



# A Study on Mayfly Algorithm and Its Recent Developments

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**Abstract.** It is to define its relationship with the partners during the formation and registration process of S Company Is a legal document prepared and also refers to the minute of the angle corresponding to the MOA 360 minute mark. Each minute represents 1/60 of a degree, just like the minutes of an hour. When shooting, even a small angle can cause you to miss the mark, so it is important to adjust your MOA to a precise angle or fine for a minute. Stands for Memorandum of Association, which refers to articles of association. They help protect and build your business and help establish the company's identity, work ethic and goals. The MOA's first duty is to obtain the patient's personal information before proceeding with the medical journey. Once the MOA collects the patient's information, he will begin transferring the patient to the doctor's office. At this point, the doctor may begin to perform medical procedures. Memorandum of Association (MOA) with its partners defines a company relationship. Is a Memorandum of Association (MOA) To define its relationship with partners Formation of limited liability company And is a legal document prepared during the registration process. The Military Operation Area (MOA) is a Class A aircraft designated to distinguish or differentiate certain hazardous military operations from IFR traffic and to identify VFR traffic carrying these operations. A company is also involved in a business or industrial organization is In order to operate a law firm Created by a group of individuals. They vary between private and public companies. Both have different ownership structures, Terms and conditions include financial statement requirements. The document containing Rules governing the internal management of a company and the regulations are called the article of the association. Select the document type as the consolidation document and select the year the attachment was filed. Pay the fee and request a certified copy. Memorandum of Association (MoA) Memorandum of Association articles there are the following subcategories: This subdivision refers to the name of the company. Company name should not be synonymous with any existing company. Also, if it is a private company, the last word should be the private company.

**Keywords:** Optimization Algorithm, Multi-Objective Optimization, Biogeography, Mayfly Algorithm.

## 1. Introduction

Companies go to the homepage of the article Download the copy online. For companies already registered, the process is simple: go to the companies' home or register with your company's construction company and use the help of quick and efficient organizational systems. His thorough review of one of those documents: A contract template. ... A memorandum of understanding is an abbreviation of the proposed transaction that will be awarded to attorneys and brokers representing both the buyer and the seller after negotiating the agreed offer. Every company should have a memorandum that will all be in the same format and contain the same information. Date attached with the acronym "always moments", MOA also means 'collecting' in Korean. The group gave the name MOA to their fans in the hope that they would be able to collect dreams from each other to complete a dream. So, the boy group gave their fans the name Melody, which means their fans complete them. To make changes to the company name, the MOA must be changed by enforcing a special resolution. In case of a name change in a private company or a public limited company, the approval of the Central Government is not required. The article is subject to reference and any subsection of the article has been modified or conflicts with reference. Memorandum of Association Establishes the Constitution and the basic terms and conditions for the formation or integration of the organization. It provides a job map for a company. Failure to comply with these instructions may result in the company suing a member. Every action of the company should be within the limits of the internal relations between the company and its members. Memorandum of Association this is the basic document for the existence of a company. They can write their own articles if desired.

## 2. Optimization Algorithm

To cover the gap in the literature, ANFIS-based mechanism for WECS blade pitch control this paper proposes that it violates traditional controllers. To create training and testing database for ANFIS controller this paper also suggests a new strategy, creating a training-appropriate database, and adjusting and testing its membership functions. For this reason, another enhancement calculation called the Mayfly optimization algorithm precisely limits the optimal range of the regulator Used to differentiate. The proposed strategy is different and there are various techniques in writing to demonstrate its benefits. Reliability of the proposed basis system and to test the strength, certain test conditions are performed. Positive components of the proposed regulator give superb execution against wind speed vacillations, load prerequisite varieties, boundary vulnerabilities and delay of correspondence channels. [22] However, cluster formation, CH selection and re-clustering between vehicles does not provide efficient solutions for data transfer, Further CH selection plays an important role in

clustering algorithms. In various solutions in the solution space Optimization as an optimal solution is a technique presented. Therefore, an optimization applies to the selection of the best node of the algorithm. However, some upgrade algorithms are used during CH selection each iteration takes a considerable amount of time to integrate. Therefore, the selection of optimization algorithms to determine network functions such as service and energy efficiency, Current study MADCR protocol to increase the lifespan of networks it also proposes to drastically reduce vehicle delays. [23] This paper highlights the importance of shift variation for global optimization algorithms and as a test bed for WOAs in the performance of optimization algorithms in the absence of shift variation properties. Performance of the optimization algorithm this characteristic ensures that it depends on the shape / form of a landscape; however, this does not depend on the location of the terrain you are looking for. The ultimate target of this research paper is horticultural experts and is to provide for researchers a guide to designing new methods keeping in mind the characteristics of shift variation. For example, Team Game Algorithm (DGA) editors used modified to evaluate the performance of their algorithm Criteria functions. [24] The emergence of more and more complex optimization problems leads to a greater demand for optimization algorithms. For the past few years, The researchers explored a number of meat protocol guidelines, both for simplicity and implementation With the benefits of simplicity, competitive alternative resolution projects have been taken up to solve complex optimization problems. These algorithms are primarily classified into four types of evolutionary algorithms (optimization algorithms based on different evolutionary and biogeography algorithms (including Ray-optimization algorithm and multi-algorithm) and mass intelligence algorithms. [25] The PSO system is based on mass intelligence. The study is at an early stage. Beyond the Gene Algorithm and Simulated Annealing approaches do not have a POS systematic calculation method and definite mathematical basis. Currently, this method is limited to the aspect of the evolutionary neural network Can be used successfully, and its other applications are still being explored. According to national documents, research on PSOs is primary Mathematical basics and applied research. The mathematical basis includes the mechanical theory of the PSO, proof of its synchronization and strength, and more. Commonly published documents include its mathematical basics, integration and speed evaluation includes some documentation about. It seeks to complete research on PSO; Application research is the pursuit of its benefits, including overcoming its shortcomings and improving its usability. [27] Structured dummy energies are used in the optimization algorithm this is important because it depends on the set of ingredients physics of the atom have relevant contexts. Also, with a maximum of to reduce the calculation time two atoms per unit cell We choose more symmetrical structures. Representatives of the metallic environment are a cube-cube structure centered on a cube and a cube face. [28].

### 3. Multi-Objective Optimization

These MOEAs, due to their demographic nature, can approximately the entire barreto-front (PF) of the MOP in a single flow. Also, as search location information is exchanged between search agents, they can quickly integrate with the actual Pareto-front. The Strength Barreto Evolutionary Algorithm (SPEA) was proposed and Thiel stores the Barreto-optimized solutions he has discovered in the external archive so far. The algorithm uses Barreto Dominance to assign exercise values to individuals, and these exercise values are determined only from the solutions that do not dominate the external archive. Then, it reduces without being destroyed in the external archive Number of non-dominant solutions stored. In SPEA, all solutions in the archive are selected and No exercise sharing parameter is required the new nickname is used. [8] The unique DV is related to the landscape change and a numerical process Proposed. This DV will remain stable until the algorithm integrates into a local optimization, the algorithm is then restarted, the optimization process will continue. In this case, the domain may be enriched or unlinked, and there is no guarantee of reaching the global minimum, so a multi-start process is used to find the best solution and the least expensive and safest solution is selected. The user must create multiple initial solutions for the multiple startup process. Different initial geometry and section design variables were considered with pre-design formulas (E.g., towers were designed before total weight. members should not exceed four-quarters). [9] This survey refers to a series of non-linear multipurpose update methods. Section 2 lays the foundation for basic concepts. Then, because the primary goal of multipurpose optimization is to model the decision maker's preferences. Methods are categorized according to how the decision maker expresses these preferences. Include the primary pronunciation of the options, which specify the objective functions or the relative importance of the desired Goals before running the optimization algorithm. Section 4 describes the methods with pronunciation behind the options, this is from a set of mathematically equivalent solutions Section 3 contains instructions for this Selecting a single solution. The pronunciation of the unwanted methods options is specified. Algorithms that include progressive pronunciation of options that the decision maker provides following input when the algorithm is running are not discussed. [10] Despite many initial attempts, Barreto's idea of hope in evolution was rejected by David E. Goldberg, first pointed out in his seminal book on genetic algorithms. People expecting Barreto on the problem of multiple objective optimizations. The basic idea is to find a set of solutions for non-Barreto people. These solutions will be assigned to the highest standards and removed from controversy. Another solution that Barreto does not dominate is determined by others and assigned to the next highest office. This process will continue until all people have received the appropriate rankings. Goldberg also suggested using to avoid turning the GA into a point ahead some kind of nitching technique. [12] This paper is called Pareto-MEC Proposes a new multipurpose optimization algorithm. This introduces Barreto's theory in the MEC to improve a number of objective issues. Principles of Pareto-MEC: Many individuals are scattered throughout the entire settlement, and then some of the best as starting points for each group as starting points for each group each group searches only one Local area and gradually Local area and gradually During the conversion process to this first page, This algorithm controls the search area of the panel and changes the direction of the panel. Both the above function and function are called dissimilation; the function is also called homogeneous taxi. From the basic MEC described in Pareto-MEC There are some differences [13] we discuss various ways to systematically design

experimental issues Multi-Objective Optimization: Multi-Objective Approach, Bottom-Up Approach and Control-Surface Approach. Multi-Objective Approach, Bottom-Up Approach and Control-Surface Approach. Was used indirectly to create more intuitive and experimental problems. In this approach, multipurpose testing can create the problem Different single purpose functions are used. To facilitate the construction process, in many cases, as different translations of an objective process Different objective functions are used. For example, it is not optimal that SCHI uses to minimize the following two single-purpose functions, but rather the Pareto-optimal package contains more than one solution, which includes a unique At least in each of the above functions. All other solutions that create exchanges between two objective functions become members of the list of many such experimental problems with the above two solutions. It is worth noting that such a construction process can extend to high vision problems, which can be difficult to understand in seemingly simple and complex issues [14].

#### 4. Biogeography

Based on our temporal difference estimates and ancestral limit reconstructions, Mill pad killer bugs have colonized Madagascar more than once in the last 68 years. The LRT model performed better than the DEC model and the Oriental first Predicts two colonial events up to Madagascar, one between 25 and 57 and one within the last 42. Following that, it is speculated that there will be a colonial event from Madagascar. For the past 28 years the post-Madagascar colonial phenomenon from this region took place around the border of the Elysium Oligocene. Although the DEC results differ, although the DEC results differ, in many respects based on the reconstructed ancestral limits; usually we see similar patterns: two eruptions from the Oriental to Madagascar and one eruption from Africa to Madagascar. However, localization outside the Madagascar region was not recovered in DEC analysis; when leaving the branch, the oriental distribution to the tip extends the range to the area at that tip. [15] Exploring the origins and relationships of the Malagasy dynasties and their sister relationships may be an important step in understanding Global diversity of Epimeroptera. Here we explore the comparative significance of foreign diffusion, vicarious and local radiation, using a group of insects that are less capable of scattering, in the formation of Malagasy fauna. To include representatives of 26 species, primitive mutation events, and refers to the traditional view propagating in one direction from a continental source is very simple. [16] Conservation biogeography, application of biogeography in conservation, Separable from ecological application and is very clear in approximate measurements. Zoological areas, aboriginal areas, rich geological patterns of organisms, or structures for conservation purposes can be immediately identified as conservation biogeography, with more focused applications of micro-spatial measurements, e.g., habitats or dynamics, drawn. From traditions in both ecology and biogeography. Similarly, analyzes that characterize the emerging statistical characteristics of environmental databases may be based on both 'environmental' characteristics and 'biogeography' properties. Attempts to develop descriptive and predictive models for the invasion of non-native organisms, for example, undermine both types of traits, often resulting in the detection of a biogeography signal, and such analyzes are derived from conservation ecological and biogeography traditions. [17] "All theories of geological botany depend on a particular concept of the origin of living things and the permanence of living things." 52 Most authors consider species to be Permanent, but about the origin of living things He considers various theories. By external causes or hybrids. There is no satisfactory way, racial differences He concludes that they are caused by things hitherto unknown. If the general summary of Condoleezza the beginning of biogeography accepted, then its subsequent history is characteristic of biogeography regions. And can be understood with reason. Buffon law, its general rules and its branches. History of biogeography Buffon is the history of fate. Term "Buffon's law" may or may not have been recognized by some modern biologists or by some historians. The eclipse of this word, used by writers such as Humboldt and Lyle in the early nineteenth century, must be sought in the context of events and happenings. Darwinian Revolution [18] Ecological biology Geography is broadly intertwined with the biology of ecologists' populations. Williams may have been more correct in looking at the uncontrolled gap between the environment and historical biology: the former gradually merging with ecology, while the latter increasingly integrates with the objectives of the system and the historical features of geography. The sorting process that divides traditional biology into its ecological and historical objects, with its most important advantage, will provide opportunities for biologists to discover whether each ingredient can be infused with its own principles and methods. My current view is that the theory of equilibrium has the same relationship with the theory of mutations in biology as with the genetics of population and the biologic analysis of evolution. Relationship friendly, but independent cohabitation. Although the current equilibrium theory is called "explanation", the belief that these different interests can be reconciled in the future may be misplaced. [19] The first objectives of historical biological geography are to identify relevant boundaries, define boundaries, and describe patterns relevant to current geography. The forms summarize the biogeography data. As general statements of biological proliferation, they are the end product of the induction process. This hypothesis introduces a deductive component in the process of historical reconstruction and must be tested in a way designed to refute or deny it in order to qualify as an acceptable scientific hypothesis. If it fails to falsify, the new data obtained for the experiment are consistent with the hypothesis. Failure to lay again and again means that the hypothesis has been confirmed [20] the division between ecology and historical biogeography reflects the past dominance of the story rather than analytical methods. Stories allow teachers to present their interpretations based on competitive beliefs rather than harsh assumptions. When analytical methods are used in autobiography, it is possible to prove that the patterns are not entirely historical or completely ecological, and that experimentation and analysis are needed if the effects of the processes that cause these patterns are to be distinguished. The context in which they can be integrated into a research project and the fact that they are useful is a step towards a necessary set of reviews of historical biogeography methods.

## 5. Mayfly Algorithm

In this context, MA and NFL based A Novel Multi-Objective Mayfly Algorithm proposed; these include archive algorithm, non-dominant sorting strategy and roulette wheel selection Added to further improve performance and integration performance. In solving many objective optimization problems. In this study, data decay technology, sub-model selection strategy, and many predictive sub-models and based on the newly proposed MA, Point Forecast a new wind speed group forecast system has been proposed. In particular, VMD is the historical wind speed data Used to separate a series. Then, to predict each broken subsection, seven widely used benchmark predictions are used. [1] Mayfly algorithm is an optimal way to achieve this goal. It combines the key benefits of PSO, GA and FA Is the newly created algorithm, resulting in a hybrid of PSO-GA-FA. Compared with the other seven transformation methods, the performance evaluation performed using the CEC test operations demonstrates the dominance of MA in terms of accumulation rate and velocity. Although this requires rapid integration, it is not yet used in many fields of engineering optimization, for antenna optimization tasks we propose to use this. [2] Mayfly Algorithm is a new and efficient bio-inspired optimization technique, it sometimes solves different optimization problems, and improving issues using the Mayfly algorithm provides a weaker solution than other upgrade algorithms. To improve the accuracy of this algorithm and solve the problem described, do a local search program uses Elite Maple pairs for each iteration. The symmetric muffle algorithm (BMA) method for upgrading is given below. First, the elite male maple was found to have the lowest price Value in population. To verify the effectiveness of a given BMA, it performed four test operations and compared its results with some new bio-train algorithms, including the Balance Optimizer. [3] Mayflies40 belongs to the genus Ephemeroptera, an ancient genus of polyoptera. The proposed MA optimization system is a powerful hybrid algorithm that Muffles are the backbone of the proposed algorithm for social behavior, especially considering the main advantages of their mating process: PSO, genetic algorithm and firefly algorithm. In the MA Mayfly article, various reports have suggested that the PSO algorithm may require some serious improvements with the help of various evolutionary guidelines and standards. Test bench functions, which confirm the reliability of MA more than other algorithms. That's why he earned his M.A. Gained, the authors in this article use confusing mapping and natural learning resistances to hybridize MA to get the best results and confirm the truth. Mayflies are already considered adults, and no matter how long they live, qualified flies will survive after hatching from eggs. The position of each map in the search area indicates a possible solution to the proposed problem. The algorithm works as follows. Initially, approximately two sets of mafias were formed to represent the male and female population. In the specified algorithm, each muffler is located as a candidate solution in the approximate N-dimensional problem search area, which is referred to as the vector. [4] Muffle is a transformation mechanism that is the result of Modification of Particle Mass Optimization Algorithm Behavior. This is triggered by the social behavior of the Mayflies. Initially, bundles of files were created in approximate network clusters, which were used to evaluate the quality. The file at the fitness function solution location. According to the MADCR protocol, exercise performance is calculated based on the distance between moving vehicles during the gravity process. The best female muffler in terms of speed values attracts the best male muffler. The value of speed is updated based on the exercise activity [5] in this section, radial based the proposed optimization of the functional neurological network is described. MA is used to solve optimization problems, Also it is triggered by flying behavior and the mating process of muffles. 37 RBFNN as a radial-based operating system, it is also used as an approximate function; time forecast classification and control system. The key components of the system operate with investment, replacement and maintenance costs. GA, PSO, ant lion optimizer, dragonfly algorithm under some optimization approaches And other optimization algorithms due to valve point impacts, restricted operating zones and fragmented cost function not ideal for providing a global solution. MDA has strong parallel search capability and gets local minimums. [6] This is the dynamic piece of the present exploration. The No Free Lunch hypothesis expresses that the normal exhibition for all issues in a class is no different for any arrangement. This intends that in a specific issue, various calculations might get various outcomes, however in all issues they will be something similar. It urged analysts to make before work and concocted new issue explicit methodologies for further developed execution. In this paper, the creators have proposed a mixture calculation in view of the Harmony Search calculation and the Mayfly calculation to tackle the FS issue. The HS calculation has been utilized to update across different spaces previously. Mama is an as of late proposed Meta-heuristic has proven successful in managing streamlining issues [7].

## 6. Conclusion

Performance evaluation using CEC experimental functions demonstrates the dominance of MA in terms of concentration ratio and velocity compared to the other seven Meat Horizon algorithms. To get quick integration, it is not yet used In many engineering optimization fields, we propose to use this for antenna optimization tasks. This is triggered by the social behavior of the Mayflies. Initially, the packages of files were created in approximate network clusters, which are a function of fitness. The solution was used to evaluate the file quality in place. According to the MADCR protocol, exercise performance is calculated based on the distance between moving vehicles during the gravitational process. The best female muffler in terms of speed values attracts the best male muffler. The value of speed is updated based on the exercise activity; some well-functioning algorithms are briefly described below. It does not dominate the external archive. Subsequently, it reduces the number of non-dominant solutions stored in the external archive without destroying the barreto-lead properties. At SPEA, all solutions in the archive take part in the selection, and a new nickname system is used, which does not require exercise sharing because there are multiple individuals throughout the entire solution. Scattered, and then some of the best

individuals were initially selected. Warmer temperatures can directly affect the metabolism of microorganisms, plants and outdoor hot water animals, as well as organisms with short heat tolerance.

## Reference

- [1]. Liu, Zhenkun, Ping Jiang, Jianzhou Wang, and Lifang Zhang. "Ensemble forecasting system for short-term wind speed forecasting based on optimal sub-model selection and multi-objective version of mayfly optimization algorithm." *Expert Systems with Applications* 177 (2021): 114974.
- [2]. Owoola, Eunice Oluwabunmi, Kewen Xia, Ting Wang, Abubakar Umar, and Romoke Grace Akindele. "Pattern Synthesis of Uniform and Sparse Linear Antenna Array Using Mayfly Algorithm." *IEEE Access* (2021).
- [3]. Sharma, Akhilesh Kumar, Gaurav Aggarwal, Sachit Bhardwaj, Prasun Chakrabarti, Tulika Chakrabarti, Jemal H. Abawajy, Siddhartha Bhattacharyya, Richa Mishra, Anirban Das, and Hairulnizam Mahdin. "Classification of Indian classical music with time-series matching deep learning approach." *IEEE Access* 9 (2021): 102041-102052.
- [4]. Chen, Liang, Chunxiang Xu, Heqing Song, and Kittisak Jemsittiparsert. "Optimal sizing and siting of EVCS in the distribution system using metaheuristics: A case study." *Energy Reports* 7 (2021): 208-217.
- [5]. Vasanth, K., V. Elanangai, S. Saravanan, and G. Nagarajan. "FSM-based VLSI architecture for the 3×3 window-based DBUTMPF algorithm." In *Proceedings of the International Conference on Soft Computing Systems*, pp. 235-247. Springer, New Delhi, 2016.
- [6]. Majumdar, Kingsuk, Provas Kumar Roy, and Subrata Banerjee. "Implementation of multi-objective chaotic mayfly optimisation for hydro-thermal-solar-wind scheduling based on available transfer capability problem." *International Transactions on Electrical Energy Systems* 31, no. 11 (2021): e13029.
- [7]. Kaur, Chamandeep & Boush, Mawahib & Hassen, Samar & Hakami, Wafaa & Abdalraheem, Mohammed & Galam, Najla & Hadi, Nedaa & Benjeed, Atheer. (2022). Incorporating sentimental analysis into development of a hybrid classification model: A comprehensive study. *International Journal of Health Sciences*. 6. 1709-1720. 10.53730/ijhs.v6nS1.4924.
- [8]. Sennan, Sankar, Somula Ramasubbareddy, Sathiyabhama Balasubramaniam, Anand Nayyar, Chaker Abdelaziz Kerrache, and Muhammad Bilal. "MADCR: Mobility aware dynamic clustering-based routing protocol in Internet of Vehicles." *China Communications* 18, no. 7 (2021): 69-85.
- [9]. Leela Prasad Kowtharapu, Naresh Kumar Katari, Christian A Sandoval, Siva Krishna Muchakayala, Vijay Kumar Rekulapally, Green Liquid Chromatography Method for the Determination of Related Substances Present in Olopatadine HCl Nasal Spray Formulation, Robustness by Design Expert, *Journal of AOAC INTERNATIONAL*, 2022, qscac072, <https://doi.org/10.1093/jaoacint/qscac072>
- [10]. Ramasamy, Krishnakumar, and Coimbatore Subramanian Ravichandran. "Optimal design of renewable sources of PV/wind/FC generation for power system reliability and cost using MA-RBFNN approach." *International Journal of Energy Research* (2021).
- [11]. Kavitha, M., V. Elanangai, S. Jayaprakash, and V. Balasubramanian. "Development of regenerative braking concept for electric vehicle enhanced with bidirectional converter." *International Journal of Power Electronics and Drive Systems* 9, no. 4 (2018): 1584.
- [12]. Bhattacharyya, Trinav, Bitanu Chatterjee, Pawan Kumar Singh, Jin Hee Yoon, Zong Woo Geem, and Ram Sarkar. "Mayfly in harmony: A new hybrid meta-heuristic feature selection algorithm." *IEEE Access* 8 (2020): 195929-195945.
- [13]. Alam, MM Gowthul, S. Jerald Nirmal Kumar, R. Uma Mageswari, and TF Michael Raj. "An Efficient SVM Based DEHO Classifier to Detect DDoS Attack in Cloud Computing Environment." *Computer Networks* (2022): 109138.
- [14]. Das, Amit Kumar, Ankit Kumar Nikum, Siva Vignesh Krishnan, and Dilip Kumar Pratihari. "Multi-objective Bonobo Optimizer (MOBO): an intelligent heuristic for multi-criteria optimization." *Knowledge and Information Systems* 62, no. 11 (2020): 4407-4444.
- [15]. Ferreira, Fernando, and Luís Simões. "Optimum design of a cable-stayed steel footbridge with three dimensional modelling and control devices." *Engineering Structures* 180 (2019): 510-523.
- [16]. Marler, R. Timothy, and Jasbir S. Arora. "Survey of multi-objective optimization methods for engineering." *Structural and multidisciplinary optimization* 26, no. 6 (2004): 369-395.
- [17]. Ramesh, S., S. Sasikala, S. Gomathi, V. Geetha, and V. Anbumani. "Segmentation and classification of breast cancer using novel deep learning architecture." *Neural Computing and Applications* (2022): 1-13.
- [18]. Konak, Abdullah, David W. Coit, and Alice E. Smith. "Multi-objective optimization using genetic algorithms: A tutorial." *Reliability engineering & system safety* 91, no. 9 (2006): 992-1007.
- [19]. Hemanand, D., Nilamadhab Mishra, G. Premalatha, Dinesh Mavaluru, Amit Vajpayee, Sumit Kushwaha, and Kibebe Sahile. "Applications of Intelligent Model to Analyze the Green Finance for Environmental Development in the Context of Artificial Intelligence." *Computational Intelligence and Neuroscience* 2022 (2022).
- [20]. Coello, CA Coello. "Evolutionary multi-objective optimization: a historical view of the field." *IEEE computational intelligence magazine* 1, no. 1 (2006): 28-36.
- [21]. Kirubakaran, S., and K. Maheswari. "An improved SIP protocol in heterogeneous mobile network for efficient communication." *Asian Journal of Research in Social Sciences and Humanities* 6, no. 9 (2016): 513-528.
- [22]. Ngatchou, Patrick, Anahita Zarei, and A. El-Sharkawi. "Pareto multi objective optimization." In *Proceedings of the 13th International Conference on, Intelligent Systems Application to Power Systems*, pp. 84-91. IEEE, 2005.

- [23]. Vasanth, K., V. Jawahar Senthil Kumar, and V. Elanagai. "Unsymmetrical Trimmed Midpoint as Detector for Salt and Pepper Noise Removal." In *Advances in Computing and Information Technology*, pp. 813-822. Springer, Berlin, Heidelberg, 2013.
- [24]. Ahirwar, Deshraj, P. K. Shukla, Kirti Raj Bhatele, Prashant Shukla, and Sachin Goyal. "Intrusion detection and tolerance in next generation wireless network." In *Next Generation Wireless Network Security and Privacy*, pp. 313-335. IGI Global, 2015.
- [25]. Siva Krishna Muchakayala, Kommera Pavithra, Naresh Kumar Katari, Vishnu Murthy Mariseti, Thirupathi Dongala and Raju V.K. Vegesna, Development and validation of RP-UPLC method for the determination of betamethasone dipropionate impurities in topical formulations using multivariate central composite design. *Analytical Methods*, 2021, 13, 3705-3723. <https://doi.org/10.1039/D1AY01096D>
- [26]. Deb, Kalyanmoy, Lothar Thiele, Marco Laumanns, and Eckart Zitzler. "Scalable multi-objective optimization test problems." In *Proceedings of the 2002 Congress on Evolutionary Computation. CEC'02 (Cat. No. 02TH8600)*, vol. 1, pp. 825-830. IEEE, 2002.
- [27]. Chopra, Pooja & Gollamandala, Vijay & Ahmed, Ahmed & Bala Gangadhara Tilak Babu, Sayila & Kaur, Chamandeep & Prasad N, Achyutha & Nuagah, Stephen. (2022). Automated Registration of Multiangle SAR Images Using Artificial Intelligence. *Mobile Information Systems*. 2022. 1-10. 10.1155/2022/4545139.
- [28]. Forthman, Michael, and Christiane Weirauch. "Phylogenetics and biogeography of the endemic Madagascan millipede assassin bugs (Hemiptera: Reduviidae: Ectrichodiinae)." *Molecular phylogenetics and evolution* 100 (2016): 219-233.
- [29]. Jayalakshmi, D. S., D. Hemanand, G. Muthu Kumar, and M. Madhu Rani. "An Efficient Route Failure Detection Mechanism with Energy Efficient Routing (EER) Protocol in MANET." *International Journal of Computer Network & Information Security* 13, no. 2 (2021).
- [30]. Monaghan, Michael T., Jean-Luc Gattolliat, Michel Sartori, Jean-Marc Elouard, Helen James, Pascale Derleth, Olivier Glaizot, Ferdy de Moor, and Alfried P. Vogler. "Trans-oceanic and endemic origins of the small minnow mayflies (Ephemeroptera, Baetidae) of Madagascar." *Proceedings of the Royal Society B: Biological Sciences* 272, no. 1574 (2005): 1829-1836.
- [31]. Uma Mageswari, R., S. Shitharth, G. Surya Narayana, A. Suresh, Leena Bojaraj, S. Chandragandhi, and Amsalu GosuAdigo. "Machine Learning Empowered Accurate CSI Prediction for Large-Scale 5G Networks." *Wireless Communications and Mobile Computing* 2022 (2022).
- [32]. Whittaker, Robert J., Miguel B. Araújo, Paul Jepsen, Richard J. Ladle, James EM Watson, and Katherine J. Willis. "Conservation biogeography: assessment and prospect." *Diversity and distributions* 11, no. 1 (2005): 3-23.
- [33]. Alnuaim, Abeer Ali, Mohammed Zakariah, Prashant Kumar Shukla, Aseel Alhadlaq, Wesam Atef Hatamleh, Hussam Tarazi, R. Sureshbabu, and Rajnish Ratna. "Human-Computer Interaction for Recognizing Speech Emotions Using Multilayer Perceptron Classifier." *Journal of Healthcare Engineering* 2022 (2022).
- [34]. Nelson, Gareth. "From Candolle to Croizat: comments on the history of biogeography." *Journal of the History of Biology* 11, no. 2 (1978): 269-305.
- [35]. Ramesh, S., and R. Seshasayanan. "Design and implementation of high throughput, low-complexity MIMO-OFDM transceiver." In *2015 International Conference on Control, Instrumentation, Communication and Computational Technologies (ICCICCT)*, pp. 637-642. IEEE, 2015.
- [36]. Siva Krishna Muchakayala, Naresh Kumar Katari, Kalyan Kumar Saripella, Henele Schaaf, Vishnu Murthy Mariseti, Santhosh Kumar Ettaboina and Vijay Kumar Rekulapally, Implementation of analytical quality by design and green chemistry principles to develop a ultra-high performance liquid chromatography method for the determination of Fluocinolone Acetonide impurities from its drug substance and topical oil formulations. *Journal of Chromatography A*, 2022. <https://doi.org/10.1016/j.chroma.2022.463380>
- [37]. Rosen, Donn E. "Vicariant patterns and historical explanation in biogeography." *Systematic zoology* 27, no. 2 (1978): 159-188.
- [38]. Subburayalu, Gopalakrishnan, Hemanand Duraivelu, Arun Prasath Raveendran, Rajesh Arunachalam, Deepika Kongara, and Chitra Thangavel. "Cluster Based Malicious Node Detection System for Mobile Ad-Hoc Network Using ANFIS Classifier." *Journal of Applied Security Research* (2021): 1-19.
- [39]. Chandra Prakash, RC. Narayanan, N. Ganesh, M. Ramachandran, S. Chinnasami, R. Rajeshwari. "A study on image processing with data analysis. "In AIP Conference Proceedings, vol. 2393, no. 1, p. 020225. AIP Publishing LLC, 2022.
- [40]. Rosen, Donn E. "A vicariance model of Caribbean biogeography." *Systematic Biology* 24, no. 4 (1975): 431-464.
- [41]. Alnuaim, Abeer Ali, Mohammed Zakariah, Chitra Shashidhar, Wesam Atef Hatamleh, Hussam Tarazi, Prashant Kumar Shukla, and Rajnish Ratna. "Speaker Gender Recognition Based on Deep Neural Networks and ResNet50." *Wireless Communications and Mobile Computing* 2022 (2022).
- [42]. Morrone, Juan J., and Jorge V. Crisci. "Historical biogeography: introduction to methods." *Annual review of ecology and systematics* 26, no. 1 (1995): 373-401.
- [43]. Mawahib, Sharafeldin & Kaur, Chamandeep. (2022). A Design for the Bandwidth Improvement for the Microstrip Patch Antenna for Wireless Network Sensor. *International Journal of Scientific Research in Computer Science Engineering and Information Technology*. 9. 396. 10.32628/IJSRSET2293130.

- [44]. Kumar, B. Senthil, R. Ravi, P. Dhanalakshmi, S. Kirubakaran, and K. Maheswari. "Classification of Mobile Applications with rich information." In 2015 International Conference on Soft-Computing and Networks Security (ICSNS), pp. 1-7. IEEE, 2015.
- [45]. Elsis, Mahmoud, Minh-Quang Tran, Karar Mahmoud, Matti Lehtonen, and Mohamed MF Darwish. "Robust design of ANFIS-based blade pitch controller for wind energy conversion systems against wind speed fluctuations." *IEEE Access* 9 (2021): 37894-37904.
- [46]. Fegade, Vishal, M. Ramachandran, S. Madhu, C. Vimala, R. Kurinji Malar, and R. Rajeshwari. "A review on basalt fibre reinforced polymeric composite materials." In *AIP Conference Proceedings*, vol. 2393, no. 1, p. 020172. AIP Publishing LLC, 2022.
- [47]. Ramesh, S., S. Nirmalraj, S. Murugan, R. Manikandan, and Fadi Al-Turjman. "Optimization of energy and security in mobile sensor network using classification based signal processing in heterogeneous network." *Journal of Signal Processing Systems* (2021): 1-8.
- [48]. Sennan, Sankar, Somula Ramasubbareddy, Sathiyabhama Balasubramaniyam, Anand Nayyar, Chaker Abdelaziz Kerrache, and Muhammad Bilal. "MADCR: Mobility aware dynamic clustering-based routing protocol in Internet of Vehicles." *China Communications* 18, no. 7 (2021): 69-85.
- [49]. Sathya, M., M. Jeyaselvi, Lalitha Krishnasamy, Mohammad Mazyad Hazzazi, Prashant Kumar Shukla, Piyush Kumar Shukla, and Stephen Jeswinde Nuagah. "A novel, efficient, and secure anomaly detection technique using DWU-ODBN for IoT-enabled multimedia communication systems." *Wireless Communications and Mobile Computing* 2021 (2021).
- [50]. Chopra, P., Gollamandala, V. S., Ahmed, A. N., Babu, S. B. G., Kaur, C., Achyutha Prasad, N., & Nuagah, S. J. (2022). Automated Registration of Multiangle SAR Images Using Artificial Intelligence. *Mobile Information Systems*, 2022.
- [51]. Askari, Qamar, Irfan Younas, and Mehreen Saeed. "Emphasizing the importance of shift invariance in metaheuristics by using whale optimization algorithm as a test bed." *Soft Computing* 25, no. 22 (2021): 14209-14225.
- [52]. Murugan, K., R. Nithya, K. Prasanth, S. Fowjiya, R. Uma Mageswari, and EA Mohamed Ali. "Analysis of Full Adder cells in Numerous Logic Styles." In 2022 International Conference on Electronics and Renewable Systems (ICEARS), pp. 90-96. IEEE, 2022.
- [53]. Leela Prasad Kowtharapu, Naresh Kumar Katari, Surekha Ch., Christian A. Sandoval, Siva Krishna Muchakayala and Naresh Konduru, A Quality by Design and green LC technique for the determination of mast cell stabilizer and histamine receptor antagonist (Olopatadine HCl) in multiple formulations. *Biomedical Chromatography*, 2022, 36, e5359. <https://doi.org/10.1002/bmc.5359>
- [54]. Jiang, Ping, Zhenkun Liu, Jianzhou Wang, and Lifang Zhang. "Decomposition-selection-ensemble forecasting system for energy futures price forecasting based on multi-objective version of chaos game optimization algorithm." *Resources Policy* 73 (2021): 102234.
- [55]. Revathi, K. Reshma, and S. Kirubakaran. "A Survey on Automatic Bug Triage Using Data Mining Concepts." *International Journal of Science and Research (IJSR)* 5, no. 3 (2016): 184186.
- [56]. Gupta, Krishnakumar, Vishal Fegade, Jeevan Kittur, M. Ramachandran, S. Madhu, S. Chinnasami, and M. Amudha. "A review on effect of cooling rate in fiber reinforced polymeric composites." In *AIP Conference Proceedings*, vol. 2393, no. 1, p. 020106. AIP Publishing LLC, 2022.
- [57]. Shaheen, Mohamed AM, Hany M. Hasanien, M. S. El Moursi, and Attia A. El-Fergany. "Precise modeling of PEM fuel cell using improved chaotic MayFly optimization algorithm." *International Journal of Energy Research* 45, no. 13 (2021): 18754-18769.
- [58]. Jayalakshmi, D. S., M. Sundareswari, E. Viswanathan, D. Hemanand, and Venkat Pranesh. "Computational study on unconventional superconductivity and mechanical properties of novel antiferrromagnetic (Ca, Sr, Ba) Fe<sub>2</sub>Bi<sub>2</sub> compounds." *International Journal of Modern Physics B* 33, no. 28 (2019): 1950341.
- [59]. Bai, Qinghai. "Analysis of particle swarm optimization algorithm." *Computer and information science* 3, no. 1 (2010): 180.
- [60]. Ramesh, S., S. Gomathi, S. Sasikala, and T. R. Saravanan. "Automatic speech emotion detection using hybrid of gray wolf optimizer and naïve Bayes." *International Journal of Speech Technology* (2021): 1-8.
- [61]. Schlipf, Martin, and François Gygi. "Optimization algorithm for the generation of ONCV pseudopotentials." *Computer Physics Communications* 196 (2015): 36-44.
- [62]. Alalmal, Ali, and Dr Gulnaz Fatma. "A., Arun & Aarif, Mohd.(2022). Significance and Challenges of Online Education during and After Covid-19. *Türk Fizyoterapi ve Rehabilitasyon Dergisi*." *Turkish Journal of Physiotherapy and Rehabilitation* 32: 6509-6520.
- [63]. Siva Krishna Muchakayala, Naresh Kumar Katari, Thirupathi Dongala, Vishnu Murthy Mariseti and Raju V.K. Vegesna, Eco-friendly method development towards green chemistry for the simultaneous determination of chlorocresol and betamethasone dipropionate in topical formulations using multivariate Box-Behnken Design. *Journal of the Iranian Chemical Society*, 2022, 19, 1397–1412. <https://doi.org/10.1007/s13738-021-02388-5>
- [64]. Sauer, Jan, Sami Domisch, Carsten Nowak, and Peter Haase. "Low mountain ranges: summit traps for montane freshwater species under climate change." *Biodiversity and Conservation* 20, no. 13 (2011): 3133-3146.

- [65]. Fegade, Vishal, Krishnakumar Gupta, M. Ramachandran, S. Madhu, C. Sathiyaraj, R. Kurinji<sup><</sup> alar, and M. Amudha. "A study on various fire retardant additives used for fire reinforced polymeric composites." In AIP Conference Proceedings, vol. 2393, no. 1, p. 020107. AIP Publishing LLC, 2022.
- [66]. Sharma, Akhilesh Kumar, Gaurav Aggarwal, Sachit Bhardwaj, Prasun Chakrabarti, Tulika Chakrabarti, Jemal H. Abawajy, Siddhartha Bhattacharyya, Richa Mishra, Anirban Das, and Hairulnizam Mahdin. "Classification of Indian classical music with time-series matching deep learning approach." IEEE Access 9 (2021): 102041-102052.
- [67]. Alnuaim, Abeer Ali, Mohammed Zakariah, Aseel Alhadlaq, Chitra Shashidhar, Wesam Atef Hatamleh, Hussam Tarazi, Prashant Kumar Shukla, and Rajnish Ratna. "Human-Computer Interaction with Detection of Speaker Emotions Using Convolution Neural Networks." Computational Intelligence and Neuroscience 2022 (2022).
- [68]. Prats, Jordi, Marie-Jose Salencon, Magali Gant, and Pierre-Alain Danis. "Simulation of the hydrodynamic behaviour of a Mediterranean reservoir under different climate change and management scenarios." J. Limnol 77 (2018): 62-81.
- [69]. Dutta, Ashit Kumar, R. Uma Mageswari, A. Gayathri, J. Mary Dallfin Bruxella, Mohamad Khairi Ishak, Samih M. Mostafa, and Habib Hamam. "Barnacles Mating Optimizer with Deep Transfer Learning Enabled Biomedical Malaria Parasite Detection and Classification." Computational Intelligence and Neuroscience 2022 (2022).
- [70]. Strayer, David L., and David Dudgeon. "Freshwater biodiversity conservation: recent progress and future challenges." Journal of the North American Benthological Society 29, no. 1 (2010): 344-358.
- [71]. Hemanand, D., D. S. Jayalakshmi, Uttam Ghosh, A. Balasundaram, Pandi Vijayakumar, and Pradip Kumar Sharma. "Enabling sustainable energy for smart environment using 5G wireless communication and internet of things." IEEE Wireless Communications 28, no. 6 (2021): 56-61.
- [72]. Morid, Reihaneh, Yukihiko Shimatani, and Tatsuro Sato. "Impact assessment of climate change on environmental flow component and water temperature—Kikuchi River." Journal of Ecohydraulics 4, no. 2 (2019): 88-105.
- [73]. Deepa, N., Asmat Parveen, Anjum Khurshid, M. Ramachandran, C. Sathiyaraj, and C. Vimala. "A study on issues and preventive measures taken to control Covid-19." In AIP Conference Proceedings, vol. 2393, no. 1, p. 020226. AIP Publishing LLC, 2022.
- [74]. Leela Prasad Kowtharapu, Naresh Kumar Katari, Christian A Sandoval, Siva Krishna Muchakayala, Vijay Kumar Rekulapally, Unique Green chromatography method for the determination of serotonin receptor antagonist (Ondansetron HCl) related substances in a liquid formulation, robustness by Quality by design based Design of Experiments approach. Journal of Separation Science, 2022, 45, 1711–1726. <https://doi.org/10.1002/jssc.202100979>
- [75]. Ramesh, S., S. Sasikala, and Nirmala Paramanandham. "Segmentation and classification of brain tumors using modified median noise filter and deep learning approaches." Multimedia Tools and Applications 80, no. 8 (2021): 11789-11813.
- [76]. Sathiyaraj Chinnasamy, M. Ramachandran, Sowmiya Soundharaj, "Exploring Various International Law and Its Classification", Recent Trends in Law and Policy Making, 1(1), (2022): 13-19
- [77]. Richards, Christopher T., and Christofer J. Clemente. "A bio-robotic platform for integrating internal and external mechanics during muscle-powered swimming." Bioinspiration & biomimetics 7, no. 1 (2012): 016010.
- [78]. Maheswari, K., and S. Kirubakaran. "Enhancing Social Personalized Search Based on Semantic Search Log using Ontology." (2014).
- [79]. Singh, Arjun, and Prasun Chakrabarti. "Ant based resource discovery and mobility aware trust management for Mobile Grid systems." In 2013 3rd IEEE International Advance Computing Conference (IACC), pp. 637-644. IEEE, 2013.
- [80]. Thomas, Chris D. "Climate, climate change and range boundaries." Diversity and Distributions 16, no. 3 (2010): 488-495.
- [81]. Short, Frederick T., and Hilary A. Neckles. "The effects of global climate change on seagrasses." Aquatic Botany 63, no. 3-4 (1999): 169-196.