Planet-Scale Land Cover Classification with FPGAs

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ABSTRACT

AI for Earth puts Microsoft's cloud and AI tools in the hands of those working to solve global environmental challenges. Land cover mapping is part of Microsoft's AI for Earth program, which was created in order to fundamentally change the way that society monitors, models, and ultimately manages Earth's natural resources. To power the land cover mapping work, DNNs are used to perform land use classification using tens of terabytes of high-resolution satellite images from National Agriculture Imagery Program (NAIP).

However, Deep Neural Networks (DNNs) are challenging to infer cost-effectively, and deploy in large-scale online services with low latencies and price/performance. Microsoft Project Brainwave is a hardware architecture designed to enable high performance real-time AI computations, and the architecture is deployed on field programmable arrays (FPGAs). This wave of hardware innovation will fundamentally transform latencies and price-performance for large scale use of DNNs.

In this session, we will walkthrough how FPGAs are used within Microsoft, and how we can tap the power of FPGAs for real-time AI.

We will share the secrets of how we are able to perform land cover classification on 20 terabytes of high-resolutions satellite images from NAIP in ten minutes, at the rate of over 415,000 inferences/second.

BIOGRAPHY

Joseph Sirosh is Chief Technology Officer of Artificial Intelligence, WW Commercial Business at Microsoft. Prior to this role, he was CVP of Microsoft's Azure Data and AI Platform, managing Databases, Big Data, Cognitive Services, Bot Services and Machine Learning.

Joseph joined Microsoft in 2013 from Amazon where he was the VP for Global Inventory Platform, responsible for the science and software behind Amazon's supply chain and order fulfillment systems, as well as the central Machine Learning group, which he built and led.

Before joining Amazon, Joseph worked for FICO as VP of Research and Development, where he led projects for DARPA, homeland security and several government organizations.

Joseph is passionate about machine learning and its applications and has been active in the field since 1990. He holds a PhD in Computer Science from the University of Texas at Austin and a B. Tech. in Computer Science & Engineering from the Indian Institute of Technology Chennai.

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