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Supercomputer Fugaku and new achievement using Fugaku and AI technologies for high-resolution, real-time tsunami inundation prediction

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Supercomputer Fugaku, which is developed by RIKEN and Fujitsu, is the first supercomputer in the history receiving the first prizes in three major supercomputers'ranking, TOP500, HPCG, and Graph500 at the same time in June 2020. It also received the first prize in the HPL-AI ranking. Fugaku is holding four prizes for three consecutive terms now.

Fujitsu's commercial product PRIMEHPC FX1000 is the same hardware with the Fugaku and capable to support the same software stack except LLIO, Light weight Layered IO accelerator designed for the large and scalable environment like Fugaku system. PRIMEHPC FX700 uses A64FX CPU used for Fugaku, while supporting the de facto standard interconnect, InfiniBand HDR. Fujitsu supercomputers and its derivatives form a center of excellence of Arm HPC ecosystem.

This presentation also introduces Fugaku use case as actual example.

By performing tens of thousands of high-resolution tsunami simulations and training the simulation results with AI on the supercomputer "Fugaku", we have developed a new AI model that can predict high-resolution tsunami inundation on a normal PC. When an earthquake occurs, by inputting the tsunami waveform data observed offshore into the newly developed AI model, it is possible to predict the coastal flood situation before the tsunami arrives with high spatial resolution. This high-resolution model provides detailed flood prediction and insights into the impact of tsunamis on coastal infrastructure such as buildings and roads. In addition, since the AI model pre-trained on the supercomputer "Fugaku" can be executed on a normal PC in a few seconds, it is easy to build a real-time flood prediction system that previously required urgent real-time use of the supercomputer.

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