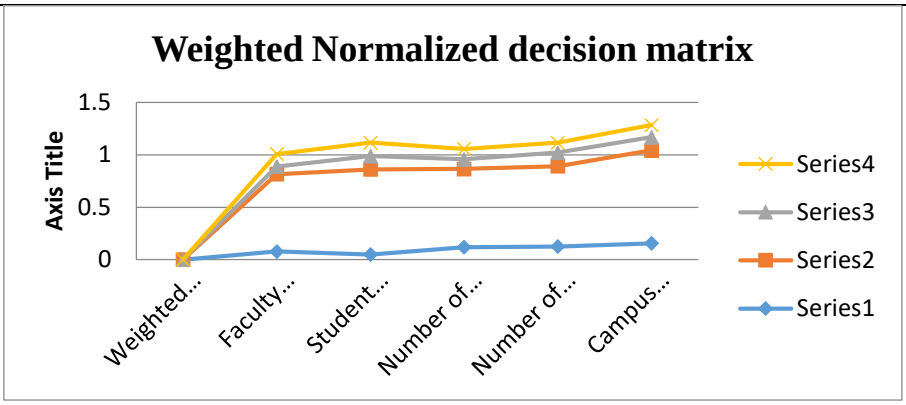

FIGURE 3. Weighted normalized decision matrix

Table 2 Number of patents applied for Facility Strength (FS), Student Admission (SI), and Number of PhDs awarded (PhD), (Patent), and Campus Area (CA). Obtained by default value. (1)

TABLE 4. Positive matrix

	Computational time	Simplicity	Mathematical calculations involved	Flexibility
Faculty strength (FS)	0.0486	0.7375	0.1303	0.1272
Student intake (SI)	0.0486	0.7375	0.1303	0.1272
Number of Ph.D. awarded (Ph.D.)	0.0486	0.7375	0.1303	0.1272
Number of patents applied for (Patent)	0.0486	0.7375	0.1303	0.1272
Campus area (CA)	0.0486	0.7375	0.1303	0.1272

TABLE 5. Negative matrix

	Computational time	Simplicity	Mathematical calculations in-volved	Flexibility
Faculty strength (FS)	0.0486	0.7375	0.1303	0.1272
Student intake (SI)	0.0486	0.7375	0.1303	0.1272
Number of Ph.D. awarded (Ph.D.)	0.0486	0.7375	0.1303	0.1272
Number of patents applied for (Patent)	0.0486	0.7375	0.1303	0.1272
Campus area (CA)	0.0486	0.7375	0.1303	0.1272

Table 4 and 5 Shows the positive and negative teams for Facility Strength (FS), Student Admission (SI), number of PhDs awarded (PhD), number of patents applied for in various positive matrices (patents), campus area (CA)The maximum value is 0.8882,0.1553. The minimum value is 0.0944, 0.0738. Then the negative team took the minimum value of 0.0486,01272 and the maximum value of 0.7375, 0.1303.

TABLE 6. SI Plus, Si Negative, Ci

	SI Plus	Si Negative	Ci
Faculty strength (FS)	0.171	0.0641	0.2722
Student intake (SI)	0.145	0.0754	0.3424
Number of Ph.D. awarded (Ph.D.)	0.147	0.0859	0.3695
Number of patents applied for (Patent)	0.138	0.0885	0.3905
Campus area (CA)	0.056	0.1850	0.7692

Table 6 Shows that various technical Indian Technical Institutions in SI Plus, Si Negative, Ci values higher and lower values

TABLE 7. Rank

	Rank
Faculty strength (FS)	5
Student intake (SI)	4
Number of Ph.D. awarded (Ph.D.)	3
Number of patents applied for (Patent)	2
Campus area (CA)	1

TABLE5. The final result of TOPSIS for big data number 2 shows the result of TOPSIS analysis. In Table 6, Si is calculated using the positive formula (3). From Figure 2, the facility value (FS) and the premises area (CA) at the Si positive are valued at the highest value. The negative value is calculated using the formula (4). In the negative, the premises area (CA) is the value of the facility strength at the lowest value.

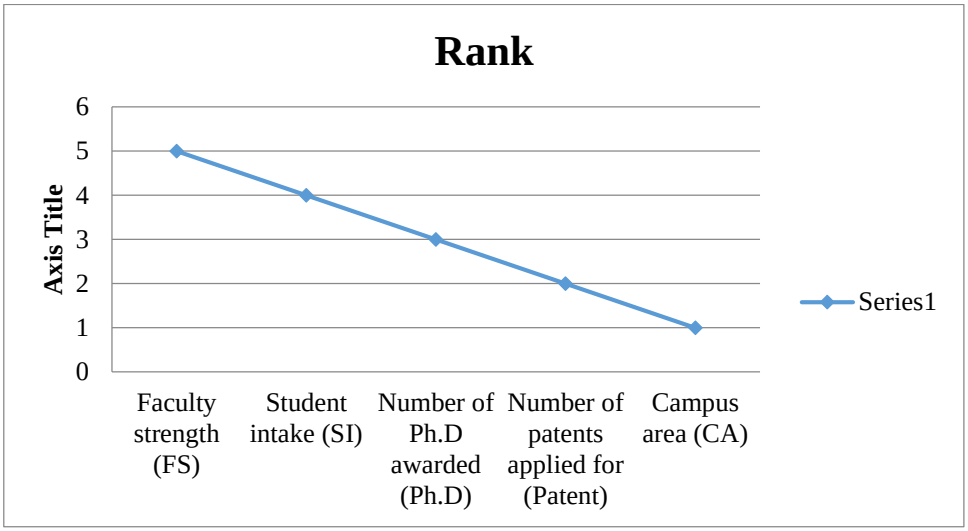

FIGURE 4. Rank

FIGURE 4 from the result it is seen that Faculty strength (FS) and is got the first rank whereas is the Campus area (CA) got is having the lowest rank.

4. Conclusion

Primary in a technology company the purpose is achieved through research is to explore and transfer knowledge, the latter is achieved through teaching. The knowledge economy is growing in the development of a country during this period Play. Technology in India is growing for education Enroll in academic courses as the number of young people increasing to meet the need. The mutual recognition of the industry worldwide Quality engineering techniques of technology companies and Quality used to evaluate multiple criteria this article explores the role of final approaches. Indian Many things related to the quality of literature in the context of this paper strategic level and functional standard issues Substantial research has been done through studies to solve the problems. The key findings of this review are, at the strategic level Such as quality improvement techniques at the computer dynamics and functional level reveal gaps in the use of techniques. Continuing career in Indian technical education system- This article also underscores the importance of reducing the educational gap. The sheet is organized as follows. The next part is vague TOPSIS Introduces the framework for ratings. Section 3 Rank reverse issue in TOPSIS mode Exploring. Section 4 provides a solution to the ranking change. The final section outlines the most important results. From the result it is seen that Faculty strength (FS) and is got the first rank whereas is the Campus area (CA) got is having the lowest rank.

Reference

[1]. Das, Manik Chandra, Bijan Sarkar, and Siddhartha Ray. "A framework to measure relative performance of Indian technical institutions using integrated fuzzy AHP and COPRAS methodology." *Socio-Economic Planning Sciences* 46, no. 3 (2012): 230-241.

[2]. Das, Manik Chandra, Bijan Sarkar, and Siddhartha Ray. "On the performance of Indian technical institutions: a combined SOWIA-MOORA approach." Opsearch 50, no. 3 (2013): 319-333.

[3]. Das, Manik Chandra, Bijan Sarkar, and Siddhartha Ray. "Comparative evaluation of Indian technical institutions using fuzzy AHP and MOORA." International Journal of Multicriteria Decision Making 2, no. 1 (2012): 74-93.

[4]. Ahmed, CR Muzakkir, M. Narayanan, S. Kalaivanan, K. Sathya Narayanan, and A. K. Reshmy. "To detect and classify oral cancer in mri image using firefly algorithm and expectation maximization algorithm." Int J Pure Appl Math 116 (2017): 149-154.

[5]. Das, Manik Chandra, Bijan Sarkar, and Siddhartha Ray. "Comparative evaluation of Indian technical institutions using distance based approach method." Benchmarking: An International Journal (2013).

[6]. Karami, Azin, Hadi Shirouyehzad, and Milad Asadpour. "A DEA-Based Decision Support Framework for Organizations' Performance Evaluation considering TQM and Knowledge Management." Journal of Healthcare Engineering 2021 (2021).

[7]. Kumar, Anil, Saleh A. Alghamdi, Abolfazl Mehbodniya, Julian L. Webber, and Shavkatov Navruzbek Shavkatovich. "Smart power consumption management and alert system using IoT on big data." Sustainable Energy Technologies and Assessments 53 (2022): 102555.

[8]. Upadhayay, Lalit, and Prem Vrat. "Quality issues affecting organisational performance: a review of Indian technical education." International Journal of Indian Culture and Business Management 14, no. 1 (2017): 1-22.

[9]. Kshirsagar, Pravin, Akshay Pote, K. K. Paliwal, Vaibhav Hendre, Pranav Chippalkatti, and Nikhil Dhabekar. "A review on IOT based health care monitoring system." ICCCE 2019 (2020): 95-100.

[10]. Revathy, G., Saleh A. Alghamdi, Sultan M. Alahmari, Saud R. Yonbawi, Anil Kumar, and Mohd Anul Haq. "Sentiment analysis using machine learning: Progress in the machine intelligence for data science." Sustainable Energy Technologies and Assessments 53 (2022): 102557

[11]. Narayanan, M., and C. Arun. "Categorize the video server in P2P networks based on seasonal and normal popularity videos using machine learning approach." In 2015 2nd International Conference on Electronics and Communication Systems (ICECS), pp. 1220-1228. IEEE, 2015.

[12]. Bhattacharyya, Amrita, and Shankar Chakraborty. "A DEA-TOPSIS-based approach for performance evaluation of Indian technical institutes." Decision science letters 3, no. 3 (2014): 397-410.

[13]. Kumar Pandey, Rakesh, Shrey Aggarwal, Griesha Nath, Anil Kumar, and Behzad Vaferi. "Metaheuristic algorithm integrated neural networks for well-test analyses of petroleum reservoirs." Scientific Reports 12, no. 1 (2022): 1-16.

[14]. Ahuja, Inderpreet Singh. "Realising quality assurance in Indian technical education." International Journal of Indian Culture and Business Management 5, no. 4 (2012): 472-488.

[15]. Nayeem, Mohd Abdul, and Manas Ranjan Tripathy. "Work-life balance among teachers of technical institutions." Indian Journal of Industrial Relations (2012): 724-736.

[16]. Madheswari, S. Pavai, and SD Uma Mageswari. "Changing paradigms of engineering education-An Indian perspective." Procedia Computer Science 172 (2020): 215-224.

[17]. Mansour, Romany F., Eatedal Alabdulkreem, Heba F. Eid, K. Sathishkumar, Mohd Abdul Rahim Khan, and Anil Kumar. "Fuzzy logic based on-line fault detection and classification method of substation equipment based on convolutional probabilistic neural network with discrete wavelet transform and fuzzy interference." Optik 270 (2022): 169956.

[18]. Yogeesh, N., and Dr PK Chenniappan. "STUDY ON INTUITIONISTIC FUZZY GRAPHS AND ITS APPLICATIONS IN THE FIELD OF REAL WORLD." International Journal of Advanced Research in Engineering and Applied Sciences 2, no. 1 (2013).

[19]. Narayanan, Madeshan, and C. Arun. "An efficient technique for video content managing in Peer-to-Peer computing using multilevel cache and bandwidth based cluster." In 2014 International Conference on Signal Propagation and Computer Technology (ICSPCT 2014), pp. 317-322. IEEE, 2014.

[20]. Karky, Nandini. "International students in an Indian technical university: Faculty counselors' preparedness and perspectives." Journal of Studies in International Education 17, no. 1 (2013): 39-54.

[21]. Kshirsagar, Pravin R., Anil N. Rakhonde, and Pranav Chippalkatti. "MRI image based brain tumor detection using machine learning." Test Engineering and Management 81 (2020): 3672-3680.

[22]. Sharma, Vandna. "A perceptual study on KM orientation in Indian private engineering institutions." International Journal of Educational Management (2012).

[23]. Sharma, Ruchi, and Akriti Jain. "Research and patenting in Indian universities and technical institutes: An exploratory study." World Patent Information 38 (2014): 62-66.

[24]. Narayanan, M., and C. Arun. "Categorize the video server in P2P networks based on seasonal and normal popularity videos using machine learning approach." In 2015 2nd International Conference on Electronics and Communication Systems (ICECS), pp. 1220-1228. IEEE, 2015.

[25]. Thandapani, D., K. Gopalakrishnan, S. R. Devadasan, and P. R. Shalij. "World class quality in engineering education via ABET accreditation: an implementation study in an Indian engineering educational institution." International Journal of Indian Culture and Business Management 3, no. 2 (2010): 208-237.

[26]. Kshirsagar, Pravin R., and Sudhir G. Akojwar. "Prediction of neurological disorders using optimized neural network." In 2016 International Conference on Signal Processing, Communication, Power and Embedded System (SCOPES), pp. 1695-1699. IEEE, 2016.

[27]. Yogeesh, N. "Graphical representation of Solutions to Initial and boundary value problems Of Second Order Linear Differential Equation Using FOOS (Free & Open Source Software)-Maxima." International Research Journal of Management Science and Technology (IRJMST) 5, no. 7 (2014)

[28]. Kumar, Anil, Rajabov Sherzod Umurzoqovich, Nguyen Duc Duong, Pratik Kanani, Arulmani Kuppusamy, M. Praneesh, and Minh Ngyen Hieu. "An intrusion identification and prevention for cloud computing: From the perspective of deep learning." Optik 270 (2022): 170044.

[29]. Aktan, E., P. Balaguru, H. Ghasemi, A. Mufti, and S. McCabe NSF. "Reforming civil engineering education given the challenges related to infrastructure engineering and management." (2007).

[30]. Akojwar, Sudhir G., and Pravin R. Kshirsagar. "Performance evolution of optimization techniques for mathematical benchmark functions." International Journal of Computers 1 (2016).

[31]. Ranjan, Rajeev, Prasenjit Chatterjee, and Shankar Chakraborty. "Evaluating performance of engineering departments in an Indian University using DEMATEL and compromise ranking methods." Opsearch 52, no. 2 (2015): 307-328.

[32]. Madeshan, Narayanan, and Arun Chokkalingam. "An efficient super-peer selection for Peer-to-Peer live streaming networks over video-on demand service." Journal of Computational and Theoretical Nanoscience 13, no. 7 (2016): 4606-4613.

[33]. Wardana, Bendra, Roni Habibi, and M. Harry K. Saputra. "Comparation of SAW method and Topsis in Assesing the best area using HSE standards." EMITTER International Journal of Engineering Technology 8, no. 1 (2020): 126-139.

[34]. Hajek, Petr, and Wojciech Froelich. "Integrating TOPSIS with interval-valued intuitionistic fuzzy cognitive maps for effective group decision making." Information Sciences 485 (2019): 394-412.

[35]. Yogeesh, N. "Graphical Representation of Mathematical Equations Using Open Source Software." Journal of Advances and Scholarly Researches in Allied Education (JASRAE) 16, no. 5 (2019).
[36]. Kapoor, Nishant Raj, Ashok Kumar, Anuj Kumar, Anil Kumar, and Krishna Kumar. "Transmission Probability of SARS-CoV-2 in Office Environment Using Artificial Neural Network." IEEE Access 10 (2022): 121204-121229.
[37]. Shih, Hsu-Shih, Huan-Jyh Shyur, and E. Stanley Lee. "An extension of TOPSIS for group decision making." Mathematical and computer modelling 45, no. 7-8 (2007): 801-813.
[38]. Kumar, Anil, Julian L. Webber, Mohd Anul Haq, Kamal Kumar Gola, Pritpal Singh, Sathishkumar Karupusamy, and Malik Bader Alazzam. "Optimal cluster head selection for energy efficient wireless sensor network using hybrid competitive swarm optimization and harmony search algorithm." Sustainable Energy Technologies and Assessments 52 (2022): 102243.
[39]. Akojwar, Dr Sudhir, Pravin Kshirsagar, and Vijetalaxmi Pai. "Feature extraction of EEG signals using wavelet and principal component analysis." In National Conference on Research Trends In Electronics, Computer Science & Information Technology and Doctoral Research Meet. 2014.
[40]. Narayanan, M., and C. Arun. "Outliers based caching of data segment with synchronization over Video-on Demand using P2P computing." Research Journal of Applied Sciences, Engineering and Technology 7, no. 21 (2014): 4559-4564.
[41]. Sruthy Anilkumar, "A Study on Impact of Migration on Socio Economic Empowerment of Inbound Female Migrant Labors in Ernakulam District", International Journal of Innovative Research in Science, Engineering and Technology, 7(10), (2018): 10464-10468
[42]. Krohling, Renato A., and André GC Pacheco. "A-TOPSIS–an approach based on TOPSIS for ranking evolutionary algorithms." Procedia Computer Science 55 (2015): 308-317.
[43]. Paksoy, Turan, Nimet Yapici Pehlivan, and Cengiz Kahraman. "Organizational strategy development in distribution channel management using fuzzy AHP and hierarchical fuzzy TOPSIS." Expert Systems with Applications 39, no. 3 (2012): 2822-2841.
[44]. Jahanshahloo, Gholam Reza, F. Hosseinzadeh Lotfi, and Mohammad Izadikhah. "Extension of the TOPSIS method for decision-making problems with fuzzy data." Applied mathematics and computation 181, no. 2 (2006): 1544-1551.
[45]. Sekar, K. R., Mohd AnulHaq, Anil Kumar, R. Shalini, and S. Poojalaxmi. "An improved ranking methodology for malignant carcinoma in multicriterian decision making using hesitant VIKOR fuzzy." Theoretical Computer Science 929 (2022): 81-94.
[46]. Yogeesh, N. "Mathematical approach to representation of locations using k-means clustering algorithm." International Journal of Mathematics And its Applications 9, no. 1 (2021): 127-136.
[47]. Sindhu, B., and Sruthy Anilkumar. "Perception of rural people towards digital transactions with special reference to card payment." In AIP Conference Proceedings, vol. 2393, no. 1, p. 020171. AIP Publishing LLC, 2022.
[48]. Zyoud, Shaher H., and Daniela Fuchs-Hanusch. "A bibliometric-based survey on AHP and TOPSIS techniques." Expert systems with applications 78 (2017): 158-18
[49]. Kshirsagar, Pravin, and Dr Sudhir Akojwar. "Classification and Prediction of Epilepsy using FFBPNN with PSO." In IEEE international conference on communication networks, vol. 17. 2015.
[50]. Narayanan, Madeshan, and C. Arun. "An efficient technique for video content managing in Peer-to-Peer computing using multilevel cache and bandwidth based cluster." In 2014 International Conference on Signal Propagation and Computer Technology (ICSPCT 2014), pp. 317-322. IEEE, 2014.
[51]. Feng, Yixiong, Zhifeng Zhang, Guangdong Tian, Amir Mohammad Fathollahi-Fard, Nannan Hao, Zhiwu Li, Wenjie Wang, and Jianrong Tan. "A novel hybrid fuzzy grey TOPSIS method: supplier evaluation of a collaborative manufacturing enterprise." Applied Sciences 9, no. 18 (2019): 3770.
[52]. William, P., N. Yogeesh, S. Vimala, and Pratik Gite. "Blockchain Technology for Data Privacy using Contract Mechanism for 5G Networks." In 2022 3rd International Conference on Intelligent Engineering and Management (ICIEM), pp. 461-465. IEEE, 2022.
[53]. Kumar Pandey, Rakesh, Anil Kumar, Ajay Mandal, and Behzad Vaferi. "Employing deep learning neural networks for characterizing dual-porosity reservoirs based on pressure transient tests." Journal of Energy Resources Technology 144, no. 11 (2022): 113002.
[54]. Muruganantham, A., and G. Meera Gandhi. "Framework for social media analytics based on multi-criteria decision making (MCDM) model." Multimedia Tools and Applications 79, no. 5 (2020): 3913-3927.