Faculty Research Published in IEEE Conference Proceedings :Advancing Secure Multi-Cloud Computing Through Intelligent Task Scheduling

The **Department of Humanities and Sciences** is delighted to congratulate **Dr. K. Gayathri Devi**, Associate Professor of Mathematics, on the publication of her research paper titled **"A Secure and Intelligent Blockchain-based Optimization Framework for Task Scheduling in Multi-Cloud IoT Networks"** in the **Proceedings of the International Conference on Computer Networks and Inventive Communication Technologies (ICCNCT-2026)**, published in the **IEEE Xplore Digital Library**. The paper presents innovative research on secure and intelligent task scheduling in multi-cloud Internet of Things (IoT) environments using Artificial Intelligence and blockchain technology.

The research introduces an **AI-Based Blockchain-Assisted Frilled Lizard Optimization (BA-FLO)** framework to enhance task scheduling by improving resource utilization, minimizing execution time, reducing operational cost, lowering energy consumption, and maintaining thermal stability in multi-cloud computing environments. The proposed framework integrates blockchain technology to ensure secure, transparent, and decentralized scheduling while employing intelligent optimization techniques to improve overall system performance. Experimental evaluation demonstrated that the proposed model significantly outperformed conventional scheduling algorithms in terms of makespan, cost, energy efficiency, and temperature management.

This scholarly contribution reflects Dr. K. Gayathri Devi's commitment to research excellence, innovation, and the advancement of emerging technologies in cloud computing and artificial intelligence. Publishing research in an IEEE conference of international repute enhances the institution's academic visibility while encouraging interdisciplinary research and technological innovation.

The Management, Principal, faculty members, staff, and students extend their heartfelt congratulations to **Dr. K. Gayathri Devi** on this remarkable academic achievement. We wish her continued success in her future research endeavours and look forward to many more valuable contributions to the global scientific community.

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A Secure and Intelligent Blockchain-based Optimization Framework for Task Scheduling in Multi-Cloud IoT Networks

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***Abstract*— Scheduling of tasks in multi-cloud is one of the most important issues because of the dynamic nature of workloads, heterogeneity of resources, and the necessity to create trade-offs between performance and energy efficiency. The paper suggests a metaheuristic algorithm AI-Based Blockchain-Assisted Frilled Lizard Optimization (BA-FLO) to solve these issues by combining blockchain with an improved Frilled Lizard Optimization algorithm to have secure and transparent coordination of the tasks and an enhanced Frilled Lizard Optimization algorithm to have intelligent scheduling. The proposed solution is considered based on the NASA iPSC/860 workload as a model in the framework of the WorkflowSim simulation, taking into account such performance parameters as makespan, cost, energy consumption, and temperature. Based on the experimental findings it can be stated that BA-FLO is significantly better than traditional algorithms such as the Ant Colony Optimization (ACO), Whale Optimization Algorithm (WOA) and Deep Reinforcement Learning (DRL) with an average decrease in makespan, cost, energy and temperature of 24.8%, 21.3%, 19.6%, and 17.9% respectively. It is possible because these improvements are explained by the adaptive exploration-exploitation balance of the FLO algorithm and the decentralized trust of blockchain implementation. The results indicate the efficiency of the suggested BA-FLO model to optimize resource usage, minimize operational overhead, and achieve thermal stability, which makes it a potentially valuable proposal in the next generation of multi-cloud scheduling systems of tasks.**

Keywords—Task Scheduling, Multi-Cloud, Blockchain, Frilled Lizard, NASA iPSC/860 workload, WorkflowSim.

I. INTRODUCTION

Multi-cloud networks Due to the rapid expansion of distributed computing environments and the rise of scalable, reliable, and energy-efficient services, efficient task scheduling in multi-cloud networks has emerged as an urgent research topic. Multi-cloud systems combine the resources of more than one cloud-provider and allow a higher degree of flexibility, fault tolerance and performance. This distributed character, however, presents considerable difficulties in the task allocation process, such as resource heterogeneity, dynamism of the workload changes, and conflicting optimization goals such as minimization of makespan, cost, and energy use and thermal stability [1]. Conventional scheduling methods do not effectively deal with these complexities resulting in inefficient resource exploitation and higher overheads in operation. Thus, it is necessary to use sophisticated smart optimization methods to improve the efficiency of scheduling and to make cloud operations sustainable [2].

The task scheduling of clouds has been extensively applied using different metaheuristic algorithms over the years. The goal of these methods is to seek near-optimal solutions to complex NP-hard scheduling problems, through imitating natural or learning based behaviors. Although these techniques have demonstrated encouraging outcomes, they have been associated with the drawbacks of slow convergence, early stagnation, excessive computation cost and inability to adapt to changing cloud conditions [3]. Moreover, they usually fail to integrate security and trusting systems, which are very important in multi-cloud architecture where data integrity and transparency are paramount. Such restrictions indicate the necessity of a more efficient, dynamic, and safe scheduling system.

In order to overcome these difficulties, this paper presents an AI-Based Frilled Lizard Optimization (BA-FLO) metaheuristic algorithm that is supported by the blockchain. The given solution combines the Frilled Lizard Optimization (FLO) algorithm that is an emergent nature-inspired algorithm relying on the defensive and predatory behavior of frilled lizards with blockchain technology to provide a safe and decentralized system of tasks management [4]. The FLO algorithm can be improved to achieve exploration and exploitation, which is why it is possible to effectively search and find the best scheduling solution, and blockchain ensures that all transactions are immutable and transparent to distribute tasks. This realization is a hybridized form of integration that guarantees better optimization performance as well as greater security, confidence, and accountability in the process of multi-cloud scheduling.

Frilled Lizard Optimization algorithm has a key role in the proposed framework as it is a model of adaptive behavioral strategies, including threat response, camouflage and dynamic movement [5]. The solutions are transformed into mathematical operators which are used to search the optimum solutions. Compared to the classical metaheuristics,