

## Commentary

# Commentary on David Sahner's "Human Consciousness and Selfhood"

Nils J. Nilsson\*

### ABSTRACT

This is my brief Commentary on David Sahner's "Human Consciousness and Selfhood: Potential Underpinnings and Compatibility with Artificial Complex Systems" in recent issue of JCER. My main point is that if a rich sensorium and extensive experiences are required for consciousness, machines will have, at least, those necessary conditions no less than humans do.

**Key Words:** consciousness, machine, artificial intelligence, sensation, perception.

It was with great interest that I read David Sahner's article in the December 2010 issue of JCER (Sahner, 2010). As I understand one of his main points, at least some part of human consciousness depends on awareness of the "sensation" of perceptions. He states that since the human sensorium so complexly depends upon our bodies, it is doubtful that artificial agents could ever have an adequate perceptual basis for the rich sensations necessary to experience qualia, etc., and thus could not have the kind of consciousness that we humans have. Further contributions to our consciousness, he writes, come from the rich experiences we humans have in our cultural milieu, experiences that artificial agents cannot have.

I don't think that artificial agents would necessarily be limited in the ways stated by David Sahner. For example, nano-sensory technology is making great strides in providing touch, temperature, and other "skin-like" sensors. Additionally, there are already robot vision systems with rather large retinas and the perceptual apparatus necessary to describe scenes, recognize faces, etc. I expect progress will continue to be rapid in machine visual perception. I could say similar things regarding sound perception. Sensory apparatus is available that perceives a wider frequency range of sounds than humans can perceive. Speech recognition is coming along fine, and I wouldn't doubt that software could be (maybe has been) designed to guess accurately whether a piece was composed by Beethoven or by Rachmaninov. David Cope at UC Santa Cruz has systems that can extract high-level features unique to the music of a particular composer and then "play those features backward" to produce never-before-heard Bach-like or Rachmaninov-like compositions.

Thus, the ability of robots to "feel" pain or a comforting touch or to be transported into a state of ecstasy upon seeing a sunset or listening to the Moonlight Sonata wouldn't seem to be precluded by perceptual deprivation alone. Of course, the problem remains of how to convert perception into "sensation" (whatever that is) but that's a technical problem that may not be insolvable. David Sahner expresses sympathy for Nicholas Humphrey's theory in which phenomenological "sensation" is grounded in internal recursive monitoring of perceptual stimulatory pathways within the human central nervous system. I suppose computers could also experience sensation through "internal recursive monitoring of perception" if that's what

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Correspondence: Professor Nils J. Nilsson, Dept. of Computer Science, Stanford Univ. <http://ai.stanford.edu/~nilsson/>  
E-mail: [nilsson@cs.stanford.edu](mailto:nilsson@cs.stanford.edu)

it takes. And, although I take his point about "skin in the game" and agree that machines might not ever have as much of it in the game as humans, I do think they will have as much or more visual and auditory perception.

David Sahner also claims that there are certain types of knowledge that simply cannot be conveyed to computers in the medium of language, but there are all kinds of "knowledge" that can be (and have been) imparted to computers without using language of any kind. Reinforcement learning methods (a kind of machine learning) can be used to teach computers various skills. Also, neural networks gather knowledge through training without using language. And most modern programs for translating languages depend on statistical analyses of large corpora of texts instead of being explicitly "programmed."

Robots may have a rich collection of experiences. They will drive on highways, work in factories and on farms, deliver the mail, do household chores and many other things. There is no reason why they couldn't "remember" everything they perceive and do. Their experiences will be different from those of people, just as yours are different from mine. Furthermore, since robot experiences are stored in their individual memories, they can be totally shared amongst them. That could give each of them a sort of "collective experience," enabling (possibly) a much richer sense of consciousness than any of us could have.

Maybe the consciousness that evolves in machines will not be human in character. But it's also the case that different humans have many different "consciousnesses" themselves. Blind people, deaf people, and others with various sensory disorders (prosopagnosia, for example) have their own special and perhaps limited consciousnesses. People raised in Japan have a different kind of consciousness than those raised in Iowa. Perhaps all of these differences are slight compared to the difference between the "average human" and the most conscious robot. We'll have to see.

The problem of consciousness may well be the last defense of those who would rather not view humans as "just" machines. But like all the other alleged barriers before it, I think it too will eventually be penetrated. The burden of proof, of course, is on those who would do so.

## Reference

Sahner, D. (2010), *Human Consciousness and Selfhood: Potential Underpinnings and Compatibility with Artificial Complex Systems*. JCER 1(9): pp. 1210-1224.