What's next in Information Technology?

Riel Heike

IBM Fellow
Director IoT Technology & Solutions
IBM T.J. Watson Research Center

Historically, enhancing compute capability has meant integrating ever more and ever smaller devices into both, the memory and the processors. However, such scaling has become much more difficult recently because of physical scaling limits. Yet despite a lot of innovative technologies in materials, devices and architectures, the speed of increasing the density of transistors has slowed down. This raises the fundamental question of what is next?

With the explosion of available data, the internet-of-things and the increasing demand for machine learning, deep learning and artificial intelligence, the computational workloads are significantly changing. Therefore, there is a growing need for specialized hardware which can handle large computational workloads which take too long to run on conventional machines. In that regard completely new computing paradigms are developed such as quantum computing and non-von Neumann computing.

I will give an overview of our research activities in the field of extending the core technology roadmaps and in the new paradigms of cognitive hardware technologies and quantum computing.