Mobility-aware task offloading for UAV-assisted Edge-IoT networks with energy harvesting

Are you fascinated by the fusion of **IoT, edge computing, and UAVs (Unmanned Aerial Vehicles)**? Do you want to contribute to **next-generation intelligent networks** that optimize computation, energy efficiency, and real-time mobility? If so, this master's thesis offers an exciting opportunity to work on a **scientifically rigorous and practically impactful** research topic.

The rise of IoT and 5G has fueled a surge in computationally intensive, low-latency applications like autonomous driving, AR, and real-time surveillance, exceeding the capabilities of IoT devices and traditional cloud systems. Edge computing has emerged as a promising paradigm to address these challenges by bringing computational resources closer to the network edge, thereby reducing latency and improving energy efficiency. Unmanned Aerial Vehicles (UAVs) have gained significant attention in Edge-IoT networks due to flexible deployment, mobility, and ability to provide seamless coverage in remote or disaster-stricken areas. However, UAVs face inherent limitations in computational power and battery life, which hinder their ability to handle complex and resource-intensive tasks. Energy Harvesting (EH) technology offers a sustainable solution by enabling UAVs to harvest energy from environmental sources or radio frequency signals, thereby extending their operational lifespan and reducing dependency on traditional power sources.

Despite these advancements, several challenges remain in UAV-assisted Edge-IoT networks. First, the limited computational resources and battery capacity of UAVs necessitate efficient task offloading strategies to balance latency and energy costs. Second, the dynamic nature of UAV networks introduces variability in task execution latency and energy consumption. Third, the integration of EH modules with task offloading introduces trade-offs between energy harvesting duration and task transmission latency, requiring adaptive optimization techniques. This master thesis aims to address these challenges by designing efficient mobility-aware task offloading algorithm (mainly focusing on deep reinforcement learning-based optimization) for UAV-assisted Edge-IoT networks with energy harvesting.

This thesis is ideal for students passionate about sensor networks, AI-driven optimization, IoT and edge computing. **Student job is also available** for this topic. If you're eager to tackle cutting-edge research challenges and contribute to the future of sustainable computing, please send your CV and transcript to make an appointment for further discussion.

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