EdgeAI: A Vision for Distributed, Edge-Native Artificial Intelligence in Future 6G Networks

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INTRODUCTION
Edge computing distributes cloud applications to the network infrastructure while providing more bandwidth, reducing latencies and improving controls on privacy. In contrast, current artificial intelligence (AI) methods assume computations are conducted in a homogeneous cloud with ample computational and data storage resources available.

AI DISTRIBUTION
Currently, AI’s cloud-centric architectural model requires transmitting raw data from the end-user devices to the cloud, consuming significant data transmission resources, introducing latencies and endangering privacy. Distributed or federated AI builds and maintains a central model in the cloud or on the edge but allows devices to update the model and use it locally for predictions. Decentralized AI flattens the distributed hierarchy, with the joint model built and maintained by devices, edge nodes and cloud nodes with equal responsibility.

BENEFITS
Clear benefits can be identified from combining AI with edge computing. We divide the interplay into edge computing for AI and AI for edge computing.

VISION
EdgeAI combines edge computing with AI methods to improve both fields in a variety of aspects. Our research aims to identify the challenges and detail the potential benefits of EdgeAI, building a coherent and overarching vision of what distributed artificial intelligence means in the context of edge computing. Further, we aim to find the methods of realizing those benefits, testing our hypotheses in a real-world setting on the edge-based computational platform we’re building upon the 5G test network (http://5gtn.fi). The vision will be realized during the 8-year time span of the 6G Flagship research program.