Keith A. Hoyes - 3D Simulation: the Key to A.I. (2007)

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0.1 Context

0.2 Learned in this study

0.3 Things to explore

1 Overview

1.1 1 Introduction

- If a concept cannot be described in three dimensions over time, it is quite likely false

1.2 2 Pillars of Intelligence

- The three pillars of intelligence
  - Virtual time travel
  - Virtual reality
  - Information bridge to reality

1.3 3 Consciousness

- Your basic human being is constructed from a virtual reality chamber connected to a biological, self assembling, nanotech robot with sensors
- The chamber is self learning from exposure to the outside world and free will stems from a process of grading simulated predictions against pre-programmed genetic and culturally programmed schemas

1.4 3.1 Feeling and Qualia

- When energy and matter are able to represent coherent information, such information can subsequently be graded, and that information interpreted as feeling
- Evolution uses the process of consciousness and the subjective "closed loop" belief in feelings, to guide behavior toward the survival and reproduction of genes
- Although we may assert pleasure and pain to be computational illusions, we have no conscious control of the process; so telling ourselves pain is just information will not work
- What we actually perceive are virtual objects within our own minds, the senses are used to align these objects to external reality, to consolidate existing memories, or to train new memories if the objects are novel
- This is the point at which subconscious can take hold, by taking these behavior precent options and running trials "subconsciously," away from the preceived scene - which may be linked or not to reality through the sensorimotor system

- Just as the eyes are formed in expectation of light, so the brain is formed with memory references in expectation of information against which to compare

1.5 4 General Intelligence

- (Intelligence) When bound to the real world, it is the ability to so deeply understand the nature of reality, of which it can provide increasingly accurate predictive power
- For intelligence to exist at all, there are certain environmental pre-cursors:
  - A physical medium upon which it can bind the predictions: reality
  - A representative medium in which it can model the predictions: virtual
  - A motive force: energy
- For intelligence to speculate on our reality it needs a means to:
  - Access that reality: exposure
  - Perceive that reality: modalities
  - Decipher that reality: instantiation machinery
  - Model that reality: modeling machinery
  - Grade the simulations: emotional machinery
  - Classify and store data: memory machinery
- It is presumed that computers are deterministic and humans non deterministic
- For all intents and purposes both can be considered non deterministic, though statistically predictable

1.6 4.1 Human Intelligence

- The human mind is a particularly difficult thing to understand, but it is the best example we have of intelligence with intentionality
- The brain appears to achieve this through a massive structure of neural networks which are able, over time, to effectively interpret sensory data in order to understand and predict the perceived environment - more usually our external world
- There are two priorities to human cognition
  - Reactive thought, which involves negotiating real world environments, objects and people in real time
  - Reflective thought, which involves thinking by processing memory records, with limited or no external sensory perception, but with far greater depth and precision
- The process of human learning is thus predicated on exposure to the real world through the sense modalities

1.7 5 3D Simulation and Language

- Language can break physical law and logic with impunity
- Language is interpreted differently by each conscious entity
- Language does not fully circumscribe or instantiate an event
- Language is time serial in nature, consciousness is parallel
- The proper place for math and language notation is as a mechanism for the coding and serialization of information, so it can be efficiently stored, transferred or retrieved from constrained informational channels

1.8 6 Epistemology

- How can it be that blind or deaf people can think?
  - Because they have constructed the same 3D world model from the remaining modalities; particularly touch and movement
- If we come to the question of our objective in building machine intelligence, we might ask - is it to replicate as closely as possible the human condition? Or will other goals be better aligned to our technology and desires?

1.9 7 Instantiation: the Heart of Consciousness

- Possibly the greatest software challenge for AI will be the instantiation engine
- It must reverse a 2D bitmap render of vision (or any modality input) to recognize the environment and objects from internal memory correlates (concepts) to recreate the virtual 3D scene

1.10 8 In a Nutshell

- All sense modalities converge to memory space as pure information, which is the very loci of consciousness
- With subconscious activity constantly traling memory records and modality stimuli, free will is simply the ability, at any given time, to flip life,s animated momentum to be aligned with alternative virtual script offerings, even a destructive one if proof of courage, or free will, are defined as higher goals
- Our reality exists in 3 dimensions over time
- Units of matter can be represented by units of information
- The aggregates of atoms within objects and environments of reality can be converted (through modalities) to stored information within memory
- The identity and behavior of objects can be instantiated from those memory records (through computation) and then stored as informational representations
- These representations can subsequently be recalled and manipulated to simulate the behavior of their real world correlates as 3D animation tweens
- A software process can judge and emotionally grade the intrinsic value of these simulations to guide and optimize script formation
- Step-ahead animation and pre-training cybernetics can be used to align physical action to the script
- With sufficient computation, memory resources and exposure to reality, this process can become a self reinforcing seed process - leading to advancing intelligence
- The controversial aspects of this paper are that:
  - 3D simulated environments are the basis of cognition
  - Human language is a subsidiary process
  - Any language which contains meaning can be reduced to a 3D simulation
  - Human feelings are illusory, they are self referential computation processes
  - The nexus of consciousness is the boundary between the modalities and the feedback from simulated environments by subconscious computations

1.11 9 Real-World AI

- There are several factors distinguishing real AI from expert systems: the breadth and scope of the knowledge base; the ability to ask the questions; to identify missing knowledge; to judge the relevance of results; to apply context or predict effects over time, etc.
- On the evidence that immobile, deaf children can still develop high intelligence, presumably from visual stimuli, we might also expect a similarly restricted machine analog to have an equal change of success
- The major software challenges:
  - 3D instantiation from 2D sense modalities
  - Construction and maintenance of a universe environment map
  - Construction and maintenance of object records and behaviors
  - Powerful, multilayer 3D simulation engine
  - Blending/morphing of environments, objects, properties and behaviors
  - Grading of simulations to guide script progression
- Any proto-intelligence would begin as basic memory formation and correction processes, but the main advances will arise when running the subconscious simulation machinery separately from the vision input

1.12 10 Conclusion

- The universal language of object form and behavior (reality) is not English or math, it is 3D animation
- All mental activity centers around the processing of virtual 3D objects

- All conscious and intelligence processes center around 3D simulation; with language and symbols used for indexing and scripting
- All knowledge can be understood in terms of 3D model behavior based on precedent
- Software designed to handle 3D models and environments will be central to AI

2 See also

3 References