Why General Collective Intelligence Must Be the Future of the Blockchain

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Abstract

General Collective Intelligence or GCI is predicted to radically increase the speed and scale at which blockchain technology can be designed, developed, and deployed as well as being predicted to radically increase demand for those new blockchain based products and services where they don't involve consumption of limited physical resources. Therefore, if a GCI can be implemented, it is predicted that GCI based platforms will quickly come to dominate the blockchain marketplace and that GCI is the future of the blockchain. But it also must be the case that GCI is the future of the blockchain because without it, through an effect called the "technology gravity well" blockchain and other technologies have the possibility of introducing an unprecedented degree of centralization, control, and abuse.

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1 Functional State Space

Unlike ontologies, state spaces have the potential to represent any possible states of a system and any possible process (behavior) that might be used to transition between those states, in the same way that three dimensional Euclidean space has the potential to represent any possible positions of a system and the motions that might be used to transition between those positions. Functional state space differ from other state spaces in that a functional state space is spanned by some minimal set of functions so that all functional states can be expressed as some composition of that minimal set [3]. Any ontology describing the behavior of a system can potentially be viewed as a subset of some functional state space, where that subset is chosen by some centralized actor. Ontologies unlike functional state spaces are then inherent sources of centralization.

2 Functional State Space and Exponentially Increasing General Problem-Solving Ability

All systems can have their behaviors (functions and processes) described in terms of functional state spaces. For any system described in terms of a functional state space, problems in understanding the system are represented as the lack of a process capable of transitioning the system from one state to another state. General problem-solving ability is represented as the volume of functional state space that can be navigated per unit time, multiplied by the density of functional states that must be navigated. Any system, including blockchain

platforms, whose behaviors are expressed in terms of functional state spaces, can achieve an exponential increase in ability to solve problems through the same pattern of solution in functional state space [4]. This pattern of solution is General Collective Intelligence [2].

3 General Collective Intelligence (GCI)

A General Collective Intelligence or GCI is a hypothetical platform able to orchestrate groups of individuals or intelligent agents in collectively executing any possible reasoning, and able to organize any possible cooperation that might increase the complexity of the collective reasoning groups are able to execute, where that cooperation might also increase the speed and scale at which that reasoning might be executed. GCI defines a universal representation of concepts and reasoning that can be shared between all participants in collective reasoning. This "functional state space" of the collective cognition (called the "collective conceptual space") is hypothesized to have the ability to represent all possible reasoning processes, and therefore all possible behaviors of this collective cognition. GCI also defines a cooperation state space capable of representing all possible cooperation processes through which the outcomes of that reasoning might be scaled. A GCI then has the potential to orchestrate the execution of any possible collective reasoning and to do so through any possible process of cooperation.

4 Applying Functional State Space and GCI to the Blockchain

All software can potentially be represented in terms of a hierarchy of functional state spaces, including identity management, data management, the blockchain functional state space, and other functional state spaces. If so then blockchain platforms can be represented by a set of paths through blockchain state space. By decoupling blockchain platforms into a library of functional components that are each represented by a path segment through blockchain functional state space, then a GCI might exponentially increase ability to solve any problem in that domain through assembling those path segments in order to navigate from any initial functional state to any target functional state. Since a GCI can potentially orchestrate cooperation between what might be billions of individuals, or even billions of intelligent agents working on behalf of each individual, this self-assembly and adaptation of software might take place dynamically and at orders of magnitude greater speed and scale than humans could possibly achieve, radically increasing the speed and scale at which blockchain technology can be developed, along with radically increasing the capacity of developers to solve any blockchain problem, including increasing blockchain interoperability, or cryptocurrency deployment while simultaneously increasing speed, scale, and security [1].

5 The Technology Gravity Well

GCI is a general system of decentralized decision-making that can be applied to any process along the entire life-cycle of blockchain platforms from research and development to administration. Without it, some blockchain platform related processes (usually design and administration) tend to be centralized. Any technology that mediates interactions within a group is centralized where it constrains decision-making to be aligned with the interests of some subset of that group. Due to an effect called "the technology gravity well" [5] in the absence of a general system for decentralization like GCI there is predicted to be an irreversible free fall towards centralization with the advance of technology. In the case of

blockchain and other technologies for which decentralization is the main selling point, this centralization might be invisible because it's natural to assume centralization isn't there, because that centralization is too complex for most to see, and because this centralization happens faster than it can reliably be detected and removed. This technology gravity well has dire societal implications, namely centralization to the point that there can be no possibility of social protection against even the worst transgressions. GCI is the only known mechanism through which it is predicted to be possible to escape this technology gravity well.

6 Larger Societal Importance

In this paper it has been hypothesized that all systems and all properties of systems can be understood in terms of functional state spaces. If so then defining a blockchain functional state space to represent all possible functions of platforms within the blockchain domain might make it possible to define expressions for properties like complexity that apply to whatever objects represent the functional states of that blockchain domain. In the same way, defining a functional state space (the conceptual space) to represent all possible functions of the cognitive system might make it possible to define expressions for properties like "importance" that apply to concepts as the functional states of that domain. Speaking about the property of importance specifically, it is hypothesized that the importance of a tool can potentially be understood in terms of the volume of conceptual space it allows to be navigated. If so, then in exponentially increasing the navigable volume of conceptual space, where simple geometrical arguments in conceptual space suggest this exponential increase has never been possible before, GCI might be the most important innovation in the history of human civilization and one that might radically increase our capacity to solve every collective challenge from poverty to climate change [1]. However, due to a great many factors coming together, no one yet knows about GCI and fewer still understand it. It is hoped this short introduction might encourage more researchers to take up the challenge of validating that GCI can be applied to the blockchain, and to generalize their example so it can be used to validate whether GCI can be applied to solve other problems in other functional state spaces like the conceptual space, such as accelerating progress towards the sustainable development goals.

References

1 Andy E Williams. Cognitive computing and its relationship to computing methods and advanced computing from a human-centric functional modeling perspective. In *SCRS Conference Proceedings on Intelligent Systems, SCRS, New Delhi, India*, pages 16–33, 2021.

2 Andy E Williams. Defining a continuum from individual, to swarm, to collective intelligence, and to general collective intelligence. *International Journal of Collaborative Intelligence*, 2(3):205–209, 2021.

3 Andy E Williams. Human-centric functional modeling and the unification of systems thinking approaches: A short communication. *Journal of Systems Thinking*, 2021.

4 Andy E Williams. Automating the process of generalization, March 2022. `doi:10.31730/osf.io/fb4us`.

5 Andy E Williams. Breaking through the barriers between centralized collective intelligence and decentralized general collective intelligence to achieve transformative social impact. *International Journal of Society Systems Science*, 2022.