

The Wisdom to Bridge the Gap between Lives and Machines: An introduction to *Fundamental Informatics*

INTRODUCTION

Here we present a complete translation of *The Wisdom to Bridge the Gap between Lives and Machines: An introduction to Fundamental Informatics* (2012). This text was originally written in Japanese, mainly for high school or undergraduate students, but it will also be useful for the readers who hope to understand the concepts and applicability of *fundamental informatics* (FI).

What is FI to begin with? FI does not provide a guide to skillful computer manipulations. Rather, it is a new theory which aims to offer the conceptual basis of diverse information-related academic fields like computer engineering, socio-information studies and various applied informatics.

The recent marvelous innovation of information technology changes our daily life rapidly, thus making us sure that the society of the 21st century is nothing but an information society heavily dependent on computer processing. On the other hand, however, we must admit that the discourses on information can hardly escape from inconsistency and confusion. We find noteworthy ambiguity even in the description of basic concepts such as information, media, communication etc. This threatens our essential freedom and may cause social suppression, in compensation for convenience.

FI is nothing but an academic effort to overcome this disorder and contribute to the construction of a stable information society without human suppression. Interdisciplinary researches based on FI have already been done in application fields like web community research, information ethics, literary studies, management science, and other information-related fields.

Historically speaking, FI is situated in the genealogy of *neocybernetics*. The classic (first-order) cybernetics, one of the origins of information science, has been established by a mathematician Norbert Wiener in the middle of the 20th century. Based on this, a physicist Heinz von Foerster proposed the *second-order* cybernetics in the 1970s, which has gradually been developed into an interdisciplinary field termed *neocybernetics*.

There we can find academic fruits such as the autopoiesis theory originated with biologists Humberto Maturana and Francisco Varela, the social systems theory by a sociologist Niklas Luhmann, the radical constructivism by a cognitive psychologist Ernst von Glasersfeld, etc. In addition, the influence of these academic fields is apparent in the literary studies by Siegfried J. Schmidt, Gerhart Plumpe, Bruce Clarke and other researchers.

The major difference between classic cybernetics and neocybernetics lies in that the former employs *open* system models while the latter does *closed* system models based on second-order observation. Since living things as well as human organizations take actions in an autonomous and recurrent manner, the assumption of operational closure is certainly convincing. However, this assumption is seemingly hardly compatible with the concept of *information*, which is ordinarily considered to be conveyed between open systems. That is, openness is believed to be the necessary condition for the information transmission in its literal sense.

This apparent antinomy can be solved by FI based on which we treat of the transmission and storing of information as they really are, by introducing a sort of hierarchical or asymmetric relations among autonomous systems. Let us assume structurally-coupled closed systems are in hierarchical order. When observing from the upper level system, it is recognized that each of the lower level systems seems functioning as an open system under some restrictions, the dynamics of which could be seen as pseudo information transmission. Note that, however, this never damages the intrinsic closure or autonomy in the lower systems. The properties of closedness and openness can be converted reciprocally depending on a viewpoint of observation.

The FI model is expected to make us possible to envision a desirable image of information society, by interrelating basic concepts with each other, such as information, media and communication.

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