

An Evolutionary Nomic Structure for Digital Rule-Making in BITNATION

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Abstract

Digital and analog are not the same with regard to rule enforcement. In digital space everything must be quantified in order to be computable. As a result we must rely on scores, on ratings, on collaborative filtering, on digital representations of sentiment, of opinion, of thought. For this reason we should avoid using words like “law”, and instead should use “rules”. Laws refer to analog legal institutions while rules refer to anything. Quantified self is an example of the power of digitization, it is the most local, but there remains political and ethical challenges with regard to questions like privacy. This paper has been collaboratively written in order to propose a new evolutionary method of rule generation which does not rely on voting, politics, or anything more than feedback loops, stigmergy, Nomic structures, and voluntary collaborative filtering. The best set of rules in the form of smart contracts under this system will rise to the top and become recommended for continued use based on scores generated by these methods.

Intro -

What is the optimal set of rules for a set of participants? How can we determine this optimal set of rules in a way where the quality of future sets of rules implemented is continuously and iteratively improved? Is it possible to use evolutionary strategies such as genetic algorithms, or Darwinian mechanism, to generate rules which increasingly conform to the preferences of participants? Can we leverage distributed big data analytics, AI, and any other future technological innovation to achieve this in a way which does not violate the social consensus?

These questions are some of the questions we hope to answer as we describe a generative rule making engine which automatically can either suggest the best (optimal) improvements to the rules.

An evolving Nomic structure for digital rule making

[Nomic](#) originally refers to a game in which the system of rules is changeable by the players. This allows for the rules to adapt and evolve continuously as the game is played where the initial rules determine the potential evolution of future rules. Nomics can have rules which can be interpreted by computer as highlighted by the game [Nomyx](#)

This Nomic structure is a good model for structuring rule making in digital space. We can have chains of rules, we have self-enforcing smart contracts, we have rules for changing rules. The blockchain provides for us an accounting ledger, a function for tracking of time, a mechanism of shared consensus, or even a collective memory.

Stigmergy and its effects on the rule generation process

To describe, smart contracts can represent a set of rules. In other words a collection of rules can be represented as a smart contract. To provide for better feedback, each smart contract should have a reputation score. By allowing each smart contract to have a reputation, to be rated, to be reviewed, or peer reviewed, then you can improve the quality of each set of rules as fitness is evaluated and the newest rules may be optimized to become the fittest. This fitness function is critical to the optimization process while stigmergy is the indirect swarm coordination mechanism.

Due to the nature of the blockchain it is possible to track everything Alice touches digitally speaking. This digital trail is very similar to the pheromone trail we see in insects and for that reason we can think of this function as the digital or virtual pheromones. In the case of blockchains you have the ability to create public or private lists, to follow any list, or any participant in the network, creating the stigmergic swarm coordination. If a particular set of rules is very good, then as more participants in the swarm discover how good it is, they will follow this set of rules, which will strengthen the digital or virtual pheromone trail, to take this set of rules viral.

Distributed [human based genetic algorithms](#) for evolutionary rule selection

“Genetic algorithms (GA) are search procedures learned from Nature and based on mechanics of natural selection and genetics. In this paper a new kind of GA is presented. It organizes individuals and uses their ability to perform intelligent crossover and selection operators on existing knowledge. Genetic algorithms that use human judgment to evaluate solutions are known as interactive genetic algorithms. There are many implementations of them to generate abstract images and music. Usually, the evolutionary program performs there the role of creator, confining a human to the role of critic. On the other hand, I believe that humans naturally prefer to be creators rather than critics. That was the motivation to devise a Human Based GA, that allows and encourages humans to take part in both roles. It is called human based genetic algorithm (HBGA) since all basic genetic operators are performed with the help of people. The algorithm processes strings of natural language and organizes knowledge flows within a community of individuals for the purpose of collaborative evolutionary problem solving, boosting innovation and creativity inside the community.”

Human based genetic algorithms also described as human evolutionary computation can be utilized to accept human judgment as an input into a process which leverages the strength of human ingenuity, that even can eventually leverage machine intelligence to scale over time. This makes the for a future-proof method of evolving rule sets according to Darwinian principles and as technology permits for AI to generate new rules (interactive genetic algorithms) then human beings could evaluate the latest generated rules. To facilitate this, human beings, smart contracts, and even AI, should all have reputation scores which represent their ability to “innovate”, “select”, and “sequence”, so that every participant is encouraged to produce continuously improving results whether the participant is human, AI or something in between.

Examples of HBGA/HBEC can be seen in the FKE (Free Knowledge Exchange) and StumbleUpon. The Free Knowledge Exchange is a good model because it uses human

computation, to help human beings solve the problems of other human beings, with the element of human selection and human innovation. StumbleUpon utilized a human-based selection strategy to curate web content so that individual participants are more likely to stumble upon content which has been evolutionarily selected to be included in their view list. Over time the most fit content is curated, rises to the top or in this case to the attention of the individual participant.

Stigmergy and universal ratings

In order to make this all work, we require an ability to rate every component in the system through a secure (and pseudo-anonymous) feedback mechanism. Data storage and computation over time will not be a problem and these feedback mechanisms will inform the network over time on how to evolve and where to improve.

General guidelines

1. Every smart contract should have a rating, a set of metrics which are community determined to represent (fitness). This would function as the community standard for quality control.
2. Every participant should have a reputation score whether the participant is an organization, a human, AI, or something in between.
3. Every participant should have followable lists (this enables stigmergy by producing trails). If Bob follows the list of Edmond then Edmond follows the list of Alice, etc.
4. Every participant should be able to rate every component, follow any other participant, follow smart contracts, rate smart contracts, continuously, and in real time.

Which metrics do we choose?

This is an area which needs input and discussion. In coinmarketcap the profitability is the core metric. Decentralization, privacy and other components are not the core metric because it's not easy to quantify these things. So when determining metrics we first have to figure out what we can and can't quantify, and produce a method of quantifying. Everything that our social consensus or social contract considers important must have trackable metrics, scores, ratings, points, and these must be attached valid signatures.

Alice can rate smart contracts and come up with her own top 10 list. Bob who knows Alice has an exceptional reputation for reviewing smart contracts can follow Alice's top 10 list. This enables stigmergy to coordinate the swarm and the amount of signatures behind Alice's top 10 list increases as more participants follow and sign onto her favorites list.

Notes from Slack:

Well, an exclusive Holon would maintain a higher reputation if they exclude or filter out the sort of people who would damage the reputation or credibility of their Holon. Just an idea to consider. Each Holon could have their own scores, but how exactly do you score certain things?

Suppose Alice and Bob are citizens of a private Holon which represents a popular communications platform, and the list of citizens is public, so the reputation of every citizen can be added up to become an aggregated score representing the total quantified prestige of the Holon, but the citizens of the Holon could have other scores as well, such as commitment level as represented by the amount of stake they hold in the tokens of the Holon, and some equivalent of the Q score which represents how much social influence or klout they have as represented by some formula. The amount of score arrangements is incredibly flexible. When Alice and Bob are both blockchain quantified, and it's all public, the Holon itself could discover the value of Alice or Bob in relation to the total reputation score of the Holon, or productivity score, or profitability, all based on this quantification. There is a technology out there called Curiosume which attempts for example to quantify knowledge, and the more scores Alice and Bob contribute, the more the Holon knows them. If Alice is for example holding a huge stake in the Holon then that would be represented by the percentage of the tokens she holds, but there are any number of other tokens which could be created to represent nearly anything, so Bob for example could win a token because he passed a test, in fact he could pass the test without even knowing there was a test just because he did something that some bot concludes is the equivalent to passing the test. It could be donating to something or it could be any action tracked by the blockchain.

So I would say, the liquid holarcracy model looks powerful and there is a lot to consider. A Holon is basically an abstract container which represents any group. A quantified Holon is a Holon which has multiple scores associated with it, including scores of citizens of it. These scores allow for the ability of the participants to curate Holons, and statistical analysis could reveal which Holon between A and B is a success just by looking at the changes in scores. Example being if Alice has very high scores in terms of reputation, commitment, or whatever else, if she chooses Holon B instead of Holon A then observers could figure out this choice from the shift in the score.

There is too much to consider all at one time, but if I look at the Nomic structure I talked about before and how it might fit into this, if you map the Reputation scores to tokens, then you could have platform independence, if Alice holds certain scores, badges, knowledge certificates, as tokens? You would simply scan the public list of citizen scores on the blockchain, and then on any platform they move to, you could sharedrop tokens in the exact same amount based on what they held originally.

So in this way, the tokens make the scores portable and platform independent. And since anyone can create a personal token and send it to anyone they personally like, you already have reputation tokens to a certain extent. So it's just a matter of mapping it. and having people import their private key.

Twitter bots could reward people with personal tokens for retweeting on certain political subjects for example. Then this could pass some test to get them beyond a certain threshold of

percentage ownership of an access token to invite them into an exclusive Holon. I hope that pulls everything I said together.

xsttiii [2:18 PM] That means people can literally buy reputation through purchasing tokens. I'm not sure that's a good thing?

I see what you mean though, in the sense that every holon can issue its own token so it has less value as "money" and more value as a kind of appreciation badge system, indeed

[2:20]

Some links to consider:

<https://github.com/slockit/smart-contract/blob/master/DAO.sol>

<https://github.com/citizencode/self-organization-constitution/blob/master/CONSTITUTION.md>

<https://github.com/holacracyone/Holacracy-Constitution>