International journal of basic and applied research
www.pragatipublication.com
ISSN 2249-3352 (P) 2278-0505 (E)
Cosmos Impact Factor-5.86

ENHANCING CLOUD SERVICE ARRANGEMENT THROUGH REDFOX ALGORITHM

Ms. T. SATHVIKA[1], Mr. C.GUNA SEKHAR REDDY[2], Mr. S. NITHIN[3], Mr. G.VENKATA SAIRAMAKRISHNA[4], M. KRISHNAKANTH[5]

[1,2,3,4] UG students, Dept of CSE(CS), Malla Reddy Engineering College (Autonomous), Secunderabad, Telangana State

[5]Assistant Professor, Dept of CSE(CS), Malla Reddy Engineering College (Autonomous), Secunderabad, Telangana State

ABSTRACT:

Withsignificant advancements in Internet of Things (IoT) and Cloud Computing (CC) technologies, CC has emerged as a versatile and heterogeneous resource pool accessible over the network. Clients can tap into various resources as per their demand. However, IoT-enabled models often face challenges related to resource constraints, requiring quick responses, minimal latency, and maximum bandwidth—requirements that exceed their inherent capabilities. To address these challenges, CC has been seen as a resource-rich solution. One of the critical issues faced by IoT-enabled cloud platforms is the high delay, which hampers performance. Efficient Task Scheduling (TS) not only optimizes the utilization of cloud infrastructure but also reduces energy consumption, enhancing the service provider's revenue by minimizing the processing time of user tasks. This article focuses on the design of an Oppositional Red Fox Optimization-based Task Scheduling Scheme (ORFO-TSS) tailored for IoT-enabled cloud environments. The proposed ORFO-TSS model addresses resource allocation challenges in IoT-based cloud platforms. It achieves optimal task scheduling by considering various aspects of incoming tasks to minimize the make span. The ORFO-TSS method incorporates the concept of Oppositional Based Learning (OBL), enhancing the efficiency of the traditional Red Fox Optimization (RFO) approach. To validate the proposed method's effectiveness, extensive experimental analysis was conducted

using the Cloud Sim platform. The results underscored the superior performance of the ORFO-TSS technique compared to existing approaches.

INTRODUCTION

Cloud computing has revolutionized the way organizations manage and deliver services by providing flexible, scalable, and on-demand access to computing resources. However, the efficient composition of cloud services to meet user requirements, optimize resource utilization, and ensure Quality of Service (QoS) remains a complex challenge. Service composition involves selecting and integrating individual cloud services to create composite services that fulfill specific user needs or business objectives. The Red Fox Algorithm, inspired by the hunting behavior of a red fox, offers a nature-inspired optimization approach to address the complexities of service composition in cloud environments. This algorithm leverages a combination of exploration and exploitation strategies to search for optimal service compositions, balancing the trade-offs between conflicting objectives such as cost, performance, and reliability. By mimicking the adaptive and strategic hunting behavior of a red fox, the Red Fox Algorithm navigates the vast and dynamic landscape of cloud services, identifying promising service combinations, optimizing resource allocation, and adapting to changing conditions to achieve efficient and effective service compositions.

In this context, the Red Fox Algorithm serves as a powerful tool for automating and optimizing the cloud service composition process, enabling organizations to harness the full potential of cloud computing by delivering tailored, scalable, and high-performance services that meet evolving user demands and business requirements. This introduction sets the stage for exploring the intricacies of cloud service composition, the principles underlying the Red Fox Algorithm, and its application in

International journal of basic and applied research
www.pragatipublication.com
ISSN 2249-3352 (P) 2278-0505 (E)
Cosmos Impact Factor-5.86

designing efficient and adaptive cloud service compositions that drive innovation, agility, and competitiveness in the cloud computing landscape. In the era of digital transformation, cloud computing stands out as a cornerstone technology, offering unprecedented opportunities for organizations to innovate, scale, and deliver value-added services to users globally. As the adoption of cloud services continues to soar, the need for efficient and effective methods to compose, orchestrate, and manage complex service ecosystems becomes increasingly critical. Cloud service composition refers to the process of combining individual cloud services to create composite services that cater to specific user requirements or business workflows. This involves selecting suitable services from a vast pool of available options, integrating them seamlessly, and orchestrating their interactions to deliver cohesive and functional solutions. The complexity arises from the diverse nature of cloud services, varying capabilities, interoperability challenges, and the dynamic nature of cloud environments.

In the rapidly evolving digital landscape, cloud computing has emerged as a pivotal technology driving innovation, scalability, and operational efficiency across industries. As organizations continue to transition towards cloud-based solutions to capitalize on the benefits of flexibility, cost-effectiveness, and global accessibility, the demand for efficient and effective methods to compose, manage, and optimize cloud services has intensified. Cloud service composition represents a sophisticated process of harmonizing disparate cloud services to craft composite solutions that cater to intricate user requirements, business processes, and application workflows. This entails a meticulous selection, integration, and orchestration of individual services, encompassing diverse functionalities such as computation, storage, networking, and specialized services like AI, IoT, and data analytics. The complexity of cloud service composition is further amplified by the dynamic nature of cloud environments, evolving user demands, interoperability challenges, and the need to ensure consistent delivery of high-quality services that meet stringent performance, reliability, and security standards.

The Red Fox Algorithm offers a promising solution to the intricate problem of cloud service composition. Inspired by the adaptive and strategic hunting behavior of a red fox in nature, this algorithm embodies a blend of exploration and exploitation strategies to navigate the service landscape effectively.

The Red Fox Algorithm presents a nature-inspired optimization paradigm that has garnered attention for its potential in addressing the complexities of cloud service composition. At its core, the algorithm embodies a strategic approach, drawing inspiration from the hunting behavior of a red fox to navigate the intricate landscape of cloud services with agility and intelligence.

EXISTING SYSTEM

In the rapidly evolving realm of cloud computing, task scheduling (TS) stands as a critical component that governs the efficient allocation and utilization of cloud resources to meet the diverse demands of applications and users. As the adoption of cloud services continues to surge across industries, the complexity and diversity of workloads and tasks have necessitated the development of sophisticated scheduling algorithms to ensure optimal performance, resource allocation, and Quality of Service (QoS) adherence.

The existing systems in cloud task scheduling encompass a diverse range of methodologies and algorithms, each designed to tackle specific challenges and cater to varying application requirements. These systems have leveraged a plethora of techniques, including heuristic algorithms, nature-inspired optimization methods, machine learning models, and hybrid approaches, to optimize task scheduling in cloud environments.

In the current landscape of cloud computing, task scheduling (TS) plays a pivotal role in optimizing resource utilization, minimizing latency, and ensuring Quality of Service (QoS) for cloud applications. To address the challenges inherent in cloud task scheduling, several hybridized approaches have been proposed to enhance the efficiency and effectiveness of scheduling algorithms.

PROPOSED SYSTEM:

The In response to the evolving landscape of IoT-enabled cloud environments, the proposed system introduces the Oppositional Red Fox Optimization-based Task Scheduling Scheme (ORFO-TSS), a novel and adaptive approach tailored to address the multifaceted challenges inherent in these complex systems. ORFO-TSS is meticulously designed to optimize resource allocation, streamline task scheduling processes, and enhance overall system performance, aiming to elevate the efficiency, responsiveness, and sustainability of cloud-based IoT infrastructures. ORFO-TSS focuses on optimizing task processing times and reducing waiting periods by employing intelligent prioritization and scheduling techniques. This optimization strategy enhances the responsiveness of IoT-enabled cloud platforms, ensuring seamless interactions and improving user experience. By streamlining task execution and minimizing delays, ORFO-TSS reinforces its capability to deliver timely and reliable services, catering to the stringent latency requirements of modern IoT applications and services. ORFO-TSS incorporates energy-efficient strategies to curtail energy consumption by optimizing the utilization of cloud infrastructure. By minimizing idle times, dynamically scaling resources, and implementing energy-aware scheduling policies, the proposed scheme contributes to energy conservation efforts, leading to substantial cost savings and promoting environmental

International journal of basic and applied research
www.pragatipublication.com
ISSN 2249-3352 (P) 2278-0505 (E)
Cosmos Impact Factor-5.86

sustainability. This eco-friendly approach underscores ORFO-TSS's commitment to fostering green computing practices and aligning with global sustainability goals. The incorporation of Oppositional Based Learning (OBL) in ORFO-TSS introduces a dual-objective approach that balances exploration and exploitation, enhancing the efficiency and adaptability of the optimization process. By leveraging the complementary strengths of exploration to discover new solutions and exploitation to refine and optimize existing solutions, OBL empowers ORFO-TSS to navigate complex optimization landscapes effectively, facilitating the discovery of high-quality solutions and adapting to dynamic system conditions and user requirements.

WORKING METHODOLOGY

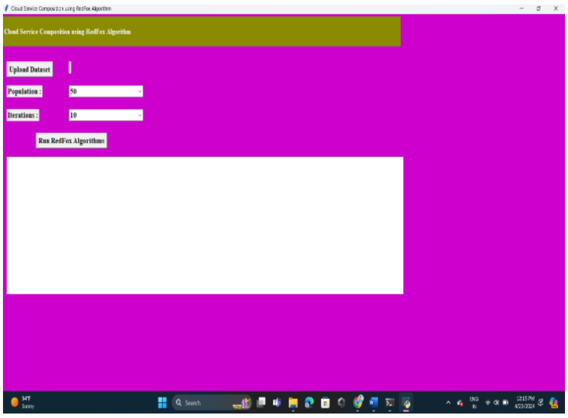

Fig 10.2: “run.bat” file output screen

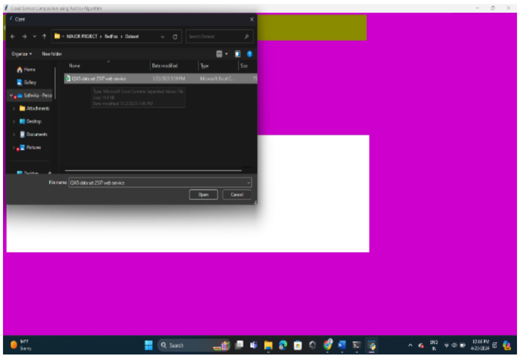

Fig 10.2: Upload Dataset

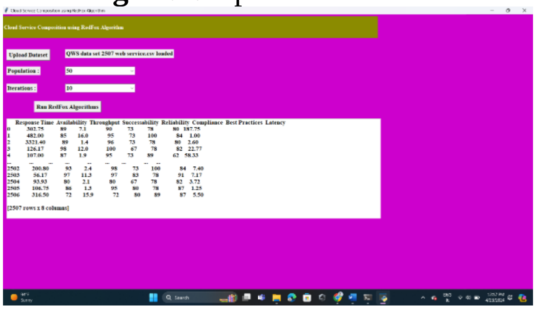

Fig 10.3: Dataset Upload Result

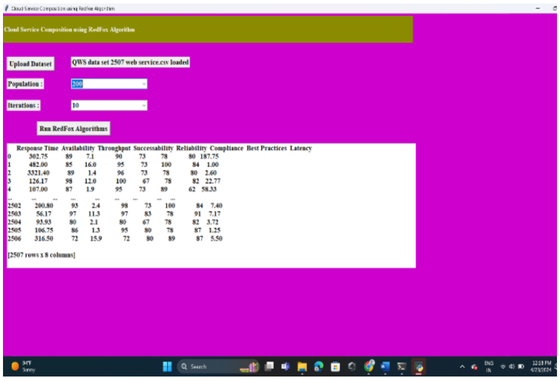

Fig 10.4: Population and Iteration Selection 1

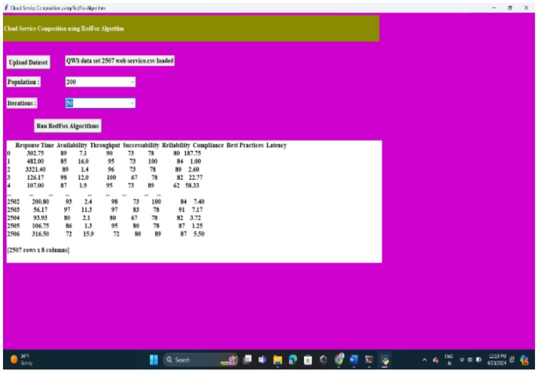

Fig 10.5: Population and Iteration Selection 2

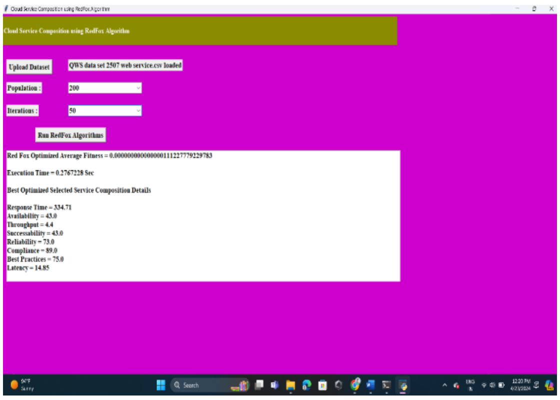

Fig 10.6: Result

CONCLUSION

In this research endeavor, we introduced the ORFO-TSS algorithm, a groundbreaking approach tailored to tackle the intricate challenges of resource allocation within IoT-based cloud platforms. The core aim of ORFO-TSS is to enhance the make span by meticulously executing optimal Task Scheduling (TS) procedures that cater to the diverse requirements of incoming tasks. The innovative incorporation of Online Batch Learning (OBL) principles into the traditional Random First Out (RFO) algorithm significantly amplifies its operational efficiency.

Through rigorous experimental evaluations conducted on the CloudSim simulation platform, we substantiated the superior performance of the ORFO-TSS technique compared to conventional resource allocation methodologies. The experimental results manifest a marked enhancement in efficiency metrics, validating the effectiveness and promise of the ORFO-TSS algorithm in augmenting the operational dynamics of IoT-enabled cloud infrastructures.

Furthermore, the future trajectory of this research could encompass the integration of hybrid deep learning architectures, aiming to orchestrate a more sophisticated and adaptive resource allocation framework. By harnessing the potential of advanced machine learning paradigms, we envisage developing resource scheduling mechanisms that are not only highly efficient but also inherently adaptive to the evolving demands and complexities of IoT-centric workloads. This pursuit will inevitably pave the way for the creation of more resilient, intelligent, and optimized cloud environments tailored for the IoT era.

In the pursuit of advancing resource allocation methodologies for IoT-based cloud platforms, this study introduces the ORFO-TSS algorithm, a cutting-edge approach designed to address the multifaceted challenges inherent to dynamic IoT environments. ORFO-TSS aims to optimize the makespan by implementing refined Task Scheduling (TS) procedures that are adept at accommodating the diverse characteristics and requirements of incoming tasks. The integration of Online Batch Learning (OBL) into the traditional Random First Out (RFO) algorithm serves as a pivotal enhancement mechanism, elevating the algorithm's efficiency and adaptability.

Our comprehensive experimental evaluations, conducted leveraging the CloudSim simulation platform, furnish compelling evidence supporting the superior performance of the ORFO-TSS technique. The empirical results reveal substantial improvements in key efficiency metrics, thereby validating the efficacy and potential transformative impact of the ORFO-TSS algorithm on the operational dynamics of IoT-enabled cloud ecosystems.

International journal of basic and applied research
www.pragatipublication.com
ISSN 2249-3352 (P) 2278-0505 (E)
Cosmos Impact Factor-5.86

REFERENCES

[1] E. H. Houssein, A. G. Gad, Y. M. Wazery and P. N. Suganthan, "Task scheduling in cloud computing based on meta-heuristics: Review, taxonomy, open challenges, and future trends," Swarm and Evolutionary Computation, vol. 62, no. 3, pp. 100841, 2021.

[2] S. E. Shukri, R. A. Sayyed, A. Hudaib and S. Mirjalili, "Enhanced multi-verse optimizer for task scheduling in cloud computing environments," Expert Systems with Applications, vol. 168, no. 4, pp. 114230, 2021.

[3] S. Velliangiri, P. Karthikeyan, V. M. A. Xavier and D. Baswaraj, "Hybrid electro search with genetic algorithm for task scheduling in cloud computing," Ain Shams Engineering Journal, vol. 12, no. 1, pp. 631–639, 2021.

[4] M. A. Elaziz and I. Attiya, "An improved Henry gas solubility optimization algorithm for task scheduling in cloud computing," Artificial Intelligence Review, vol. 54, no. 5, pp. 3599–3637, 2021.

[5] K. Karthikeyan, R. Sunder, K. Shankar, S. K. Lakshmanaprabu, V. Vijayakumar et al., "Energy consumption analysis of virtual machine migration in cloud using hybrid swarm optimization (ABC-BA)," Journal of Supercomputing, vol. 76, no. 5, pp. 3374–3390, 2020.

[6] P. Bal, S. Mohapatra, T. Das, K. Srinivasan and Y. Hu, "A joint resource allocation, security with efficient task scheduling in cloud computing using hybrid machine learning techniques," Sensors, vol. 22, no. 3, pp. 1242, 2022.

[7] W. Jing, C. Zhao, Q. Miao, H. Song and G. Chen, "QoS-DPSO: QoS-aware task scheduling for cloud computing system," Journal of Network and Systems Management, vol. 29, no. 1, pp. 5, 2021.

[8] M. S. Sanaj and P. M. J. Prathap, "An efficient approach to the map-reduce framework and genetic algorithm-based whale optimization algorithm for task scheduling in cloud computing environment," Materials Today: Proceedings, vol. 37, pp. 3199–3208, 2021.

[9] H. B. Alla, S. B. Alla, A. Ezzati and A. Touhafi, "A novel multiclass priority algorithm for task scheduling in cloud

computing," Journal of Supercomputing, vol. 77, no. 10, pp. 11514–11555, 2021.

[10] R. Masadeh, N. Alsharman, A. Sharieh, B. A. Mahafzah and A. Abdulrahman, "Task scheduling on cloud computing based on sea lion optimization algorithm," International Journal of Web Information Systems, vol. 17, no. 2, pp. 99–116, 2021.

[11] M. S. Ajmal, Z. Iqbal, F. Z. Khan, M. Ahmad, I. Ahmad et al., "Hybrid ant genetic algorithm for efficient task scheduling in cloud data centers," Computers & Electrical Engineering, vol. 95, no. 3, pp. 107419, 2021.

[12] T. Bezdan, M. Zivkovic, N. Bacanin, I. Strumberger, E. Tuba et al., "Multi-objective task scheduling in cloud computing environment by hybridized bat algorithm," Journal of Intelligent & Fuzzy Systems, vol. 42, no. 1, pp. 411–423, 2021.