Simulated Reality

Authored by

mohammad looti

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Simulated reality is the hypothesis that reality could be simulated -- for example by quantum computer simulation -- to a degree indistinguishable from "true" reality. It could contain conscious minds which may or may not be fully aware that they are living inside a simulation. This is quite different from the current, technologically achievable concept of virtual reality. Virtual reality is easily distinguished from the experience of actuality; participants are never in doubt about the nature of what they experience. Simulated reality, by contrast, would be hard or impossible to separate from "true" reality. There has been much debate over this topic, ranging from philosophical discourse to practical applications in computing.

Arguments

Simulation argument

The simulation hypothesis was first published by Hans Moravec. Later, the philosopher Nick Bostrom developed an expanded argument examining the probability of our reality being a simulation. His argument states that at least one of the following statements is very likely to be true:

Human civilization is unlikely to reach a level of technological maturity capable of producing simulated realities or such simulations are physically impossible to construct.
A comparable civilization reaching aforementioned technological status will likely not produce a significant number of simulated realities (one that might push the probable existence of digital entities beyond the probable number of "real" entities in a Universe) for any of a number of reasons, such as, diversion of computational processing power for other tasks, ethical considerations of holding entities captive in simulated realities, etc.
Any entities with our general set of experiences are almost certainly living in a simulation.

In greater detail, Bostrom is attempting to prove a tripartite disjunction, that at least one of these propositions must be true. His argument rests on the premise that given sufficiently advanced technology, it is possible to represent the populated surface of the Earth without recourse to digital physics; that the qualia experienced by a simulated consciousness are comparable or equivalent to those of a naturally occurring human consciousness; and that one or more levels of simulation within simulations would be feasible given only a modest expenditure of computational resources in the real world.

If one assumes first that humans will not be destroyed nor destroy themselves before developing such a technology, and, next, that human descendants will have no overriding legal restrictions or moral compunctions against simulating biospheres or their own historical biosphere, then it would be unreasonable to count ourselves among the small minority of genuine organisms who, sooner or later, will be vastly outnumbered by artificial simulations.

Epistemologically, it is not impossible to tell whether we are living in a simulation. For example, Bostrom suggests that a window could pop up saying: "You are living in a simulation. Click here for more information." However, imperfections in a simulated environment might be difficult for the native inhabitants to identify and for purposes of authenticity, even the simulated memory of a blatant revelation might be purged programmatically. Nonetheless, should any evidence come to light, either for or against the skeptical hypothesis, it would radically alter the aforementioned probability.

Computationalism

Computationalism is a philosophy of mind theory stating that cognition is a form of computation. It is relevant to the Simulation hypothesis in that it illustrates how a simulation could contain conscious subjects, as required by a "virtual people" simulation. For example, it is well known that physical systems can be simulated to some degree of accuracy. If computationalism is correct and if there is no problem in generating artificial consciousness or cognition, it would establish the theoretical possibility of a simulated reality. Nevertheless, the relationship between cognition and phenomenal qualia of consciousness is disputed. It is possible that consciousness requires a vital substrate that a computer cannot provide and that simulated people, while behaving appropriately, would be philosophical zombies. This would undermine Nick Bostrom's simulation argument; we cannot be a simulated consciousness, if consciousness, as we know it, cannot be simulated. The skeptical hypothesis remains intact, however, and we could still be envatted brains, existing as conscious beings within a simulated environment, even if consciousness cannot be simulated. It has been suggested that whereas virtual reality would enable a participant to experience only three senses (sight, sound and optionally smell), simulated reality would enable all five (including taste and touch).

Some theorists have argued that if the "consciousness-is-computation" version of computationalism and mathematical realism (or radical mathematical Platonism) are true then consciousnesses is computation, which in principle is platform independent and thus admits of simulation. This argument states that a "Platonic realm" or ultimate ensemble would contain every algorithm, including those which implement consciousness. Hans Moravec has explored the simulation hypothesis and has argued for a kind of mathematical Platonism according to which every object (including, for example, a stone) can be regarded as implementing every possible computation.

Dreaming

A dream could be considered a type of simulation capable of fooling someone who is asleep. As a result, the "dream hypothesis" cannot be ruled out, although it has been argued that common

sense and considerations of simplicity rule against it. One of the first philosophers to question the distinction between reality and dreams was Zhuangzi, a Chinese philosopher from the 4th century BC. He phrased the problem as the well-known "Butterfly Dream," which went as follows:

Once Zhuangzi dreamt he was a butterfly, a butterfly flitting and fluttering around, happy with himself and doing as he pleased. He didn't know he was Zhuangzi. Suddenly he woke up and there he was, solid and unmistakable Zhuangzi. But he didn't know if he was Zhuangzi who had dreamt he was a butterfly or a butterfly dreaming he was Zhuangzi. Between Zhuangzi and a butterfly there must be some distinction! This is called the Transformation of Things. (2, tr. Burton Watson 1968:49)

The philosophical underpinnings of this argument are also brought up by Descartes, who was one of the first Western philosophers to do so. In Meditations on First Philosophy, he states "... there are no certain indications by which we may clearly distinguish wakefulness from sleep", and goes on to conclude that "It is possible that I am dreaming right now and that all of my perceptions are false".

Chalmers (2003) discusses the dream hypothesis and notes that this comes in two distinct forms:

that he is currently dreaming, in which case many of his beliefs about the world are incorrect;
that he has always been dreaming, in which case the objects he perceives actually exist, albeit in his imagination.

Both the dream argument and the simulation hypothesis can be regarded as skeptical hypotheses; however in raising these doubts, just as Descartes noted that his own thinking led him to be convinced of his own existence, the existence of the argument itself is testament to the possibility of its own truth. Another state of mind in which some argue an individual's perceptions have no physical basis in the real world is called psychosis though psychosis may have a physical basis in the real world and explanations vary.

Perhaps some of those with psychosis have tapped into a part of the simulated reality that others have not; and for whatever reason are being punished, rewarded; or something else, for their actions in the simulated reality.

Nested simulations

The existence of simulated reality is unprovable in any concrete sense: any "evidence" that is directly observed could be another simulation itself. In other words, there is an infinite regress problem with the argument. Even if we are a simulated reality, there is no way to be sure the beings running the simulation are not themselves a simulation and the operators of that simulation are not a simulation.

"Recursive simulation involves a simulation or an entity in the simulation, creating another instance of the same simulation, running it and using its results" (Pooch and Sullivan 2000).

The experience machine

In his 1974 book Anarchy, State and Utopia philosopher Robert Nozick discusses an "experience machine", a hypothetical device which can provide its users with any simulated reality they desire. If given the choice, would we want to plug ourselves into such a machine? If not, then according to Nozick there seems to be something wrong with hedonism, the view that pleasure and happiness are the primary or most important intrinsic goods and the proper aim of human life. Nozick's thought experiment has been widely debated since.