

A process based framework for consciousness

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A conscious being is a system that experiences (feels) something. In order to build an artificial conscious being we need to give an account of what it is to experience or feel something. Any project that aims to design an artificial conscious being thus needs to take issue with the notion of experience or feeling. For the purposes of robotics this task can be profitably approached if we leave behind the dualist framework of traditional Cartesian substance metaphysics and adopt a process-metaphysical stance. An outline of a process-ontological scheme whose basic entities are called 'onphenes' is sketched. From within this scheme a series of constraints on an architecture for consciousness is formulated. Some neuroscientific and physical evidence is examined and discussed.

The history of robotics is intertwined with that of artificial intelligence especially in the last decades. Artificial intelligence learned the utility of having a body to know the environment and robotics learned from artificial intelligence, neural networks and artificial life procedures and algorithms in the fields of perception, motor coordination and path planning.

Time has come to start to test the hypothesis whether it is possible to build a conscious machine capable of making phenomenal experiences. To make phenomenal experience may be considered the first step towards consciousness and awareness.

The Tucson Conferences “Towards a Science of Consciousness” (1996-2004) have helped in creating the scientific environment for the study of consciousness playing a role similar to that had by the Macy Conferences on Cybernetics (1946-1953), that settled the ground for cybernetics and artificial intelligence in the following years.

Many approaches are emerging to cope with the scientific study of consciousness. Among them there are a neuroscience approach and a constructivist approach. The first was summarized in a Nature Neuroscience editorial: “By combining psychophysics, neuro-imaging and electrophysiology, it will eventually be possible to understand the computations that occur between sensory input and motor output, and to pinpoint the differences between cases where a stimulus is consciously perceived and those where it is not”. The constructivist approach was sketched by Edelman and Tononi in their book: “To understand the mental we may have to invent further ways of looking at brains. We may even have to synthesize artifacts resembling brains connected to bodily functions in order fully to understand those processes. Although the day when we shall be able to create a such conscious artifacts is far off we may have to make them before we deeply understand the processes of thought itself.”

The building of conscious machines belongs to the constructivist approach to consciousness. However, since the engineers are used to build “objects” and not “subjects”, it is necessary to cope with the vexing question of dualism.