# Abstract

Sensor-Cloud combines the two technologies, wireless sensor networks (WSN) and cloud, into a single platform. In sensor-cloud, a sensor-cloud service provider (SCSP) obtains sensor nodes from their respective sensor-owners on a rental basis and provisions Sensors-as-a-Service (Se-aaS) to end-users with the help of its cloud servers. Recently, researchers conceived the Mobile Sensor-Cloud (MSC) architecture which utilizes sensors reddeployed in various mobile Internet of Things (IoT) devices for Se-aaS provisioning. Due to the amalgamation of different types of resources, the need to support a massive number of users, and its underlying business model, efficient resource allocation is a crucial aspect of the sensor-cloud architecture. The existing resource allocation schemes fail to consider the multi-hop nature of WSNs, which is a key distinguishing property of sensor-cloud. Moreover, in the case of MSC, the support of edge infrastructure is required for the collection of sensed data from mobile IoT devices, specifically vehicles, and its preliminary processing. The inclusion of the edge layer further increases the challenges of efficient Se-aaS provisioning in MSC. The existing works on MSC neither consider the presence of the edge layer, nor the various additional issues present in edge-enabled MSC. Thus, in this thesis, we aim to overcome these challenges by proposing four different schemes. In the first work, we propose GS2 address the problem of energy-efficient resource allocation in sensor-cloud for provisioning Se-aaS using multi-hop WSNs. In the second work, we propose that MobiEdge address the issue of service allocation problem in edge-enabled MSC while satisfying the users' quality-of-service (QoS) requirements and maximizing the service providers' profits. Thereafter, in the third work, we target the issue of fairness and propose MobiFair for fair resource allocation among edge devices in MSC. Finally, in the fourth work, we propose MobiTrust to ensure high QoS of Se-aaS and profits of the service providers in the presence of selfish entities in MSC. While designing the four schemes, we adopt a game theoretic approach to capture the interactions of the various involved entities. We analyze the proposed games theoretically and prove the existence of equilibrium. For performance evaluation, we conduct extensive simulations on a Python-based simulation platform and compare the results with existing benchmarks. Experimental results depict the performance superiority of the proposed schemes in terms of QoS, resource savings, and profitability.

**Keywords**: Sensor-cloud, Virtualization, Wireless Sensor Network, Internet of Things, Resource Allocation.