PHOTREK

Diversify Voting Influence

Cardano Catalyst Report 4-2, August 27, 2021

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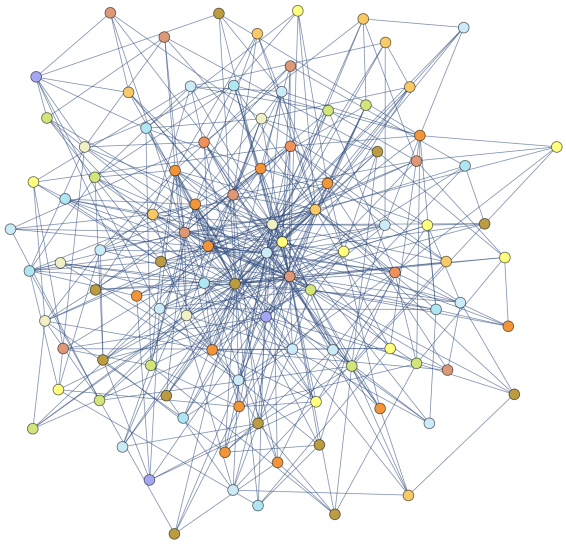
Executive Summary



Andre Vilela has completed a detailed review of the quadratic voting system which is closely related to the Penrose square-root voting. Our plan for September's analysis is to compare quadratic and square-root voting and their generalizations to other powers.

Vilela and Nelson met with the IOG Voltaire team (Kriss Baird, Daniel Ribar, Mikhail Zabaluev) to discuss the Cardano Catalyst data requests. The discussion focused on balancing the interests of privacy and transparency. IOG is developing an Explorer application for users to be able to monitor voting. Presently, there is a CLI API for accessing the voting data on the Jormungandr network. Following the call, Photrek provided a detailed data request, ranging from all the available data to a limited set of cohort bins by log-scale wealth and just the top two challenges (Developers Ecosystem and Dapps & Integration). A suggestion was proposed that a Fund 7 Challenge topic be submitted regarding Prototyping the Diversified Voting on a isolated voting requirement.

Accomplishments

1) Literature review emphasized the importance of quadratic voting. Key references are:
    a) Eric A. Posner and E. Glen Weyl. "Quadratic Voting as Efficient Corporate Governance", Coase-Sandor Working Paper Series in Law and Economics, University of Chicago Law School Chicago Unbound, 2013.
    b) Steven P. Lalley and Glen Weyl. "Quadratic Voting: How Mechanism Design Can Radicalize Democracy", Aea Papers and Proceedings, Vol. 108, 2018.
    c) Eric Posner and E. Glen Weyl. "Quadratic Voting and the Public Good: Introduction", 172 Public Choice 1, 2017.
2) Meeting with IOG Voltaire team helped to clarify the availability of Catalyst voting data. A data requirement list was provided and a follow up meeting with M. Zabaluev is schedule for Aug 31st.
3) Summary of the Quadratic Voting System has been written (see appendix of report). In short, the system defines a difference between how votes are accumulated towards the vote tally (Gain) and how votes are decremented from a voters influence (Cost). While the gain increases linearly, the cost increases quadratically. This difference incentivizes a voter to optimize his/her Liquidity (Liquidity = Gain - Cost). Multiplying constants on the Gain and Cost enable modeling of the relative interest a voter has regarding a particular project. In addition to the change of weighting, the quadratic voting system requires that voters decided how much of their voting influence to apply to each choice.
4) Decided on the following methods for the September analysis:
    a) Current Catalyst Voting System: One coin - One vote
    b) Penrose Square Root Voting
    c) Quadratic Voting with influence budget per Challenge Category
    d) Generalized powers for the square root and quadratic voting

Open Issues

- Clarification of when Cardano Catalyst voting data will be available.
- Seeking to determine the best vehicle to engage effectively with the Cardano community. Currently utilizing Discord, Github repository, and Catalyst Swarm participation.

Plans

- August 30th - Sept 10th
    - Open meeting to review first months accomplishments with the Cardano Community
    - Initiate the analysis of the quadratic, square-root voting methods and their generalizations to other powers
- For September 2021 focus will be on completing analysis of voting strategies
- For October 2021 focus will be on proposing more extensive simulation plans and completing a recommendation for weighting of votes

Appendix

Diversify Voting Influence Research Notes as of August 27, 2021:

https://github.com/Photrek/Cardano-Catalyst/blob/main/Diversify%20Voting%20Influence/DVI%20Research%20Notes%2027Aug2021.pdf