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Do you see a way use abstract rewriting system over graphs from Wolfram Physics Project to represent code-data dual algothms that modify each other and form natural selection process?

(self.DigitalPhilosophy)
submitted 1 year ago by kiwi0fruit

Article Some Relativistic and Gravitational Properties of the Wolfram Model (by Jonathan Gorard - 2020) has interesting definition of abstract rewriting systems that work on graphs.

Do you see a way to use them to represent code-data dual algorithms that modify each other and form natural selection process? That could be a nice base for open-ended natural selection a-life model.

More info:

- Open-ended natural selection of interacting code-data-dual algorithms as a property analogous to Turing completeness
- Wolfram Physics Project

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[–] **kiwi0fruit** [S] 1 point 1 year ago

discussion:
https://community.wolfram.com/groups/-/m/t/1942523?p_p_auth=S1rPcPlo

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[–] **kiwi0fruit** [S] 1 point 1 year ago

Yep. I don't see the particular way and I have no time to dig into it (even if I had time I doubt that I would see the way. Still... hope is there).

DigitalPhilosophy

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kiwi0fruit (edit)

Digital philosophy is a direction in philosophy/metaphysics that relies on computer science and theory of computation. It commonly assumes discrete and finite/countable ontology.

Posts about digital philosophy together with posts close in spirit (or logically connected) are welcome in this subreddit. For example the welcomed posts may be about:

- digital physics,
- digital probabilistic physics,
- artificial life,
- open-ended evolution,
- universal Darwinism in physics,
- philosophy of artificial intelligence.

Original definition of the digital philosophy (DP) by Edward Fredkin was rather specific but for example Gregory Chaitin's ideas are indeterministic instead of deterministic but they are still considered belonging to DP. So it's more an umbrella term now.

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[–] **kiwi0fruit** [S] 1 point 1 year ago

> You might be interested in chemlambda or graph automata. This is a line of thinking I'd always wished would go somewhere, so I'm glad to see someone working on it.

(u/NeuroPyrox)

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[–] **kiwi0fruit** [S] 1 point 1 year ago

> I don't know anything about the Wolfram model because I think Wolfram is a crackpot who is on to absolutely nothing, but I've recently been considering the idea of randomized networks of randomly initialized actors, each able only to send and receive messages (including links to other actors), and just seeing what arises out of that, if anything, as old ones on the periphery of the network are deleted and new ones randomly inserted. Possibly together with the ability to make requests to one another to perform calculations and trade memory or processing time in return. Not sure exactly how it would work though.

(u/EmergencyGuava2)

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[–] **kiwi0fruit** [S] 1 point 1 year ago*

> There's no reason to adopt the Wolfram model. Self-modifying code has been a thing since software was invented. Before, actually, if you count Gödel Numbering.

(u/jimgagnon)

Thanks. I guess I should check different ontologies for this. There are so many of them. Even if they are capable of producing similar results (that we could even see their equivalence - if got lucky and work hard) it's still would be easier to go with one than another... And I'm more inclined to use something that is not Turing complete. As natural assumption would be that the model should be finite in resources and it can get access to infinite time or memory only in time limit (assuming that the individual algorithms would survive for this to happen).

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According to Wikipedia DP is advocated by certain mathematicians and theoretical physicists, including: Edward Fredkin, Konrad Zuse, Stephen Wolfram, Rudy Rucker, Gregory Chaitin, and Seth Lloyd.

Recommended subreddits:

- r/compsci Computer Science: Theory and Application
- r/algorithms Computer Science for Computer Scientists
- r/oee Open-Ended Evolution
- r/alife Artificial life

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Where to find more on abstract rewriting systems: https://news.ycombinator.com/item?id=22871806

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[–] **kiwi0fruit** [S] 1 point 1 year ago*

I'm interested in research direction of using code-data dual algothms that modify each other and form natural selection process to formally abstract notion of evolutional open-endedness (like Turing completeness is an abstraction of algorithms notion). More details: https://www.reddit.com/r/DigitalPhilosophy/comments/dzghec/openended_natural_selection_of_interacting/

Maybe you could advise some developed language or model for this task? The interesting part is to have code-data duality and enough rich language to kick start natural selection that would produce competing algorithms that would gradually become more and more complex (and gradually become closer to sentience).

Though the language might not even be Truring complete as it is. As natural assumption would be that the model should be finite in resources and it can get access to infinite time or memory only in time limit (assuming that the individual algorithms would survive for this to happen).

> Path to the Fundamental Theory of Physics by Stephen Wolfram (Wolfram Physics Project)

That's an interesting direction of research. Can it actually formaulate QFT in other postulates that are more computer science friendly? If not then how to bridge the enormous gap between simple rules + complex graph dynamics vs. QFT?

Possible workaround is to get a probabilistic model from simulation graph dynamics then run this new model as a simulation. But that would require emergence of "something" to abstact it in the new model. And if we are ever to automate this abstracting the fundamental-basic model and abstracted should share fractal structure (whatever that means).

In my opinion this way would better work with ontology of indeternimistic natural selection process that branches. Like Open-ended natural selection of interacting code-data-dual algorithms as a property analogous to Turing completeness (and more details with a discussion on r/compsci).

So probably Wolfram Physics Project lacks indeterminism.

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