Artificial Intelligence for Energy-Efficient and Delay Guaranteed Computation offloading in Edge Cloud Computing Systems

Project Overview:

Edge computing has recently emerged as an extension to cloud computing for quality of service (QoS) provisioning particularly delay guarantee for delay-sensitive applications. By offloading the computationally intensive workloads to edge servers, the quality of computation experience, e.g., network transmission delay and transmission energy consumption, could be improved greatly. However, the computation energy consumption in edge servers may be higher than that in clouds when the workload is heavy. To provide QoS for end users while achieving green computing for computing systems, the cooperation between edge servers and the cloud is significantly important. The aim of the project to find the optimum offloading strategy (local, edge and cloud) to minimize the energy consumption of all users using artificial intelligence techniques.

Eligible Departments:

Electronics	
Communications	
Networking	**X**

Software/Hardware:

Matlab

Relevant References:

1) An energy efficient design for UAV communication with mobile edge computing
   https://ieeexplore.ieee.org/document/8633301

2) Energy-Efficient Task Offloading and Resource Scheduling for Mobile Edge Computing
   https://ieeexplore.ieee.org/document/8515731

3) Energy-Efficient Mobile Edge Hosts for Mobile Edge Computing System
   https://ieeexplore.ieee.org/document/8913354

Latency-Optimal Task Offloading for Edge Computing System based on artificial intelligence

Project Overview:

Driven by great demands on low-latency services of the edge devices, edge computing has been proposed to enable the computing capacities at the edge of the radio access network. However, conventional edge computing servers suffer some disadvantages such as limited computing capacity, preventing and computation-intensive tasks to be processed on time. The aim of the project is to minimize weighted-sum latency of all users in a dynamic multi-user edge computing system by choosing the optimal offloading strategies (local, edge and cloud).

Eligible Departments:

Electronics	
Communications	
Networking	**X**

Software/Hardware:

Matlab

Relevant References:

1) Latency-Optimal Task Offloading for Mobile-Edge Computing System in 5G Heterogeneous Networks
   https://ieeexplore.ieee.org/document/8417606

2) Collaborative Cloud and Edge Computing for Latency Minimization
   https://ieeexplore.ieee.org/document/8664595

3) Multi-User Offloading for Edge Computing Networks: A Dependency-Aware and Latency-Optimal Approach
   https://ieeexplore.ieee.org/document/8847369