Abstract of the Ph.D. Work

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Title : QoS issues for wireless sensor Networks in Cloud Environment

Wireless Sensor Network (WSN) is a collection of battery-operated sensors. A massive quantity of energy in nodes of a Wireless Sensor Network (WSN) is used up due to the internal communications. In this thesis, a new Modified-LEACH (MD- LEACH) protocol has been proposed. This hierarchical routing protocol (MD-LEACH) is inspired by the K-means clustering technique to consolidate sensor networks into clusters and acquire an enhanced QoS parameter. The K-means algorithm attempts to improve the clustering procedure of LEACH protocol using Euclidean distance and prolong the lifespan of the sensor network. This algorithm forms the optimized clusters by a distance of cluster head from cluster nodes and energy of nodes which is going to be designated as the cluster head (CH). To evaluate the approaches, the author used NS2 simulator and assessed the following QoS parameters: Packet Delivery Ratio (PDR), Energy Consumption, Bandwidth, and Throughput. The simulation results have shown that the MD-LEACH algorithm beats LEACH protocol, optimizes all QoS parameters and improves network performance.

There are many limitations of WSNs like storage capacity of sensor nodes of sensed data and processing power of the sensed data on sensor nodes. Since cloud computing has vast storage capacity and processing power, the integration of WSN and cloud computing removed the shortfalls to a large extent of WSN. Integration of wireless sensor network into cloud computing is a growing paradigm that supports a massive amount of applications in cloud computing, optimization of resources required in the machines. This integration requires the optimization of resources to efficiently complete the different tasks in the devices at cloud platform. This optimization has been done using load scheduling algorithms. These algorithms reduce overload and achieve higher throughput by maximizing the machine utilization concerning cost stabilization. There are lots of methods like First Come First Serve, Min-Min, and Particle Swarm Optimization (PSO) for optimizing the load but we use Particle Swarm Optimization as it obtains the motivation from the social behaviour of the flock of birds and analyses various approaches for load scheduling. In this thesis, proposed the load scheduling algorithm based on PSO in wireless sensor networks for cloud computing to minimize total transfer time and cost stabilization. The proposed method is compared with the existing approaches used for load scheduling in Cloudlets. It is clear from the simulation results that the proposed method is more efficient because it minimizes the transfer time and cost than the conventional algorithms thereby making a system for cost stable.

Cloud computing is a framework which provides on-demand services to the user for scalability, security, and reliability based on pay as used service anytime & anywhere. For load balancing, task scheduling is the most critical issues in the cloud environment. There are so many meta-heuristic algorithms used to solve the load balancing problem. A good task scheduling algorithm should be used for optimum load balancing in the cloud environment. Such scheduling algorithm must have some vital characteristic like minimum

makespan, maximum throughput, and maximum resource utilization, etc. In this thesis, a dynamic load balancing and task scheduling algorithm based on ant colony optimization (DLBACO) has been proposed. This algorithm assigns the task to the virtual machines (VM) which has the highest probability of availability in minimum time. The proposed algorithm balances the whole system by minimizing the makespan of the task and maximizing the throughput. CloudSim simulator is used to simulate the proposed scheduling algorithm and results show that the proposed (DLBACO) algorithm is better than the existing algorithms such as FCFS, LBACO (Load balancing ACO), and primary ACO.