

Big Visions

Big visions promise unlimited profits to those companies that will master the technology of machine understanding and consciousness. Conscious machines would be the ultimate achievement of artificial intelligence and perhaps even the greatest invention of mankind. Could a machine possess mental capacity and awareness that could parallel that of humans is a question that is seriously debated today. "Machine consciousness" (MC) is an emerging technology that aims to emulate human cognition and consciousness. This technology tries to provide machines with the kind of autonomy and general intelligence that enable humans to be successful and surpass contemporary computers in everyday situations.

There are different approaches towards machine consciousness. Top-down methods try to achieve artificial consciousness by emulating high level cognitive processes. Bottom-up methods try to understand and emulate the neural circuitry that is utilized by the brain. System approaches may try to combine these two methods. Another way of categorizing the work is the division between functional and phenomenal approaches. The functional approach tries to reproduce the functions of cognition and consciousness, which then might or might not allow the emergence of phenomenal effects (qualia). The phenomenal approach tries to understand and eventually reproduce the phenomenal aspects of consciousness, which then might lead to functionality. However, categorizations like these tend to be inaccurate and eclectic approaches are possible.

Several workshops focusing on machine consciousness have been held during this decade. The first workshops mainly speculated on the possibility of machine consciousness, while over the years the situation has changed. Definite research results have begun to emerge and books and publications on machine consciousness have evolved from purely philosophical to practical. Even actual applications for conscious machines and machine understanding are now envisioned.

This workshop highlights many of the essential issues of machine consciousness from theoretical to practical. Introduction to this topic is given by Prof. Igor Aleksander. Some practical and theoretical models and architectures for systems that try to incorporate functional and/or phenomenal aspects of consciousness are described by several participants (Chella, Sanz and Hernández, Goertzel, Kinouchi, Valpola, Marques). The question of phenomenology and qualia are addressed by others (Ramamurthy, Gamez, Manzotti, Hesslow, Haikonen). Emotional and affective processes are seen as important contributors to cognition; these are also discussed here (Browne, Chrisley). Silent or inner speech is one manifestation of thinking. Technology may allow the detection and recognition of this (Lesser and Jorgensen). Consciousness is not necessarily an on/off phenomenon; instead it may be a graded one. It would help if there were means of quantifying this (Arrabales Moreno). The actual implementation of machine consciousness may call for the development of dedicated microchips (Åberg and Rantala).

The rapid development of this field prompts the following questions to which this workshop tries to find answers: Where are we now? Is there any emerging coherence in this research? What would be the strong and possibly unifying ideas of the research presented so far and could we use these to guide the research towards most promising avenues? How could we propagate our ideas more effectively? What recommendations can we give to research organizations and financing bodies?

PHa