DOI: http://doi.org/10.46632/jemm/8/4/4

REST Journal on Emerging trends in Modelling and Manufacturing
Vol: 8(4), 2022
REST Publisher; ISSN: 2455-4537
Website: http://restpublisher.com/journals/jemm/

Analysing Nelder-Mead Simplicial Heuristic Using DEMATEL Method

*Manjula Selvam, Vidhya Prasanth, M. Ramachandran
REST Labs, Kaveripattinam, Krishnagiri, Tamil Nadu, India
*Corresponding author Email: manjulaselvam2016@gmail.com

Abstract: Nelder-Mead Simplicial Heuristic in DEMATEL Method. A simple volume mesh element patterns a parallel algorithm framework for optimization we describe. By using simultaneous Parallel and asymmetric multiprocessing in hardware, we achieve more than this ten times the speed of Current state-of-the-art sequencing methods. Alternative: Strength 'pedestrian avoidance, For intimate and personal spaces moderation in between, For intimate and personal spaces The intensity of the transition between Strength of obstacle avoidance, Governs the queue width, Evaluation Preference: The strength of 'pedestrian avoidance (A1), Moderation between intimate and personal space (A2), The intensity of transition between intimate and personal space (A3), and Strength of obstacle avoidance(A4), Governs the queue width(A5), From the result it is seen that Strength of 'pedestrian avoidance and is got the first rank whereas is the Strength of obstacle avoidance got is having the lowest rank. The value of the dataset for Freight Distribution Concept Selection in DEMATEL shows that it results in Strength of 'pedestrian avoidance and top ranking.
Keywords: evaluation problems, Nelder-Mead method, Simplicial, MCDM, Strength of obstacle avoidance and Strength of 'pedestrian avoidance.

1. Introduction

The Nelder-Mead method is primarily a statistical parameter Designed for evaluation problems. Original Paper A method for calculating surface curvature provides a minimum neighborhood by computing Functional at the midpoints of the edge's values finite simplexes. A first towards population-based LONs Step by step, population-based search, well the known Nelder-Mead downhill simplex algorithm we receive and analyze LONs generated by We do, but its effectiveness is being judged. In a large set of test problems the derivative- Current state of the art optimization algorithms A systematic comparison of implementations is currently lacking. A systematic comparison of derivative-free optimization algorithms Current implementations are one of the major test problems is currently lacking. A simple An optimization problem is a real function minimization (or maximization) contains, where one Searches for input values—perhaps a few Subject to restrictions—low (or high) To find the one that gives the output value is trying In many practical applications, functional Values are information only that can be used by an optimization algorithm, as derivative information is either unavailable or too expensive to obtain.

2. Nelder-Mead Simplicial Heuristic

The Downhill simplex method (also known as the Nelder-Mead method called) is a classic direct search method. It moves, deforms and Resize until its size is smaller. This time later by Spendley, Hext and Himsworth They developed a modified version, the Nelder-Mead created Allows adjusting its search step. This is Nelder-Evolutionary operators inspired from Mead Achieving efficient hybrid EA by design makes it possible. [2]. the following section is Here is a brief review of the algorithm. We are we use set of terminals and functions from the original NM algorithm As a primitive set for GP. This primitive We repeat the original NM method using set Before writing and actually running the GP With wood to see if it can be done Let's design it as a built-in structure. Exercise other product like measurement and population size activities and we in our experiment The GP parameters used are described. in tree-generated Standard of test operations NM using the package [7]. Nelder-mead (NM) derivative-free optimization based simplex algorithm another well read and highly referenced is proper. As with the, which are plentiful Contains quotes. Finally, Bestek (1981) The Fuzzy C-Meaning (FCM) algorithm is very It can easily be said that follows. Despite all that this simplicity, as far as we know, these well-known three do not exist Studied till date [16]. The Nelder-Mead method is unconstrained solution Minimization problems are a class of direct search methods that do not use derivatives (For a recent review of direct search methods, see if the slope f off is not found, some direct search methods off of It by evaluating the values at several points Trying to evaluate. Simplex in general is used for that purpose because it is such has a minimum number of points (n+1). One of these points in each iteration is dropped and a new point is added, thus a new simplex is defined [17]. Finally, replacing SSA with cooling simulated live search by annealing (DSSA) method rate is received. Kelly (1999) proposed the ideal SSA and Kelly's Nelder-Mead method in solutions Modification [19]. In this optimization En route, barriers to three-dimensional Nelder-Mead practice We noticed

Copyright@ 2022 REST Publisher

that the registration, of the result was poor performance, too much The Nelder-Mead algorithm is also intermediate in application To use multiple GPU registers to store variables, Optimization as simplex nodes Be that as it may, each is of excellent quality too [21]. The parameters of the A universal such as simulated annealing (SA). The JA model is estimated using the mixture. And Nelder–Mead simplex (NMS). JA model's parameters it is calculated in four steps: (1) the initial set of parameters measured large Hysteresis is derived from the loop. (2). After that, a hysteretic (analytical) The parameters of the function are the average M (H) curve (3) At this stage, the global optimization SA method is done using (4) Finally, the result of the SA method is well with the NMS method corrected [22]. Estimation of DEB model parameters, obese Predictors calculated with the model along with the data In terms of adjustment of values, constrained optimization problem is solved. [25]. Examples of non-derivative methods are, Valid in the area surrounding the current response Considered linear or quadratic models Using confidence-zone methods. of local model Optima was selected as the next iteration. Direct Examples of search methods include the simple method, Nelder-Met modified simplex method and pattern search [27]. The Nelder-Mead technique is a heuristic search Systematic (derivation free) as no stationary point's changes. The algorithm repeats a sequence that approximates the [29]. The Nelder-Mead optimization method is Downhill Simplex Method or known as amoeba method, this are the minimum and maximum of the objective function. one such technique is The Nelder-Mead method is a heuristic search is proper coincides with unstable points [34]. The focus of this work is on static particle swarms to overcome the major drawbacks of optimization, Modified Arithmetic Shortcut and Nelder-Mead method to propose an optimization algorithm. A modified arithmetic shortcut is, Stagnation and Prematurity of Population convergence enables coordinates methodology accelerates. [37]. Many algorithms of global boundaries Implementation and analysis are done. A new optimization routine (particle swarm simplex optimization basically) to combine most of the benefits was created efficient and most effective algorithms [42]. Noise is reduced over time (virtual temp is reduced) so that of the simplex designs space highly sensitive to details. Virtual once the temperature is sufficiently reduced, the simplex becomes one of the nearest local optima. Effectively these two different heuristic search methods integrate; Ors structure is simplex first To position in relatively high scoring area analysis is performed, after which the usual Nelder-is used. [43].

3. DEMATEL

By studying the index Management of influencing factors DEMATEL main impact Administrative Performance Factors of Expressway The construction plan is as follows: Status of Administration Information, supervisory structure, as well as incentives mechanism [1]. In this paper, iron and steel industry in Thailand Let us study the influencing factors and for the industry DEMATEL method to identify causal factors we use Structure of the paper as follows. Provides an of the iron and steel industry in Thailand Overview, Identity in various literatures Reviews the observed factors and Describes DEMATEL methodology in detail [2]. Logical relationships between queens in a system by analyzing the relationship, the degree of influence to obtain, DEMATEL is a direct influence matrix creates. Influence, degree of causality, and of each factor among other factors Degree of centrality [3]. 1) Blockchain in electronic transactions Summarize the potential use cases of the technology Analyzing; 2) HFLTS to improve DEMATEL method and factor Structured specifically for analytical research. [4]. Therefore, the combination DEMATEL method and Bayesian network A for developing Bayesian network architecture Lays a solid foundation. This method is Bayesian Caused by the traditional way of network architecture Avoids subjective biases and different attributes Rational and scientific nature of internal logical relationship Updates, which is based on DEMATEL Created a hybrid system, which is the state of government and affects both rules and precedence [7]. Although there is a large literature using DEMATEL, this useful structural modeling tool has not yet been applied to healthcare performance management. Basically, health performance measurement can be considered a complex system for the large number of indicators that influence each other. Therefore, an interesting research topic is to use the DEMATEL technique to capture the interdependence network between performance indicators and identify KPIs [8]. Considered as the main advantages of DEMATEL method One of the useful procedures is to assess the between the factors (criteria) of a system Structure and relationships. This method is a type of relationship and for criteria based on intensity can be prioritized mutual influence. Criteria with Those that result more from each other are considered High priority and are invited the causal criterion [9]. First, it is unclear we used DEMATEL approach. Then, to identify the quality and importance of attributes we have used Fuzzy TOPSIS. Ambiguous DEMATEL and theoretical foundations of [10]. The authors of this study conducted a manual review of research publications on repeatability of barriers. Accordingly, we have listed twelve barriers, a panel of experts has after examining this list, they agreed. So, analyze these constraints through DEMATEL method A list of 12 obstacles to do has been finalized [11]. The paper consists of two levels. The first step involves the application of Fuzzy DEMATEL. In this section, the correlation between the criteria is presented and the weights of the evaluation criteria are determined. The second stage is the supplier Estimation phase, where Fuzzy C-Means (FCM) The classification feature of the algorithm is implemented. The proposed method is very suitable Not only selecting supplier(s), but also specific All vendors according to the criteria the cluster does. [13]. A hybrid method consisting of two phases, expert judgments, a qualitative description method and a quantitative phase including DEMATEL is used to express the awareness and general applicability of the smart city and evaluate its dimensions by DEMATEL. Accordingly, the results will be discussed in each relevant method for the consistency of the research questions [16]. Based on the proposed method, the internal relationships between elements are firstly mapped through the fuzzy DEMATEL method. Later, the Criteria weights are by fuzzy ANP method are received. Finally, the fuzzy VIKOR technique Used to prioritize watersheds. This hybrid model helps to take into account the complex relationships between different decision-making stages and Weighting of decision criteria take into

account [18]. Though this time for various MCDM Widely used. problems, and to the best of our knowledge, these three decision methods combined for LSWF research This is the first time it has been used [19]. Therefore, to gauge expert opinion, for causes and effects of criteria computer-intelligible causal relationships between DEMATEL method for structural modeling we used Appendix A, some of DEMATEL Summarizes the definitions and properties [20]. Therefore, research on the improved DEMATEL method considering priority stability in this paper has important theoretical and practical application value for decision-oriented pluralistic problems [21].

TABLE 1. Nelder-Mead Simplicial Heuristic in DEMATEL date set

	A1	A2	A3	A4	A5	Sum
A1	0	1	2	3	4	10
A2	2	0	3	5	6	16
A3	5	4	0	6	7	22
A4	6	7	4	0	5	22
A5	4	2	5	4	0	15

Table 1 shows that DEMATEL Decision Alternative: Strength of ’pedestrian avoidance, Moderation between intimate and personal space, Intensity of transition between intimate and personal space, Strength of obstacle avoidance, Governs the queue width, Evaluation Preference: Strength of ’pedestrian avoidance, Moderation between intimate and personal space, Intensity of transition between intimate and personal space, Strength of obstacle avoidance, Governs the queue width.

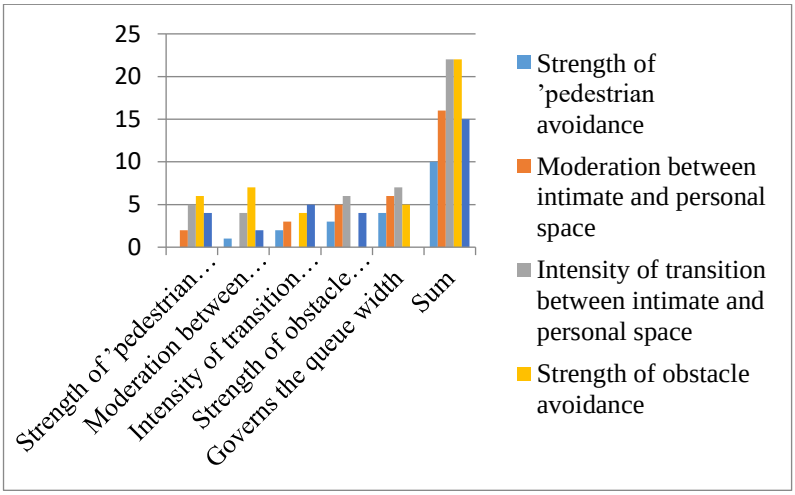

FIGURE 1. Nelder-Mead Simplicial Heuristic in DEMATEL date set

FIGURE 1 shows that DEMATEL Decision Alternative: Strength of ’pedestrian avoidance, Moderation between intimate and personal space, Intensity of transition between intimate and personal space, Strength of obstacle avoidance, Evaluation Preference: Strength of ’pedestrian avoidance, Moderation between intimate and personal space, Intensity of transition between intimate and personal space, Strength of obstacle avoidance.

TABLE 2. Normalization of direct relation matrix

	A1	A2	A3	A4	A5
A1	0	0.090909091	0.18181818	0.272727273	0.363636364
A2	0.181818182	0	0.27272727	0.454545455	0.545454545
A3	0.454545455	0.363636364	0	0.545454545	0.636363636
A4	0.545454545	0.636363636	0.36363636	0	0.454545455
A5	0.363636364	0.181818182	0.45454545	0.363636364	0

Table 2 shows that the Normalizing of direct relation matrix in Strength of ’pedestrian avoidance, Moderation between intimate and personal space, Intensity of transition between intimate and personal space, Strength of obstacle avoidance, Governs the queue width, The diagonal value of all the data set is zero.

TABLE 3. Calculate the total relation matrix

	A1	A2	A3	A4	A5
A1	0	0.090909091	0.18181818	0.272727273	0.363636364
A2	0.181818182	0	0.27272727	0.454545455	0.545454545
A3	0.454545455	0.363636364	0	0.545454545	0.636363636

A4	0.545454545	0.636363636	0.36363636	0	0.454545455
A5	0.363636364	0.181818182	0.45454545	0.363636364	0

Table 3 Shows the Calculate the total relation matrix in Make the decision to outsource or buy, Strength of obstacle avoidance, Intensity of transition between intimate and personal space, Strength of obstacle avoidance, Governs the queue width.

TABLE 4.I

I				
1	0	0	0	0
0	1	0	0	0
0	0	1	0	0
0	0	0	1	0
0	0	0	0	1

Table 4 Shows the T= Y(I-Y)-1, I= Identity matrix in Air conditioner, Color television, washing machine, Water heater, Electric cooker is the common Value.

TABLE 5.Y

Y				
0	0.090909091	0.181818182	0.272727273	0.36363636
0.181818182	0	0.272727273	0.454545455	0.54545455
0.454545455	0.363636364	0	0.545454545	0.63636364
0.545454545	0.636363636	0.363636364	0	0.45454545
0.363636364	0.181818182	0.454545455	0.363636364	0

Table 5 Shows the Y Value in Air Strength of ’pedestrian avoidance, Moderation between intimate and personal space, Intensity of transition between intimate and personal space, Strength of obstacle avoidance, Governs the queue width is the Calculate the total relation matrix Value and Y Value is the same value.

TABLE 6. I-Y

I-Y				
1	-0.09091	-0.18182	-0.27273	-0.36364
-0.18181818	1	-0.27273	-0.45455	-0.54545
-0.45454545	-0.36364	1	-0.54545	-0.63636
-0.54545455	-0.63636	-0.36364	1	-0.45455
-0.36363636	-0.18182	-0.45455	-0.36364	1

Table 6 Shows the I-Y Value Strength of ’pedestrian avoidance, Moderation between intimate and personal space, Intensity of transition between intimate and personal space, Strength of obstacle avoidance, Governs the queue width table 4 T= Y(I-Y)-1, I= Identity matrix and table 5 Y Value Subtraction Value.

TABLE 7. (I-Y)-1

(I-Y)-1				
0.466796	-0.3592	-0.31144	-0.34435	-0.38089
-0.6544	0.332006	-0.48463	-0.50884	-0.59656
-0.68112	-0.57039	0.131914	-0.65382	-0.77205
-0.63154	-0.40954	-0.59252	0.019838	-0.82108
-0.48849	-0.47844	-0.35687	-0.50771	0.103522

Table 7 Shows the (I-Y)-1Value Strength of ’pedestrian avoidance, Moderation between intimate and personal space, Intensity of transition between intimate and personal space, Strength of obstacle avoidance, Governs the queue width Table 6 shown the Minverse Value.

TABLE 8. Total Relation matrix (T)

Total Relation matrix (T)				
-0.5332	-0.3592	-0.31144	-0.34435	-0.38089
-0.6544	-0.66799	-0.48463	-0.50884	-0.59656
-0.68112	-0.57039	-0.86809	-0.65382	-0.77205
-0.63154	-0.40954	-0.59252	-0.98016	-0.82108
-0.48849	-0.47844	-0.35687	-0.50771	-0.89648
-2.98876	-2.48557	-2.61355	-2.99488	-3.46706

Copyright@ REST Publisher

Table 8 shows that the total relation matrix the direct relation matrix is multiplied with the inverse of the value that the direct relation matrix is subtracted from the identity matrix.

TABLE 9. Ri & Ci

Ri	Ci
-1.92908	-2.98876
-2.91243	-2.48557
-3.54547	-2.61355
-3.43485	-2.99488
-2.72799	-3.46706

Table 9 shows the Ri, Ci Value in Outsourcing Ri is the high value -3.54547 lowest value -1.92908. Ci is the high value -3.46706 lowest value -2.48557.

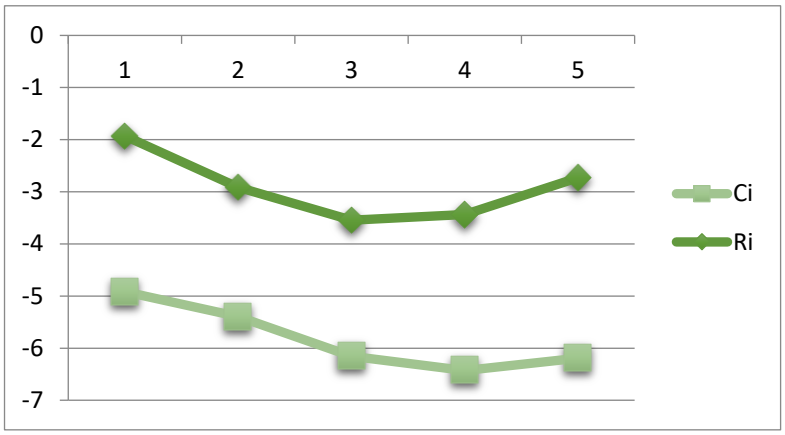

FIGURE 2. Ri & Ci

Figure 3. shows the graphical representation Ri, Ci Value in Outsourcing Ri is the high value -3.54547 lowest value -1.92908. Ci is the high value -3.46706 lowest value -2.48557.

TABLE 10. Ri+Ci & Ri-Ci & Rank &Identity

Ri+Ci	Ri-Ci	Rank	Identity
-4.91784	1.059683	1	cause
-5.398	-0.42687	2	cause
-6.15902	-0.93192	3	effect
-6.42972	-0.43997	5	effect
-6.19505	0.73907	4	effect

Table 10 shows the Calculation of Ri+Ci and Ri-Ci to Get the Cause and Effect. the final result of this paper the Make-or-buy decisions for outsourcing The process is in 1st grade, public institutions The 2rd standard is to define outsourcing priorities Due to this, outsourcing provider selection problem is 3th Standard effect, high-tech manufacturers Outsourcing reverse logistics is in 5th rank Motives for outsourcing logistics activities is in 4nd rank effect. The final result is done by using the DEMATEL method.

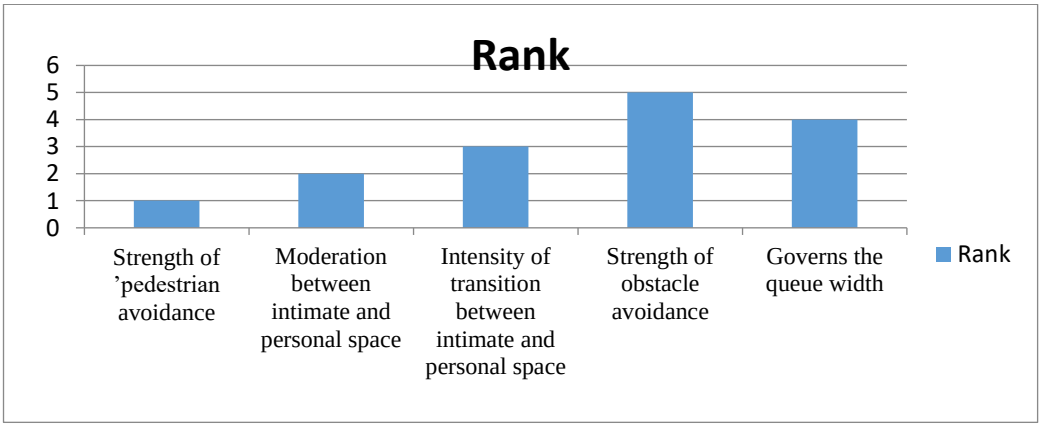

FIGURE 3. Rank

Figure 3. Shows the graphical representation the final result of this paper the Make-or-buy decisions for outsourcing The process is in 1st grade, public institutions The 2nd standard is to define outsourcing priorities Due to this, outsourcing provider selection problem is 3rd Standard effect, high-tech manufacturers Outsourcing reverse logistics is in 5th rank Motives for outsourcing logistics activities is in 4td rank effect.

TABLE 11. T matrix

T matrix				
-0.5332	-0.3592	-0.31144	-0.34435	-0.38089
-0.6544	-0.66799	-0.48463	-0.50884	-0.59656
-0.68112	-0.57039	-0.86809	-0.65382	-0.77205
-0.63154	-0.40954	-0.59252	-0.98016	-0.82108
-0.48849	-0.47844	-0.35687	-0.50771	-0.89648

Table 11 shows the T Matrix Value calculate the average of the matrix and its threshold value (alpha) = Alpha -0.58199 If the T matrix value is greater than threshold value then bolds it.

4. Conclusion

The following section is the original Nelder-Mead (NM) optimization here is a brief review of the algorithm. We are we use set of terminals and functions from the original NM algorithm as a primitive set for GP. This primitive We repeat the original NM method using set Before writing and actually running the GP With wood to see if it can be done Let's design it as a built-in structure. In this optimization En route, barriers to three-dimensional Nelder-Mead practice Noticed that the record is recorded, and as a result Poor performance resulted in very high usage However, the Nelder-Mead algorithm intermediate variables must use multiple GPU registers to store. The vertices of the optimization simplex, at each vertex Quality. Considered as the main advantages of DEMATEL method One of the useful procedures is to assess the between the factors (criteria) of a system Structure and relationships. This method is a type of relationship and for criteria based on intensity can be prioritized mutual influence. Criteria with Those that result more from each other are considered High priority and are invited the causal criterion First, the weighting of the criteria Fuzzy DEMATEL to determine We used the approach Based on the proposed method, The internal relationships between elements are firstly mapped through the fuzzy DEMATEL method.

References

[1]. Luo, Changtong, and Bo Yu. "Low dimensional simplex evolution: a new heuristic for global optimization." *Journal of Global Optimization* 52, no. 1 (2012): 45-55.

[2]. Fajfar, Iztok, Janez Puhan, and Árpád Bűrmen. "Evolving a Nelder–Mead algorithm for optimization with genetic programming." *Evolutionary computation* 25, no. 3 (2017): 351-373.

[3]. Krishna Kumar, T. P., M. Ramachandran, and Sathiyaraj Chinnasamy. "Investigation of Public Transportation System Using MOORA Method." *REST Journal on Emerging trends in Modelling and Manufacturing* 6, no. 4 (2020): 124-129.

[4]. C. Venkateswaran; M. Ramachandran; Kurinjimalar Ramu; Chandrasekar Raja, "Analysis of Market Segment Evaluation Using Gray Relational Analysis Method", REST Journal on Banking, Accounting and Business, 1(1), (2022):52-60

[5]. Singh, Rajesh, Anita Gehlot, P. S. Ranjit, and Dolly Sharma, eds. *Futuristic Sustainable Energy & Technology: Proceedings of the International Conference on Futuristic Sustainable Energy &Technology (ICFSE, 2021), 19-20 September, 2021*. CRC Press, 2022.

[6]. Ningthoujam, Sanjit, Tekcham Chingkheinganba, Swarnendu Kumar Chakraborty, Ahmed A. Elngar, Prasun Chakrabarti, Tulika Chakrabarti, S. Phani Praveen, Amit Gupta, and Martin Margala. "Performance Analysis for Molecular Communication Under Feedback Channel Using Multipath and Single Path Technique." *Available at SSRN 4251021* (2022).

[7]. Pathak, Shruti, and Bhisham Sharma. "A comparative analysis of routing protocols in iot." In *2019 6th International Conference on Computing for Sustainable Global Development (INDIACom)*, pp. 522-527. IEEE, 2019.

[8]. Farooqui, Nafees Akhter, and Ritika Amit Kumar Mishra. "Analysis of Antioxidant and Rutin Content in Buckwheat Flour Bread by Machine Learning Approach." *Design Engineering* (2021): 17188-17201.

[9]. Kucukdeniz, Tarik, and Sakir Esnaf. "Hybrid revised weighted fuzzy c-means clustering with Nelder-Mead simplex algorithm for generalized multisource Weber problem." *Journal of Enterprise Information Management* 31, no. 6 (2018): 908-924.

[10]. Zhao, Qiu Hong, Dragan Urosević, Nenad Mladenović, and Pierre Hansen. "A restarted and modified simplex search for unconstrained optimization." *Computers & Operations Research* 36, no. 12 (2009): 3263-3271.

[11]. Kanthaswamy, G., and Jovitha Jerome. "Design of PID controllers for dead-time systems using simulated annealing algorithms." *International Journal of Automation and Control* 4, no. 4 (2010): 380-397.

Copyright@ REST Publisher

[12]. Manjunath, C. R., Ketan Rathor, Nandini Kulkarni, Prashant Pandurang Patil, Manoj S. Patil, and Jasdeep Singh. "Cloud Based DDOS Attack Detection Using Machine Learning Architectures: Understanding the Potential for Scientific Applications." *International Journal of Intelligent Systems and Applications in Engineering* 10, no. 2s (2022): 268-271.

[13]. K. Janaki Priya; M. Ramachandran; Manjula Selvam, "A Comprehensive Emergency Management using VIKOR MCDM Method", REST Journal on Banking, Accounting and Business, 1(1), (2022):34-41

[14]. Krishna Kumar, T. P., M. Ramachandran, and Sathiyaraj Chinnasamy. "Exploring Various Applications of Block Chain Technology." *Recent trends in Management and Commerce* 1, no. 1 (2020): 92-96.

[15]. Ranjit, P. S., Narayan Khatri, Mukesh Saxena, Himanshu Padia, Kalpit Joshi, Gaurav Mehta, and Sahil Kalra. "Studies on various Performance, Combustion & Emission Characteristics of an IDI CI Engine with Multi-hole injector at different Injection Pressures and using SVO-Diesel blend as fuel." *International Journal of Emerging Technology and Advanced Engineering (IJETAE)* 4, no. 4 (2014): 340-344.

[16]. Gupta, Manik, Bhisham Sharma, Akarsh Tripathi, Shashank Singh, Abhishek Bhola, Rajani Singh, and Ashutosh Dhar Dwivedi. "n-Player Stochastic Duel Game Model with Applied Deep Learning and Its Modern Implications." *Sensors* 22, no. 6 (2022): 2422.

[17]. Cheng, Zuofu, Eric Shaffer, Raine Yeh, George Zagaris, and Luke Olson. "Efficient parallel optimization of volume meshes on heterogeneous computing systems." *Engineering with Computers* 33, no. 4 (2017): 717-726.

[18]. Upadhaya, Brijesh, Paavo Rasilo, Lauri Perkkiö, Paul Handgruber, Anouar Belahcen, and Antero Arkkio. "A constraint-based optimization technique for estimating physical parameters of Jiles–Atherton hysteresis model." *COMPEL-The international journal for computation and mathematics in electrical and electronic engineering* (2020).

[19]. Morais, J. V., A. L. Custódio, and G. M. Marques. "Calibration of parameters in Dynamic Energy Budget models using Direct-Search methods." *Journal of Mathematical Biology* 78, no. 5 (2019): 1439-1458.

[20]. Kalantar, Shahab, and Uwe R. Zimmer. "Optima localization by vehicle formations imitating the Nelder-Mead simplex algorithm." *Autonomous Robots* 27, no. 3 (2009): 239-260.

[21]. Kumar, Ashish, Ketan Rathor, Snehit Vaddi, Devanshi Patel, Preethi Vanjarapu, and Manichandra Maddi. "ECG Based Early Heart Attack Prediction Using Neural Networks." In *2022 3rd International Conference on Electronics and Sustainable Communication Systems (ICESC)*, pp. 1080-1083. IEEE, 2022.

[22]. Kumar, Mukesh, Bhisham Sharma, and Disha Handa. "Building predictive model by using data mining and feature selection techniques on academic dataset." *International Journal of Modern Education and Computer Science (IJMECS)* 14, no. 4 (2022): 16-29.

[23]. Kanti Das, Sreemoy, G. S. Chakraborthy, Tulika Chakrabarti, Prasun Chakrabarti, Mohammad Javad Gholamzadeh, and Mohammad Nami. "Evaluation of nootropic activity of standardized Epipremnum aureum extract against scopolamine-induced amnesia in experimental animals." *Journal of Advanced Medical Sciences and Applied Technologies* 6, no. 1 (2021): 64-71.

[24]. Ranjit, P. S., and N. K. Mukesh Saxena. "Studies on Combustion, Performance and Emission Characteristics of IDI CI Engine with Single-hole injector using SVO blends with diesel." *Asian Academic Research Journal of Multidisciplinary (AARJM)* 1, no. 21 (2014): 239-248.

[25]. Krishna Kumar, T. P., M. Ramachandran, and Vimala Saravanan. "Candidate Selection for a Project Using Weight Sum Method." *Data Analytics and Artificial Intelligence* 1, no. 1 (2021): 53-59.

[26]. Karban, Pavel, Vaclav Kotlan, and Ivo Dolezel. "Optimization of process of induction clamping." In *2016 17th International Conference Computational Problems of Electrical Engineering (CPEE)*, pp. 1-4. IEEE, 2016.

[27]. Rathor, Ketan, Keyur Patil, Mandiga Sahasra Sai Tarun, Shashwat Nikam, Devanshi Patel, and Sasanapuri Ranjit. "A Novel and Efficient Method to Detect the Face Coverings to Ensurethe Safety using Comparison Analysis." In *2022 International Conference on Edge Computing and Applications (ICECAA)*, pp. 1664-1667. IEEE, 2022.

[28]. Rastogi, Shreya, Amit Kumar Mishra, and Loveleen Gaur. "Detection of DeepFakes Using Local Features and Convolutional Neural Network." In *DeepFakes*, pp. 73-89. CRC Press.

[29]. Bajaj, Karan, Bhisham Sharma, and Raman Singh. "Comparative analysis of simulators for IoT applications in fog/cloud computing." In *2022 International Conference on Sustainable Computing and Data Communication Systems (ICSCDS)*, pp. 983-988. IEEE, 2022.

[30]. Chakrabarti, Tulika, Sibabrata Mukhopadhyay, Prasun Chakrabarti, Gholamreza Hatam, and Mohammad Nami. "Phenyl Ethanoid Glycoside from the Bark of Oroxylum indicum Vent: a Potential Inhibitor of DNA Topoisomerase IB of Leishmania donovani." *Journal of Advanced Medical Sciences and Applied Technologies* (2021).

[31]. D. Ravindran; M. Ramachandran; Vimala Saravanan, "Evaluating of E- Learning Programs using Gray-Related Analysis (GRA) Method", REST Journal on Banking, Accounting and Business, 1(1), (2022):26-33.

[32]. Khulbe, Saumya, N. Khatri, and P. S. Ranjit. "Feasibility establishment with on board generated hydrogen supplementation and studies on emission characteristics of gasoline engine." *IOSR Journal of Mechanical and Civil Engineering (IOSR-JMCE) e-ISSN* (2014): 2278-1684.

[33]. Krishna Kumar, T. P., M. Ramachandran, and Vimala Saravanan. "A Risk Assessment of Emergency management using (WASPAS) MCDM Method." *Recent trends in Management and Commerce* 2, no. 3 (2022): 36-43.

Copyright@ REST Publisher

[34]. Basu, Amlan, Sumit Mohanty, and Rohit Sharma. "Designing of the PID and FOPID controllers using conventional tuning techniques." In *2016 International conference on inventive computation technologies (ICICT)*, vol. 2, pp. 1-6. IEEE, 2016.

[35]. Tawhid, Mohamed A., and Ahmed F. Ali. "Simplex particle swarm optimization with arithmetical crossover for solving global optimization problems." *Opsearch* 53, no. 4 (2016): 705-740.

[36]. Staubach, Christian, Jonathan Wulff, and Frank Jenau. "Particle swarm based simplex optimization implemented in a nonlinear, multiple-coupled finite-element-model for stress grading in generator end windings." In *2012 13th International Conference on Optimization of Electrical and Electronic Equipment (OPTIM)*, pp. 482-488. IEEE, 2012.

[37]. De Ridder, Krister, and Manfred Roza. "Automatic optimization of motion drive algorithms using OMCT." In *AIAA Modeling and Simulation Technologies Conference*, p. 1139. 2015.

[38]. Yan, Liang, Zhen Chen, Xiongbiao Xie, and Xiaowen Zeng. "Analysis of influencing factors on the management performance of expressway construction project based on DEMATEL method." In *2009 First International Conference on Information Science and Engineering*, pp. 4198-4201. IEEE, 2009.

[39]. Rattanavijit, Supattra, Tuanjai Somboonwiwat, and Charoenchai Khompatraporn. "Analysis of Causal Competitive Factors of Thai Iron and Steel Supply Chain by DEMATEL Method." In *Industrial Engineering, Management Science and Applications 2015*, pp. 541-550. Springer, Berlin, Heidelberg, 2015.

[40]. Zhou, Jianli, Yunna Wu, Fangtong Liu, Yao Tao, and Jianwei Gao. "Prospects and obstacles analysis of applying blockchain technology to power trading using a deeply improved model based on the DEMATEL approach." *Sustainable Cities and Society* 70 (2021): 102910.

[41]. Si, Sheng-Li, Xiao-Yue You, Hu-Chen Liu, and Jia Huang. "Identifying key performance indicators for holistic hospital management with a modified DEMATEL approach." *International journal of environmental research and public health* 14, no. 8 (2017): 934.

[42]. Paliwal, Shweta, Vishal Bharti, and Amit Kumar Mishra. "Machine learning combating DOS and DDOS attacks." *International Journal of Business Information Systems* 40, no. 2 (2022): 177-191.

[43]. Rathor, Ketan, Sushant Lenka, Kartik A. Pandya, B. S. Gokulakrishna, Susheel Sriram Ananthan, and Zoheib Tufail Khan. "A Detailed View on industrial Safety and Health Analytics using Machine Learning Hybrid Ensemble Techniques." In *2022 International Conference on Edge Computing and Applications (ICECAA)*, pp. 1166-1169. IEEE, 2022.

[44]. Dogra, Roopali, Shalli Rani, and Bhisham Sharma. "Two-level data dissemination for energy-efficient routing in IoT-Based wireless sensor network." In *Proceedings of International Conference on IoT Inclusive Life (ICIIL 2019), NITTTR Chandigarh, India*, pp. 127-142. Springer Singapore, 2020.

[45]. Magare, Archana, Madonna Lamin, and Prasun Chakrabarti. "Inherent mapping analysis of agile development methodology through design thinking." In *Data Science and Intelligent Applications: Proceedings of ICDSIA 2020*, pp. 527-534. Springer Singapore, 2021.

[46]. C. Sukumaran, M. Ramachandran, Vimala Saravanan, Sathiyaraj Chinnasamy, "An Empirical Study of Brand Marketing Using TOPSIS MCDM Method", REST Journal on Banking, Accounting and Business, 1(1), (2022):10-18

[47]. Ranjit, P. S., Swapnil Sureshchandra Bhurat, Dash Santosh Kumar, Venkata Kamesh Vinjamuri, A. Saravanan, Varaprasad Bh, M. Murugan, and Yashvir Singh. "Experimental investigations on gaseous hydrogen supplemented Aleurites Fordii biodiesel in a direct injection diesel engine for performance enhancement and reduction in emissions." *Materials Today: Proceedings* 46 (2021): 11140-11148.

[48]. TP, Krishna Kumar, and M. Ramachandran. "A Review of Marine Current Energy and Types of Energy using MOORA Method."

[49]. Kfita, Abdelaziz El, and Omar Drissi-Kaitouni. "A fuzzy revised-DEMATEL method to evaluate vehicles fleet maintenance management in uncertainty." *International Journal of Logistics Systems and Management* 28, no. 1 (2017): 59-83.

[50]. Sangaiah, Arun Kumar, Prabakar Rontala Subramaniam, and Xinliang Zheng. "A combined fuzzy DEMATEL and fuzzy TOPSIS approach for evaluating GSD project outcome factors." *Neural Computing and Applications* 26, no. 5 (2015): 1025-1040.

[51]. Singh, Charanjit, Davinder Singh, and J. S. Khamba. "Analyzing barriers of Green Lean practices in manufacturing industries by DEMATEL approach." *Journal of Manufacturing Technology Management* (2020).

[52]. Keskin, Gülşen Aydın. "Using integrated fuzzy DEMATEL and fuzzy C: means algorithm for supplier evaluation and selection." *International Journal of Production Research* 53, no. 12 (2015): 3586-3602.

[53]. Razavi Toosi, S. L., and J. M. V. Samani. "Prioritizing watersheds using a novel hybrid decision model based on fuzzy DEMATEL, fuzzy ANP and fuzzy VIKOR." *Water Resources Management* 31, no. 9 (2017): 2853-2867.

[54]. Wu, Yunna, Mingjuan Liao, Mengyao Hu, Jiawei Lin, Jianli Zhou, Buyuan Zhang, and Chuanbo Xu. "A decision framework of low-speed wind farm projects in hilly areas based on DEMATEL-entropy-TODIM method from the sustainability perspective: a case in China." *Energy* 213 (2020): 119014.

[55]. Gupta, Yogesh, Ghanshyam Raghuwanshi, Abdullah Ali H. Ahmadini, Utkarsh Sharma, Amit Kumar Mishra, Wali Khan Mashwani, Pinar Goktas, Shokrya S. Alshqaq, and Oluwafemi Samson Balogun. "Impact of weather predictions on covid-19 infection rate by using deep learning models." *Complexity* 2021 (2021): 1-11.

[56]. Rathor, Ketan, Anshul Mandawat, Kartik A. Pandya, Bhanu Teja, Falak Khan, and Zoheib Tufail Khan. "Management of Shipment Content using Novel Practices of Supply Chain Management and Big Data Analytics." In *2022 International Conference on Augmented Intelligence and Sustainable Systems (ICAISS)*, pp. 884-887. IEEE, 2022.

[57]. Kour, Manpreet, Bhisham Sharma, and T. C. Aseri. "A study of traffic redirection based congestion control protocols for wireless sensor networks." *Int J Comput Sci Technol* 6, no. 2 (2015): 152-158.

[58]. Chakrabarti, Prasun, Siddhant Bane, Biswajit Satpathy, Mark Goh, Biswa Nath Datta, and Tulika Chakrabarti. "Compound Poisson Process and its Applications in Business." In *ICDSMLA 2019: Proceedings of the 1st International Conference on Data Science, Machine Learning and Applications*, pp. 678-685. Springer Singapore, 2020.

[59]. C. Sukumaran; M. Ramachandran; Chinnasami Sivaji; Manjula Selvam, "Ranking of Product in E-store using WASPAS method", REST Journal on Banking, Accounting and Business, 1(1), (2022): 1-9.

[60]. Dash, Santosh Kumar, P. S. Ranjit, Bhemuni Varaprasad, Nabam Hina Papu, and P. V. V. S. S. Manikanta. "Biodiesel Prepared from Used Palm Oil Collected from Hostel Mess is a Promising Supplement for Diesel Fuel." In *Advances in Mechanical and Materials Technology: Select Proceedings of EMSME 2020*, pp. 841-850. Springer Singapore, 2022.

[61]. Krishna Kumar, T. P., M. Ramachandran, and Sathiyaraj Chinnasamy. "Investigation of Public Transportation System Using MOORA Method." *REST Journal on Emerging trends in Modelling and Manufacturing* 6, no. 4 (2020): 124-129.

[62]. Tsai, Wen-Hsien, and Wei Hsu. "A novel hybrid model based on DEMATEL and ANP for selecting cost of quality model development." *Total quality management* 21, no. 4 (2010): 439-456.

[63]. Xu, Chenglei, and Yueyun Zhu. "Research on improved DEMATEL method considering preference consistency." In *2016 13th International Conference on Service Systems and Service Management (ICSSSM)*, pp. 1-5. IEEE, 2016.

Copyright@ REST Publisher