Playing with Non-Fungible Governance

May 23, 2020

Wade Kimbrough, Alex Fisher, Kevin Vitale

Overview

This is a non-technical concept note for a crypto-economic primitive called Non-Fungible Governance. In traditional forms of Quadratic Voting and Liberal Radicalism users aggregate the degree of their preference by using money (i.e. buying votes or donating to a project). Non-Fungible Governance proposes a new way of aggregating preferences by capturing the Effort an individual gives to a community (e.g. voting, contributing to open source software, volunteering). Allowing communities to set the standard of what is considered Effort can greatly reduce the opportunity for Sybil Attacks. Finally, to sandbox and test Non-Fungible Governance in a low risk setting we propose using a game.

The Problem

Quadratic Voting (QV) and Liberal Radicalism (i.e. Quadratic Funding) have two major vulnerabilities; Fraud and Collusion. Below is the definition of Fraud and Collusion put forth by Buterin, Hitzig, & Weyl:

1. Fraud - “Takes place when a single citizen misrepresents herself as many.”[1] E.g. Sybil Attack.
2. Collusion - “Takes place when multiple agents act in their mutual interest to the detriment of other participants.”[2]

There are many proposed solutions to these vulnerabilities. However, these solutions come at the cost of anonymity. For example, Gitcoin Grants which utilizes Quadratic Funding (QF) mitigates sybil attacks by tying a funders identity to their Github.

We are using this Hackathon to explore a new solution that may allow for users to remain anonymous while at the same time mitigating Fraud, specifically sybil attacks.

The Solution - Non-Fungible Governance

There are two main ways in which people give to public goods like open source software; donations and volunteering.

---

[1] Page 15. Buterin, Vitalik, Zoe Hitzig, and E. Glen Weyl. "Liberal radicalism: a flexible design for philanthropic matching funds." *Available at SSRN 3243656* (2018).
[2] Ibid.

Here are our definitions for each:

1. Donations - Giving money.
2. Volunteering - Giving effort.

Donations are efficient and under a scheme like QF they are near optimal. Money can be used by an organization for the public good in a way that significantly reduces waste.

Volunteerism generates value differently. Something tangible is done for the public good and the volunteer is engaged in a task that is meaningful to them. It is this engagement that builds communities. We call this value derived from volunteering Effort, and it is the key to Non-fungible Governance.

When we look at QV or QF, all current instances aggregate preference through money. Users buy votes or give donations. What if instead we could capture a user's Effort in a non-fungible token (NFT) and use that as the measure to aggregate preferences.

Let's create a hypothetical about how Non-Fungible Governance could either replace QF or somehow augment it for Gitcoin Grants:

1. To capture Effort, let's create a system of NFTs.[3] All community members that want to participate in QV or QF must buy an NFT. The capital from that NFT goes into a pool where it generates interest on DeFi.
    a. The interest and capital in the pool can be distributed in any way the community sees fit (e.g. funding public goods).
2. These NFTs can level up by doing things for the community. This is very similar to gaining experience points in games. The parameters for gaining points to level-up are set by the community. For example, taking on bounties, voting, or participating in a hackathon all might give a different amount of experience points.
3. When it comes time to aggregate preferences QV happens as follows:
    a. 1 NFT (no matter the level) = 1 Vote, OR
    b. Burning the NFT gives votes = the level squared. For example, a level 10 NFT could be burned for 100 votes.
        i. When burned the capital and interest that the NFT represents is distributed based on rules created by the community.[4]

Non-fungible Governance would significantly increase the cost of a sybil attack. There would be no difference between buying many NFTs in one account or across many. A participant that tries to steal the vote by buying hundreds or thousands of NFTs would be contributing to the community pool at a much higher rate than other members. In essence doing this would be similar to how payments for votes are redistributed to voters on a pro rata basis in traditional

[3] This is not far fetched as Gitcoin already uses NFTs called Kudos.
[4] In our test of non-fungible governance we are creating a no-loss system where the NFT returns its initial cost to its current owner (see **Our Implementation** - **Suicide Kings**).

QV.[5] Depending on what a community designates as Effort, it may also be impossible for an attacker to level-up multiple NFTs. Designating the actions and amount of work that dictate Effort allows a community to signify an individual without identifying that individual.

Our Implementation - Suicide Kings

Suicide Kings is a “no-loss” game (e.g. PoolTogether) that uses Non-Fungible Governance in a fun and engaging way. Players have the goal of getting as much interest from the community pool as possible. They win interest by voting on how it is distributed (e.g. I vote on distributing it to my NFT types). They can level-up their NFTs by voting on which NFTs to give experience points. Voting is done in rounds over a discrete time period (e.g. every 12 hours) and interest / XP accumulate for the NFTs throughout the life of the game. Burning an NFT gives the player votes of the NFT’s level squared, hence the name Suicide Kings.

While we are primarily concerned with proving that Non-Fungible Governance reduces fraud in anonymous QV, we are also very interested in collusion. Colluding with other players may in fact be one of the dominant strategies in the game. Since Suicide Kings is a “no-loss” game, players can lose safely without needing to make the system collusion-safe. We’ve taken no steps to reduce collusion and on the contrary we want to encourage it. Playing with collusion may be the best way to say something meaningful about it. We are particularly interested to see how individuals within the game understand their own actions. Is there a distinction between a group colluding vs. a group forming a “guild” or “band” of players to better aggregate their preferences?

There are two caveats with our game. First, the Effort for gaining XP is very easy for the players to accomplish. It may be so easy that players will find very simple ways to cheat our system (e.g. bots). In the game players only need to vote to be awarded XP points to level up their NFTs. In a real world setting, communities will need to better define what Effort is required. Second, we have made it easy for one player to level-up many NFTs quickly. This may also be problematic in the real world. Again, these design choices were made to make the game more fun and engaging.

Conclusion

Suicide Kings is applied research into Non-Fungible Governance. So far we have run basic playtests with groups of 3 to 4 players and we have run games where 3 players band together to play hundreds of bots. Based on our several tests and iterations of the game, we believe there is promise for Non-Fungible Governance to reduce the opportunity for Sybil Attack.

---

[5] Posner, Eric A., and E. Glen Weyl. "Voting squared: Quadratic voting in democratic politics." *Vand. L. Rev.* 68 (2015): 441.

Non-Fungible Governance is also showing promise for saying something meaningful about collusion and how to create matching funds for public goods (i.e. The Henry George Theorem[6]).

There is also a distinction to be made between “games” that are used by economists as experiments and Serious Games that create some sort of real world impact. This project falls into both categories. Even if our experiment proves our theory wrong, we believe Suicide Kings can create impact on how new ideas are launched and tested on Ethereum. Games and play can test crypto-economic primitives in safe, “no-loss” ways.

[6] The primary example of this is property tax to fund schools. For the theory to work, the value generated (better schools) must exceed the cost (property tax). Blockchain communities have an interesting dilemma because several questions come up. What’s a fair property to tax? Does this tax affect the economy of the community negatively (e.g. reduce its growth or network effect)? Etc.