**GEETHANJALI COLLEGE OF ENGINEERING AND TECHNOLOGY**

**(Autonomous)**

**Cheeryal (V), Keesara (M), Medchal Dist., Telangana - 501 301**

**DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING**

**MAJOR PROJECT ABSTRACT**

**IV B.Tech. I SEM CSE - C Section**

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| **BATCH NUMBER: C12** | **Major Project** | **Academic Year: 2024-2025** |

**PROJECT TITLE: Multi-Objective Data Migration in Container-Based Heterogenous Cloud Environments Using Deep Adaptive Dragonfly Optimization**

**TEAM MEMBERS:**

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**ABSTRACT**

Cloud computing has transformed how computing resources are managed and utilized, delivering benefits such as optimized infrastructure use, increased flexibility, and faster deployment times. Despite these advantages, achieving seamless interoperability across diverse cloud environments remains a significant challenge, especially in terms of ensuring smooth resource sharing and access in heterogeneous systems. Containers have emerged as a lightweight virtualization solution that enhances scalability, portability, and flexibility in cloud services. However, issues such as energy efficiency and effective data migration in these diverse environments persist.

The proposed solution employs the Adaptive Dragonfly Optimization (ADrO) algorithm for efficient data migration. While the traditional Dragonfly optimization algorithm is prone to local optima trapping due to loss of population diversity, this limitation is addressed by integrating a Levy flight strategy, enhancing population diversity and accelerating convergence toward optimal solutions. In the migration process, user tasks are collected, organized, and assigned to containers, ensuring efficient resource allocation. Additionally, load prediction is performed using an Actor-Critic Neural Network (ACNN) to further optimize migration decisions, accounting for predicted load and system capacity.

A multi-objective function is developed to evaluate migration based on parameters such as predicted load transmission cost, demand, resource capacity, agility, reputation, migration time, and energy consumption. The effectiveness of this approach is demonstrated through comprehensive evaluations and comparisons with other methods. The proposed energy-efficient data migration framework is implemented using Python, showcasing its potential to enhance performance in container-based heterogeneous cloud environments.

**Objective:**

* Optimize Resource Allocation and Task Organization: Develop a method for effectively collecting and organizing user tasks to optimize resource allocation and ensure efficient data migration in a container-based heterogeneous cloud environment.
* Energy-Efficient Data Migration: Design and implement an energy-efficient data migration strategy using the Adaptive Dragonfly Optimization (ADrO) Algorithm, which minimizes energy consumption while maintaining performance during the migration process.
* Overcome Local Optima in Optimization: Integrate the Levy flight strategy with the Dragonfly Optimization Algorithm (DrO) to avoid local optima trapping and enhance convergence speed, particularly for complex optimization problems.
* Predict Load with Actor Critic Neural Network (ACNN): Utilize an Actor Critic Neural Network (ACNN) to predict load accurately during the migration process, facilitating optimal decision-making in resource allocation and load balancing.
* Design a Multi-Objective Function for Migration: Develop a multi-objective function to evaluate the migration strategy, taking into account factors such as predicted load transmission cost, demand, resource capacity, agility, reputation, migration time.
* Compare and Evaluate Effectiveness: Evaluate the proposed approach using performance metrics and compare it with existing methods to assess its effectiveness in terms of scalability, portability, energy efficiency, and resource management.
* Implement and Test Using Python: Implement the proposed methodology using Python, demonstrating its practical feasibility and efficiency in real-world container-based cloud environments.

**Commercializable: Yes/No: Yes**

**REFERENCES:**

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**Date of Submission:** 28/09/2024

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**Guide with Date Project In-charge**