National Institute of Technology Rourkela

Defence Seminar

Seminar Title	: Performance Enhancement Strategies in Fog Computing Environment
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Venue	: CS208 (Convention Hall), CSE Department
Date and Time	: 29 Aug 2025 (4.00PM)
Abstract	: The rapid growth of Internet of Things (IoT) applications demands low-latency processing, energy efficiency, high availability, and secure data handling. Fog computing addresses these needs by bringing computation closer to data sources, yet optimal performance remains challenging due to resource heterogeneity, dynamic workloads, and strict QoS constraints. The thesis on Performance Enhancement Strategies in Fog Computing Environment addresses the challenges of the growing Internet of Things (IoT) landscape by proposing several innovative solutions. The first contribution introduces a dynamic cluster&ndashbased heuristic that adaptively groups fog nodes based on proximity, workload, and capacity to enhance responsiveness and resource utilisation. The second presents a hybrid meta-heuristic combining Genetic Algorithm and Simulated Annealing for multi-objective placement, achieving significant reductions in latency, energy consumption, and cost compared to existing methods. The third contribution develops a priority-aware queuing model that effectively manages delay-sensitive and delay-tolerant tasks, reducing task abandonment. Fourth, a fault-aware placement strategy grounded in complex network theory, including the Louvain&ndashEigenvector Centrality Service Placement algorithm, is proposed to enhance system availability and energy efficiency. Finally, the thesis offers a blockchain-assisted framework that ensures decentralised authentication and tamper-proof data storage for secure fog operations. Extensive simulation studies using iFogSim2 demonstrate notable improvements in latency, resource efficiency, and service availability, facilitating scalable and QoS-aware IoT deployments in realistic fog computing environments.