
From: Joscha Bach - [REDACTED]
Sent: Friday, June 5, 2015 3:36 AM
To: Jeffrey Epstein; Martin Nowak
Subject: Mobjects and Replisomes
Attachments: signature.asc

Dear Jeffrey,

thank you for an inspiring afternoon! I believe that the 'mobjects' that you have been talking about are going to become a very hot topic. They must be above the level of neurons, and below, or orthogonal to most mechanisms of language. Mathematically, we can probably treat them as directed hypergraphs with typed links, but we rarely go to that level of description. I guess that Carnap and Tarski delivered the first incarnations of the modern theories on them, and every comprehensive theory of thinking, planning and language has to account for them, and yet our understanding is preliminary. In AI, we got Schank's schemas, scripts and MOPs, which resulted in Minsky's descriptions of frames, which in turn probably informed Danny Hillis' work on concept net (which is now the foundation of Google's knowledge graph). Jeff Hinton is currently talking about "capsules" that are artificial neural implementations of mobjects, and Markram has been trying to go after them by modeling neural columns. In MicroPsi, I call them concept nodes, in OpenCog, they are the elements of the AtomTable, and John Anderson talks about chunks. I would be very interested to learn about Noam's ideas; I sense that he is mostly familiar with approaches like Winston's, who uses symbolic approximations?

Hope that it continues soon!

Joscha

Dear Martin,

perhaps you will like this lesser-known Björk video (I discovered it Sunday at the MoMa). It is part of her "biophilia" album, and travels in a stepwise order-of-magnitude enlargement into the molecular mechanisms of cellular replication; the song is inspired by the thought of individuals representing parts of a lineage, both on the cellular and the organismic level. To me, the animation is one of the most beautiful and enlightening ones that I have seen on the topic, especially considering its short duration.

<https://www.youtube.com/watch?v=Wa1A0pPc-ik>

Nucleosomes start at about 1:40, halfway through the video, a groove protein travels along a strand of DNA, and beginning from 3:05, there is a fantastically animated replisome. I wished I could get the animator (Drew Berry) to do a similar thing that elucidates neural networks... Cheers,

Joscha