



Title of Project : Constructive Developmental Science: Revealing the Principles of Development from Fetal Period and Systematic Understanding of Developmental Disorders

Yasuo Kuniyoshi
(The University of Tokyo, Graduate School of Information Science and Technology, Professor)

【Purpose of the Research Project】

How does human mind develop? What causes developmental disorders? Recent studies suggest the importance of the fetal period in human development. However, study of human fetuses is strongly constrained by technical and ethical difficulties. This project aims at understanding the principles of human development by analyzing and modeling it from the fetal period. Integrating robotics, medicine, psychology, neuroscience, and *Tohjisha-kenkyu* (person-centered, peer-supported research), we establish a new interdisciplinary research field called Constructive Developmental Science. Its contributions include a new understanding of human development and its disorders, comprehensive diagnostic methodologies, and truly appropriate assistive technology.

【Content of the Research Project】

This project consists of three research areas described as follows:

- A. Constructive approach: It aims to model human development from the fetal period to infancy by integrating the evidences and hypotheses obtained in B and C while it provides B and C new technologies to measure development. Assistive systems for developmental disorders will also be designed using the technologies.
- B. Human science: It aims to analyze the longitudinal development of children with developmental disorders as well as normal children. Comprehensive diagnostics will be established so as to reveal not only the development of each function (e.g., motor, perception, social abilities) but also relations between functions.
- C. Tohjisha-kenkyu: We support the hypothesis that the essential characteristic of autism is the difficulty to integrate sensory-motor information rather than in social interaction. This research area intends to verify the hypothesis, develop systems to assist developmental disorders, and to facilitate

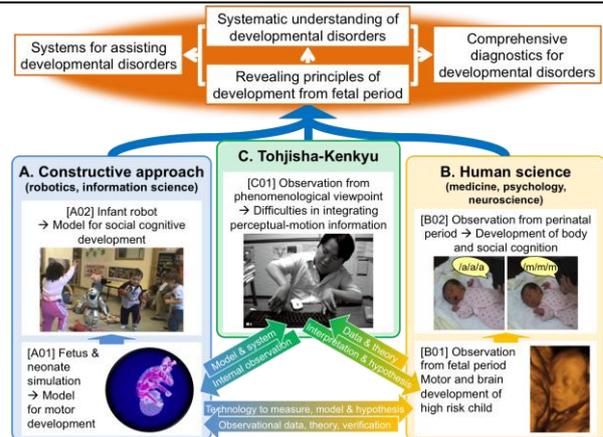


Figure 1 The goal and three research areas research in A and B by providing evidences and interpretations of their perceptual and motor experiences.

【Expected Research Achievements and Scientific Significance】

This project promotes the new interdisciplinary research, which integrates modeling studies in robotics, observational studies in human science, and phenomenological analysis in Tohjisha-kenkyu. Our project will go beyond existing research areas and establish systematic understanding of human development, which can be applied to the comprehensive diagnostics and truly appropriate assistive systems for developmental disorders.

【Key Words】

Constructive approach: An approach to understanding a mechanism by modeling, simulating and evaluating it under various environmental conditions.

【Term of Project】 FY2012-2016

【Budget Allocation】 1,093,300 Thousand Yen

【Homepage Address and Other Contact Information】

<http://www.isi.imi.i.u-tokyo.ac.jp/devsci/>
devsci-office@isi.imi.i.u-tokyo.ac.jp