

Intelligent Being: Whose Intelligence ?

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Abstract

Cognitive Neuroscience provides an integrated, multi-disciplinary approach for exploring the uniqueness of our species, *Homo sapiens*, in terms of these eternal issues: *Who are we ? Where do we come from? Where are we going? What have we accomplished with respect to the evolving complicated 8 Os Societies (Bio-Geno-Neuro-info-Cogno-Techno-Medico-Cultural/Socio)? How did we do it? How to characterize our present civilization in terms of the increasing level of Intelligence? But what is Intelligence and whose Intelligence we are referring to (i.e., natural or artificial)?*

These questions are difficult to answer, especially the last one. In my view, a real understanding of Intelligence will not be achieved until we have a reasonable notion of its neurological mechanisms and their manifested cognitive functions. From the perspective of evolutionary neurobiology, the brain physically rewired to accommodate the environmental changes in our perception (visual, verbal, sense), cognitive processing (attention, memory, cognitive control, executive function, decision-making, multitasking skills, etc.), and production (motion, speech, gesturing, signing and writing). Intellectual behaviors are formed and constantly upgraded by the so-called biologically secondary learning via (1) Imitation (mirror neurons, iconicity), (2) Borrowing with modifications (accommodation, assimilation, derivative), (3) Fast encoding and retrieval from huge size storage (cognitive architecture and human information processing, chunking, duality of patterning), (4) Transformation (mutation, changes after critical evaluation), and (5) Knowledge Connections (distributed intelligence, collective wisdom and creativity). (成智五步：仿、借、存、轉、聯).

In other words, human cognition develops through the stages of sensori-enactive, iconic, and symbolic representation, in both phylogenetic and ontogenetic sense. It should be noted that imitation is not just coping, rather, it is a reconstruction process (i.e., from analog to digital) and the new adaptation is made possible by rewiring the preexisting neuronal circuits in the brain in a recycling manner. Knowledge transforms itself and disruptive innovation upgrade the power of creativity. With syntax and software engineering, human being creates artificial intelligence (AI) to replace routine as well as complex procedures in problem solving. In specific domain areas, AI

challenges and outperforms human's natural intelligence without "PERSONAL" knowledge, which allows "compassion", "curiosity", and "feeling of knowing" about the domain specific problems. For example, AlphaGo was able to defeat the Grand champion Go master easily without knowing Go games. So, the big question is: What and whose intelligence we are talking about ? AI or NI ? Both are evolving, with different types of constraints on it speed and directions of advancements. It is difficult to predict what they will be fifty years from now. Can AI be more compassionated and has spontaneous curiosity about the world and themselves ? Will it appreciates, enjoys, and seeks mindfulness in its living experience ? Let us use our NI and try to visualize the future AI.