

해외 학자 초청 온라인 세미나

세미나 주제: Edge AI: Federated Learning for Edge Computing Systems

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강연시간: 16:00~18:00 (2시간)

강연 요약:

Standard machine learning (ML) techniques require centralising the training data on cloud data centers due to the high computing resources (e.g., GPUs) available on the cloud, so that large amounts of data can be analyzed to obtain useful information for the detection, classification, and prediction of future events with high accuracy. However, the proliferation of mobile devices, ranging from smartphones to autonomous vehicles, drones, and various Internet-of-things (IoT) devices such as wearable sensors and surveillance cameras, has resulted in a vast amount of data being generated. Data from all of these devices is collected in a distributed manner and sent to a central server, where it is used to train a powerful ML model. Due to network bandwidth, latency and data privacy concerns, sending all of the data to a remote cloud is impractical and often unnecessary. Furthermore, in many applications, user data contains sensitive personal information, raising privacy concerns as another reason to avoid offloading data to a centralized server. Instead of sending raw data to distant clouds, it should be processed and stored locally leveraging edge computing paradigm. Furthermore, the industry giants are also shifting from a traditional cloud-based model to edge computing platforms due to major factors of latency, bandwidth, and data privacy. In this regard, Google recently introduced the concept of Federated Learning in 2016, which is a privacy-preserving ML technique in which an ML model is collaboratively learned across several distributed devices (e.g., mobile phones), while all training data is kept on local devices. The FL provides privacy-by-design and is well suited for edge computing applications because it can take advantage of the computation power of edge servers. A number of technical challenges must be overcome in order to build such an edge federated learning system. In this talk, I will discuss distributed ML, with a focus on FL for edge computing systems. I will start by giving a quick explanation of FL and how it relates to edge computing. The common characteristics of edge computing and FL, as well as their applications, open-source platforms, current trends, development, and relevant future directions will be discussed particularly from the network perspective. Furthermore, the containerization of applications in edge cloud computing environments will be discussed, as well as the current challenges and solutions that are widely used in the industry.