

Building a Model of *Kokoro*

Makoto Nagao

Professor Emeritus, Kyoto University

Can a machine have a *kokoro* like humans'? To answer this question, we need a definition of the *kokoro*, and this in turn requires understanding how the human brain functions. Let us begin by considering a hypothetical computer model of the brain showing three types of functions: intellectual, mental, and spiritual (or vital).

Intellectual functions include reasoning based on the use of knowledge networks, while spiritual ones comprise generating life-sustaining energy and providing regulatory parameters for the other functions. Mental functions — the functions of the *kokoro* — are the most complex and difficult to define of the three; in fact, they can only be defined as being neither intellectual nor spiritual. To be more specific, they would encompass sensitivity, emotion, feeling, value judgement, intention, decision-making, motivation, hope, and compassion.

The intellectual, mental, and spiritual functions, however, are not completely independent of each other; they can actually be characterized as being mutually influential. For example, the more energy the spiritual functions generate, the more powerful and positive the mental functions will be. Decision-making is a mental function, but identifying the available options is an intellectual one. Decisions also closely reflect one's sense of value and other aspects of the individual's *kokoro*. The mental functions are thus extremely diverse, and constitute a highly complex system.

Naturally, it would not be easy to program such complex functions into a machine. Today's AI is extremely powerful when it comes to performing intellectual functions, but

these are carried out in isolation from all the other functions. This is where AI falls short of replicating the kokoro.

Still, if we can build a comprehensive database of human experiences, covering all possible cases, we may eventually be able to program the kokoro. An artificial kokoro would decide how to respond to each new stimulus after consulting this database. This kind of database, if ever built, might indeed give machines a kokoro.