ST. FRANCIS XAVIER UNIVERSITY

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Presents

Energy-Efficient Edge Computing Computation Offloading using DVFS and Q-Learning for Time-Critical IoT Applications

by
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Zoom link to follow

Internet of Things (IoT) is an emerging domain that provides ordinary tiny physical devices to be connected to the internet, collect, and share data that is changing the way people interact with things around them. It provides the pervasively connected infrastructure to support innovative applications and services that can automate otherwise intensely laborious manual effort. IoT devices often generate a huge amount of data and traditionally offload data to centralized cloud servers to provide computational resources for processing named Cloud Computing (CC). This approach suffers from several shortcomings such as network latency, higher network bandwidth requirement, privacy and security concerns, etc. Edge computing (EC) complements the powerful centralized cloud servers by providing powerful processing capability close to the data source, minimize network latency, and securing data privacy. Energy consumption is one of the most vital issues for battery-powered tiny IoT devices. In recent years, the energy consumption problem has continued to receive a lot of attention from the IoT community in applying various techniques to reduce energy consumption while meeting the computational demand. In any computing device, the processor is the highest energy-consuming unit. Dynamic Voltage and Frequency Scaling (DVFS) has been commonly used in processors to reduce power consumption. In this thesis, we propose an offloading technique using reinforcement learning and DVFS in an edge computing environment to reduce the energy consumption of IoT devices. Preliminary experimental results show that this technique can reduce energy consumption while achieving the IoT application and services computational goals.