Information Geometry

Information geometry is the field of studying differential geometric properties in the possession of probability distributions sets. Based on information geometry, differential geometric structures are included in various problems of information science, e.g., EM algorithms, the probability propagation method, independent component analysis, universal compressed data—important for the machine learning—as well as the high-order asymptotic method and hypothesis tests have been examined; consequently, new perspectives have been offered to many researchers around the world. Characteristics and properties of information geometry have drawn a lot of attention as subjects of mathematical science, and accordingly, they are expanding their span of influence now.

Service Engineering

From around 1982, H. Enomoto came to think that software systems were systems to provide services. And then he proposed the concept of service engineering—a new field of study where services are searched for by applying engineered approaches considering software development and this development process of services and software structure is service architecture. This concept forms the basis of current IT technologies, e.g., Web service engineering, service-oriented architecture and cloud services, accordingly, and has advanced the information-oriented society.

Cognitive Science based on Learning through Actions

From the 1970s, Y. Anzai achieved pioneering results in cognitive science about human cognition, thinking, problem solving, learning and memory. In addition, in the beginning of the 1990s, he started an integrated study about the interactive systems of humans and robots and took the lead in the construction of new human science by integrating the study of cognitive science about thinking and learning with the study of information science about interactions.