



With over 23 years of academic, research, and administrative experience, Dr. Shish Ahmad currently serve as Professor and Head of the Department of Computer Science Engineering at Integral University, Lucknow. His expertise spans Information Security, Wireless Sensor Networks, Cloud/Quantum Computing, and IoT. He have guided 9 Ph.D. scholars and over 20 M.Tech. dissertations, fostering a strong research culture. His 75+ publications, 3 patents, and leadership in establishing advanced labs reflect his commitment to academic excellence. He actively engage in national and international academic events as a reviewer, session chair, and organizer. He envision academic leadership that is collaborative, globally aligned, and innovation driven.



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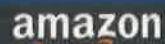
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Advances in AI and Smart Computing

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Chapter-1

Hybrid Metaheuristic Framework for Load Balancing in Cloud Computing: A HAPSO- TCS Approach

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Abstract

Cloud computing, which provides on-demand, scalable, as well as flexible resource access, has completely changes the way computational services are provided in the age of digital transformation. However, effective load balancing has grown increasingly difficult due to rising cloud workloads as well as user demands. For task scheduling, traditional heuristic algorithms such as Ant Colony Optimization (ACO) and Particle Swarm Optimization (PSO) have been used; however, they have drawbacks such as sluggish adaptation and premature convergence. This study suggests a unique Hybrid ACO-PSO Scheduling Framework with Adaptive Pheromone Decay and Time-conscious Scheduling (HAPSO-TCS) to get around these issues. In order to manage tasks with deadlines, this model makes use of the positive reinforcement approach of ACO, the global search capability of PSO, and adaptive mechanisms. The algorithm, which was simulated using CloudSim, was assessed using measures such as makespan, throughput, resource utilization, as well as response time in comparison to conventional ACO and PSO techniques. Superior performance was shown in the