The Semantic Simulation

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Interested in LLMs and the problem of modeling human-like reasoning in general. Interested in modeling semantic inferences based on semantic structures governed by equations of evolution. Let me expound on the latter. I believe that in order to model human-like reasoning we need to pose the problem of extracting semantic meaning and generating semantic inferences in a different way. That is – we define a *semantic simulation* as a process in which appropriately defined laws governing the evolution through time of semantic structures populating the *semantic space* or *simulation space.* Here *semantic space* which is defined as a metric space with *N* dimensions. The chosen metric in that space is *the semantic distance*. Let us assume that this semantic environment accepts textual input which is partitioned into *text quanta*. A *text quantum* represents a portion of the textual information with semantic meaning. Each new set of quanta introduced to the environment will result in creating a new *semantic structure* in the metric space. Think of this structure as a collection of *semantic particles* in this space. This collection of particles evolves using some laws of attraction and conservation of certain quantities defined in that metric space. Each semantic particle has intrinsic properties which characterize it. One intrinsic property to every semantic particle is its *semantic mass*. Another intrinsic property to each semantic particle is its *semantic energy*. In this way introducing new structures (corresponding to new textual input in the environment) in this space will alter the position, the movement and the composition of the existing structures. The distance (the metric) between two structures in that space will correspond to their semantic similarity. The closer semantically are two structures the smaller the distance between their centers. Inference in that space is done by recognizing patterns in the created structures and matching the recognized patterns in creating new structures which positions and motion will influence the existing structures and hence will alter their semantic distances and composition.

I am looking into an implementation of semantic simulation mechanism using reinforcement learning:

Here are my preliminary notes on the semantic simulation process:

https://github.com/dimitarpg13/aiconcepts/blob/master/docs/ModelingAttractiveRepulsiveForcesInSemanticProperties.pdf

https://github.com/dimitarpg13/aiconcepts/blob/master/docs/ReinforcementMechanismInSemanticStructureModels.pdf

https://github.com/dimitarpg13/aiconcepts/blob/master/docs/SemanticTemplates.pdf
https://github.com/dimitarpg13/aiconcepts/blob/master/docs/PracticalExamplesUsingSemanticSimulationWithRL.pdf