

Shivarthu: A new blockchain based, decentralized fair democracy inspired by Delegated Proof of Stake algorithm

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Abstract

Democracy is about fair and equal treatment of everyone in a country. But it becomes unrealistic to achieve when political parties have their conflict of interest, and leaders don't have the expertise to make evidence-based policies and neither have the skill and manpower for solving problems that surround our society and ecosystem. The new fair democracy provides an elegant way of governance that separates the representative responsibility according to their specialization and can grow into any complexity. The governance is divided into various departments, and each department is supervised by representatives with expertise in the field. Voters are rational and need to have enough knowledge about the departments and the department problems, in order to vote for the selecting representatives of a department. The selection process of representatives is "difficult in and easy out", which allows only utilitarian actors to hold the responsibility, weeding out frivolous ones.

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Introduction

The current governance model in countries suffers for many basic challenges like poverty, low literacy and graduation rates, gender and wealth inequality, climate change, biodiversity loss, pollution, religious conflict, poor infrastructure to name a few. But governments are inept to solve these issues due to corruption and political incorrectness and usually, their own political agenda takes precedence over important challenges. The Pareto principle (also known as the 80/20 rule) states that, for many events, roughly 80% of the effects come from 20% of the causes. 20% of the causes that decides the functioning of the world, can be none other than governance and education system.

The achievable features of the new democracy

- 1) Fair (treating people equally without favoritism or discrimination) and equal opportunity to succeed for each and everyone.
- 2) *Decentralized Democracy*: No authoritarian regime or no anarchical regime (leaderlessness or ignorant leaders lacking knowledge or good judgment) and no concentration of power, because the ability to approve policy is limited only to the concerned department who have the required expertise to make a decision.
- 3) *Evidence-based democracy*: Only evidence-based policies are allowed, and representatives need to be experts in the field and each statement they make in the policy has to be backed by evidence and sound reasoning.
- 4) *No catch22 paradox*, that is people have true freedom to select their nominee for the election, and is not decided by political parties, voters have a very large pool of nominee out

of which representatives can be selected and also people have true freedom to remove their representatives easily without the involvement of vested interest or party politics.

A catch-22 is a paradoxical situation from which an individual cannot escape because of contradictory rules or limitations.

5) *Collaborative democracy*: Collaborative problem solving, not by competition. As all representatives have almost an equal chance of getting removed if they behave frivolously (not having any serious purpose or value), they have to collaborate in order to solve a problem, not compete for each other.

7) *Infinitely Stable Democracy*: Infinitely stable government, voting will continue in short intervals like 6 months, but the government will remain stable infinitely.

8) *No nepotism* (the practice among those with power or influence of favoring relatives or friends, especially by giving them jobs), frivolous one just can't stay.

9) *No conflict of interest democracy*: No in-group or out-group bias, representatives can take their individual stand, without considering the profit and loss of their alliance and opponent. Democracy design where conflict of interest is not plausible. Not a don't be evil design, but a can't be evil design.

As there are no opponent parties with their self-interested goals, and representatives are experts in their respective fields, consensus to reach a decision will be more objective (not influenced by personal feelings or opinions; considering only facts) and justifiable.

10) *Evolutionary democracy* that gets adapted and refined with an increase in efficiency and productivity of representatives with each election every 6 months, as bad candidates are removed by voters.

11) *Blockchain democracy* without any middleman such as politicians (MPs, MLAs, PM, CM) and bureaucrats, who delay the implementation. People will transact directly with their service provider departments.

12) *Mega participation democracy* with a massive number of expert representatives per department, who can implement policies collaboratively within a limited extent of time as it makes a decent ratio between population versus a department. Representatives will also assign tasks to voters, common citizens, and students to quickly get the job done by volunteering.

13) *Mobile and global democracy* where boundaries between countries become obscure with time, the expertise of representatives matter, not the origin.

14) *Inclusive democracy*: People are not discriminated because of origin, color, gender, sexual orientation, type of job, culture, age, legacy, ethnicity, generation, genetic characteristics and disability.

Use Case

A narrative describing a scenario about Shivarthu:

Meet Ajay. He is an engineer. After spending years of education in India, he doesn't have a job. Later he found out that the courses he learned in colleges are not useful that can create job opportunities for him. He always had a big dream and wanted to do something for the country. He was sad that he is not alone, most of his friends are either jobless or work for as little as ₹8000 per month even after working night shifts, the money is not even sufficient for paying the utility bills in a different state. He was defeated by the governance model of the country. A model where any uneducated person or a person without the capacity and wisdom to handle the complexity of our society can join politics and work for their vested interest. He was disappointed with the corruption in the country. Poverty and slums in the country made him feel pained. He has no escape except accepting his misery. Then, he thought something must be done to this country, so he joined Shivarthu Democracy. Shivarthu is a global democracy that has completely different governance models in comparison to the governance of other countries.

The governance model is divided into utility departments, where only experts and scientists become representatives. Each district, state, and country has its own department. The voters who select the representatives for a department are also rational and have some expertise in their respective departments. The voting methods too are different, and the whole process was designed in such a manner that frivolous representatives just can't stay. All policies and

tasks they design must be based on strong scientific evidence and feedback from the community.

The work they do is funded through quadratic voting, which takes care preference of all strata of the society.

All expert representatives of different countries and departments work through collective intelligence by collaboration, sharing each other's ideas and giving feedback and criticism to each other.

Scientists know their job, so they always make the best possible decisions for their citizens.

All the process is done using blockchain with no central authority. It means Shivarthu is not owned or controlled by any individual but by the people.

Initially, Ajay joined as a volunteer to help the scientists. Soon he gained experience through rigorous learning about the associated department problems through scientific literature and with practical work he was doing in Shivarthu. After two years he was ready to make his own portfolio and plan and go for the election in Shivarthu. And finally, he became one of the thousands of representatives in a department in his home town by winning the election. He became the change instead of expecting politicians to change the system.

Slowly, Shivarthu gained momentum, lots of people who can be funders, voters or scientists started participating. The problems like poverty, unemployment, climate change, wealth inequality started shrinking at an accelerated rate.

The Voting Process

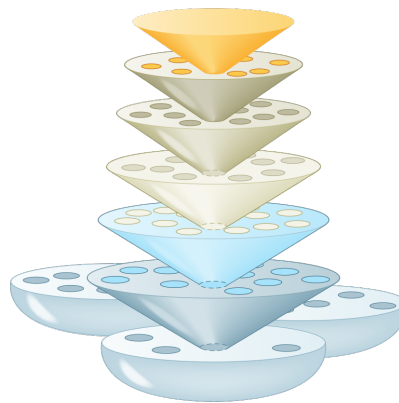


Figure: The Tree of Democracy: Each funnel is a department with its subdepartments

Its an evolutionary democracy using hierarchical specialization inspired by delegated proof of stake algorithm that uses approval voting, where different specialized departments are in a symbiotic or mutually beneficial relationship.

For example, the education department can have its sub-departments such as kid education, adult education, research, entrepreneurship.

Each department consists of **large outer** representatives and a **few inner** representatives.

These large outer representatives are the grand total of all its sub-department outer representatives and the few inner representatives are the grand totals of all its sub-department inner representatives.

Inner representatives of center and state are policy approver, and inner representatives of all the regions (center, state, district, and small administrative regions) are task assigner to outer representatives of their regions for implementation of policies.

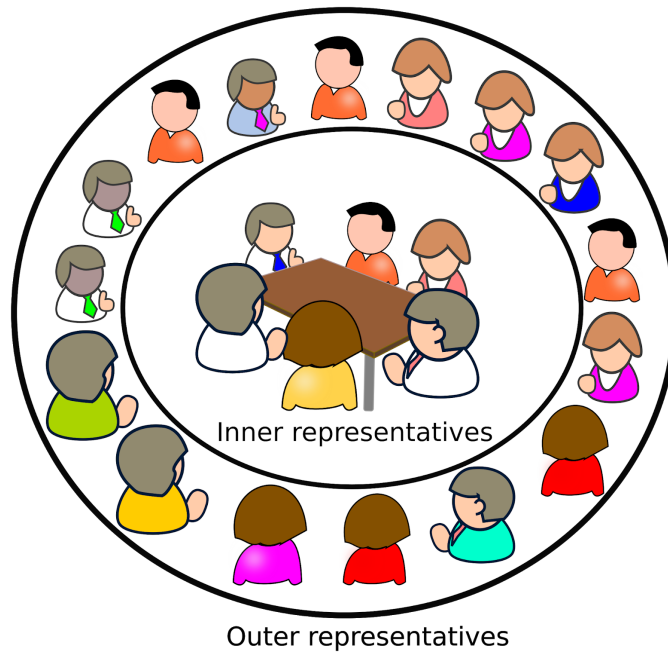


Figure: A Department with inner and outer representatives

Representatives are leaders who collect evidence, data, and feedback, design policy on evidence, test and improve it or implement it through collaboration, without conflict of interest.

The policy can be approved by inner representatives of the concerned departments only after addressing the conflict of interest with other departments.

International democracy, where the origin of representatives is irrelevant, what matters is the availability of representative in the concerned region, or willingness to work remotely for the region and expertise to implement policies and solving the problems of departments. But the location of voters do matter, a voter can only vote for their concerned regions.

Evolutionary democracy, where the tree of democracy or departments can grow into any complexity, can include any number of representatives with the scalable voting system, and can include all possible or required departments, and can adapt and refine with time through new evidence.

The whole process of voting

Which voting method will be used?

The voting method is a way to express your decision about which candidates will win the election. But humans are not completely rational and not necessarily make decisions based on the utility of the candidates. An incorrect voting method can blur the decision-making process of voters whereas a good voting method can absorb some shocks due to irrational, self-centered or uninformed voters. Even if all voters are rational, they can't get the candidates of their preferences due to a poor voting method.

We shall evaluate 7 voting methods with their common benefits and limitations in the governance system. The 7 voting methods are Plurality, Instant Runoff, Condorcet, Borda, Approval, Score, and Quadratic voting.

Plurality Voting:

It's a single choice voting in which each voter is allowed to vote for only one candidate and the candidate who gets the most votes is elected. Plurality voting performs worst when

compared with all voting methods in the list.

Disadvantages include:

1) Tactical Voting:

Voters are under pressure to select only one candidate, many times voters support a candidate more strongly than their sincere preference to prevent an undesirable outcome. For example, a voter will vote for a more popular and less desirable candidate, rather than their most desirable candidate as the voter can think the most desirable candidate is not popular enough to win, and voting the desirable candidate will decrease the votes of the less desirable candidate.

Other examples include, in the case of local community voting, voters prefer winning party candidates of the state rather than a desirable or utilitarian candidate, as the winning state party in power is unlikely to support the work of a local candidate of a different party.

2) Popularity and Noise rather than Utility:

As voters have to select a single candidate from just a very few candidates, popularity and noise play a great role in the decision making of people. Candidates try to vilify and use abusive insults against counterparties to gain votes. Candidates use funds in social media, to attack or spread fake and biased news to defame their opponents.

Substantial power to increase the popularity of candidates remains with news media. So, candidates and their party lobby news media to spread propaganda against opponents or biased self-praising news to enhance their reputation.

3) Spoiler effect:

As you can select only one candidate in plurality, vote splitting occurs between candidates who often have similar ideologies. Due to the vote-splitting, the chance of winning any of the candidates with similar ideologies decreases.

For example, Candidate A has 49% votes, Candidate B has 43% votes, and Candidate C with 8% votes. Both Candidate B and C have similar ideologies. Here, candidate A is the winner. But if Candidate C had not participated in the election, Candidate B would have scored 51% votes and become the winner.

4) Unfair for most:

Usually, in plurality voting, just difference in a few votes can make a candidate lose or win. So, most people can't get their candidate of preference.

For example, if 6 members stand in an election and 1 member gets 50% votes and the rest get 10% each. The member with 50% votes wins and forms the govt. In other terms, 50% of people choose him while the other 50% didn't. Is it ok to choose him where half of the population didn't support him? What about when the rest 5 members make an alliance and want to form the government?

Ranked Voting:

Instead of indicating support for only one candidate, voters in the ranked voting system can rank the candidates in order of preference.

The three voting methods Instant Runoff, Condorcet and Borda are ranked voting systems. As voters have to rank their preferences, it suffers from all kinds of strategic or tactical voting issues along with problems mentioned in Arrow's impossibility theorem. Candidates in the election have their advantages and disadvantages. In this complex world, problems and solutions are multifaceted. Voters have more than one priority and need, but with ranked voting, voters are forced to rank their priorities and the popular candidate which manages to market themselves only for a few important ideas wins sacrificing other important plans and ideas.

Rank any number of options
in your order of preference.

| | |
|-------------------------------------|-------------|
| <input type="checkbox"/> | Candidate 1 |
| <input checked="" type="checkbox"/> | Candidate 2 |
| <input checked="" type="checkbox"/> | Candidate 3 |
| <input type="checkbox"/> | Candidate 4 |
| <input checked="" type="checkbox"/> | Candidate 5 |

Figure: Ranked voting optional preferential ballot paper

Approval Voting:

In approval voting, a voter may select or approve any number of candidates. The winners are the most-approved candidate. In the case of a single winner, the highest approved candidate is elected. Though approval voting is not immune to strategic or tactical voting but performs better than any ranked voting. It can prevent minor-party candidates from being spoilers and reduce negative campaigning. Strategic voting is further reduced when there are multiple winners. Approval voting chooses centrist and utilitarian candidates with broad appeal rather than polarizing candidates who appeal only to the majority.

Vote for any number
of options.

| | |
|-------------------------------------|-------------|
| <input type="checkbox"/> | Candidate 1 |
| <input checked="" type="checkbox"/> | Candidate 2 |
| <input checked="" type="checkbox"/> | Candidate 3 |
| <input type="checkbox"/> | Candidate 4 |
| <input checked="" type="checkbox"/> | Candidate 5 |

Figure: Approval voting ballot paper

Score Voting:

Score voting or range voting is an optimization of approval voting, where voters give each candidate a score and candidates with the highest total score are elected. The voting system can further reduce strategic voting and the polarizing negative campaign as voters can select more than one candidate and also score them.

Scoring can reduce information loss, and voters can give their intensity of preferences. Even though it reduces strategic voting (i.e. to not select their sincere preference to prevent an undesirable outcome), but score voting is more vulnerable to fraudulent voters.

Take an example of vote-buying in an election. An election has 2000 voters. 50% of voters are bribed and made an agreement to vote a candidate A instead of Candidate B with monetary incentives provided. 50% of the honest voter, each one them has voted 3 scores to candidate A whereas 4 score points to candidate B and other 50% of dishonest voters voted 5 scores to Candidate A and 1 score to candidate B. As they are dishonest, they will vote to extremes to get best results, even they can simply not vote to candidate B, in other words, give zero scores.

Total votes:

Candidate A = 3×1000 (honest voters) + 5×1000 (dishonest voters) = 8000 score points

Candidate B = 4×1000 (honest voters) + 1×1000 (dishonest voters) = 5000 score points

You can see, Candidate A becomes 3000 score points ahead of candidate B due to fraudulent voters.

In case of approval voting, there must be at least 51% attack of fraudulent voters to succeed, but in score voting, it can be less than 51%.

In approval voting (its a score voting with 0 or 1 as allowed score):

Candidate A = 0×1000 (honest voters) + 1×1000 (dishonest voters) = 1000

Candidate B = 1×1000 (honest voters) + 0×1000 (dishonest voters) = 1000

So, in approval voting, it becomes a tie.

Further, scoring not necessarily reduce information loss but brings more ambiguity. The utility of a person or manifesto of the person is subjective and hard to measure. It's not like measuring rice or oil in Kgs and Liters. e.g. people will score arbitrarily between 9 and 10, as they can't quantify the difference in terms of the person utility.

Score the manifesto of each candidate
0 is worst, 9 is best

Candidate 1 (0)(1)(2)(3)(4)(5)(6)(7)(8)(9)
 Candidate 2 (0)(1)(2)(3)(4)(5)(6)(7)(8)(9)
 Candidate 3 (0)(1)(2)(3)(4)(5)(6)(7)(8)(9)
 Candidate 4 (0)(1)(2)(3)(4)(5)(6)(7)(8)(9)
 Candidate 5 (0)(1)(2)(3)(4)(5)(6)(7)(8)(9)

Figure: Score voting ballot paper

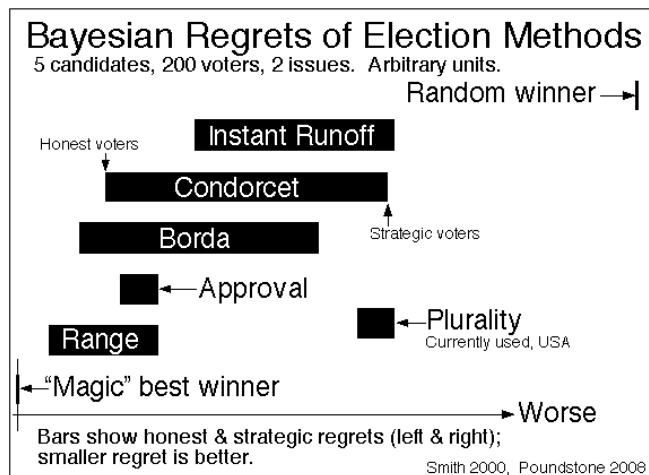


Figure: Bayesian Regrets of Election Methods. Bayesian regret of an election is the "expected avoidable human unhappiness". Score or range voting has least Bayesian regret. <https://rangevoting.org>

Quadratic Voting:

The simplified formula of quadratic voting function is:

$$\text{cost to the voter} = (\text{number of votes})^2$$

Quadratic Voting (QV) is a collective decision-making process where people purchase votes directly proportional to the strength of their preferences.

In one person one vote, even if you think an issue is important, you can't give additional votes to express your strong preference or you can't do additional funding for the issue. In case of paid voting, if all votes cost the same, issues that are in the interest of over-privileged are well funded ignoring issues of underprivileged.

With quadratic voting, users can pay for additional votes to express their preference for a given matter more strongly with protection to the preference of lower-income voters. As there is quadratic growth in the cost of buying votes, one has to spend too much on buying more and more votes. This discourages the over-privileged to hijack the preference through vote-buying.

Quadratic voting can also be scored, for example, each vote can have a score -0.02 or +1. This allows giving a negating preference for an issue. 50 votes containing -0.02 score will cancel out a +1 score.

Negative scores in QV can help to provide your negative preference for a project so that scammy projects don't cut the fund. But it can give unexpected results as they can prevent the appearance of other's preferences. So, negative voting should be less intense than positive scores.

Multiple values of the score like +1, +2 and +3 will take away the properties of quadratic voting. For example, two votes with score +2 will give preference of +4, whereas two votes with score +3 will give preference of +6. It means +4 and +6 will cost the same, instead of its square value.

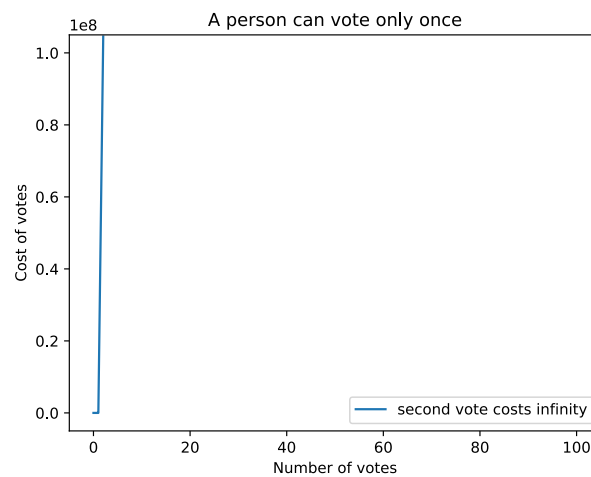


Figure: In case of one person one vote, second vote costs infinity

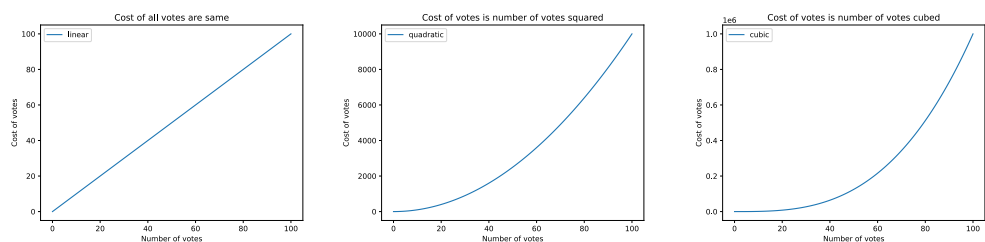


Figure: Cost of voting a) All votes cost same b) Quadratic voting c) Cubic voting

An example:

Two projects are submitted. Project A has the utility of 1 whereas Project B has more pragmatic with utility score 10. There are two types of voters in this example, poor and rich. 10 poor voters are holding \$1000 each and 2 rich voters are holding \$10,000. So, a total of 12 voters are present. The 2 rich voters have vested interest in project A even though it has less utility for the public.

In the case of all votes cost the same, Project B will get 10,000 votes ($\$1000 * 10$ poor voters) whereas Project A will get 20,000 votes ($\$10,000 * 2$ rich voters). As a result Project A will get double funding then that of Project B even if it has less utility. So, just two rich voters can hack the preference.

In the case of Quadratic Voting, Project B will get 316 votes ($\sqrt{1000} * 10$ poor voters) whereas Project A will get 200 votes ($\sqrt{10000} * 2$ rich voters). So, quadratic voting is resistant to hijack by rich and the preference for common good wins.

The unique property of quadratic voting is the cost of the next vote increases linearly with the number of votes. The cost of the next vote can be analogous to the degree of preference.

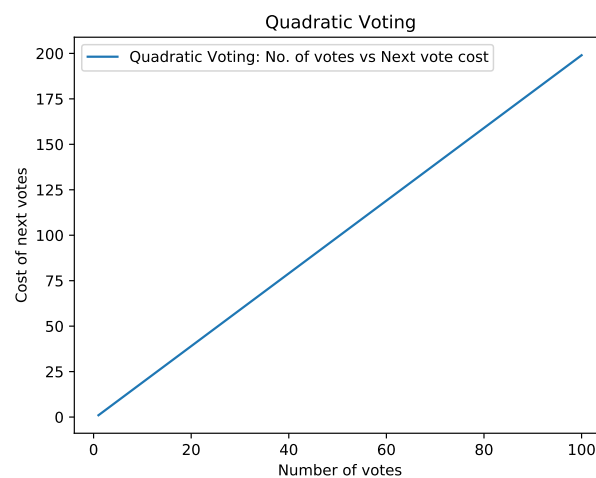


Figure: Cost of the next vote increases linearly with number of votes in case of quadratic voting

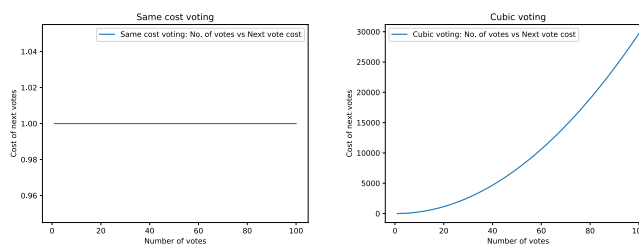


Figure: Cost of the next vote a) All votes cost same b) Cubic voting

How voters can be informed about the contribution of their representatives, in order to vote? How to hold the representatives accountable?

We'll consider accountability through the lens of five core principles: responsibility, explainability, accuracy, auditability, and fairness.

Responsibility is not about legal responsibility but, rather, a focus on avenues for redress, public dialogue, and internal authority for change. This could be as straightforward as giving someone the internal power and resources to change the system.

In a country, there are various departments or branches such as education (with sub-branches such as kid education, adult education, research, and entrepreneurship), transportation (with sub-branches such as railways, road transport), health, environment (with sub-branches such as air pollution, water pollution, water supply, cleanliness, drainage system), energy (with sub-branches such as solar, wind, bioenergy, nuclear, petroleum), social justice (with sub-branches crime, family planning, human rights, philosophy), economics, agriculture, industry (with sub-branches such as manufacturing, mining, housing), biodiversity (with sub-branches such as forest, wildlife, domestic animals, aquatic life, afforestation), Entertainment (with sub-branches sports, television, movies), Information Technology, Defence, Foreign Relationships etc.

These departments are complex in nature with further sub-branches and many times intersect with each other.

This governance encourages diversity, which means, for example, if you are standing for the law department, you need to have studied about the law, maybe you are a lawyer or have worked under social justice, or you may be a psychologist or criminal psychologist, or you may be computer scientist interested in automating the law system, or you may be biotechnologist with forensic knowledge.

Experts do make bad decisions but the bad decision making is minimized through collective decision making, scientific peer review, feedback and scientific argumentation between all interacting departments and citizens.

How there will be ab initio assignment of representatives in these departments?

Whitelisting of nominees standing in the election and voters:

The real power of a governance voting system emerges when voters are rational and informed and nominees are experts of their concerned departments.

People with interest in the departments can stand for election, after showing some evidence of their expertise in understanding the departments. Evidence can include their research work, proposed achievable solutions, a detailed sketch of the plans and blueprints and a portfolio that a common citizen can understand.

Candidates participating in the election and voters will be whitelisted using their evidence of expertise with the Schelling Game. The game is about cooperation without any communication by anticipating other people's actions. If your decision doesn't match with what the majority decides, you will lose incentives, and if it matches you receive incentives. So, you will always vote for the obvious answers, rather than the incorrect one.

| | | | |
|----------------------|-------------------|-----------------|-------------------|
| The majority Votes ↓ | You Vote → | | |
| | | Expertise Valid | Expertise Invalid |
| | Expertise Valid | +1 | -1 |
| | Expertise Invalid | -1 | +1 |

Figure: Schelling Game, an incentive system to find out if expertise is a valid one.

Functioning process of departments:

Voters can vote for selecting outer representatives of a department, to select some 500 members. And these outer representatives can vote for the inner representatives who are law approvers of the departments and member count of inner representatives can be somewhere between 30-50. The outer representative voters should also provide authentic provable reasoning for their votes.

Who will decide whether to form new departments or join or remove departments?

Its the job of all inner representatives of all concerned departments, when the consensus is reached after taking feedback from outer representatives and voters.

How new policies can be made?

First, a draft can be made by inner representatives, and should be submitted publicly and should be asked for feedback, inner representatives and outer representatives of other departments can provide their conflict of interest and after addressing to different specific problems and argumentation to the line numbers or paragraphs, and rebuttals, explanation to the public, inner representatives can pass the final draft as policy. Inner representatives can provide incentives to outer representatives for their contributions.

Policies can be approved by inner representatives of the concerned departments only after addressing the conflict of interest with other departments. Departments can interact not just top-down or bottom-up but even side-ways to know the conflict of interests of all the departments.

What about the availability and contribution of inner and outer representatives?

Representatives should collaborate and discuss problems and solutions and they can be available in the community to collect information and check the implementation. Individual contributions of each person and collaborative contribution should be made available for each day or week linked to the calendar within a website, it can include drafts, flowcharts, videos, etc.

Take your time before uploading your contributions, for processing the data into useful information, and to think, analyze and write reviews containing your premise, argumentation, with a conclusion where needed and references to back your argumentation. No specific format is required, but the information needs to be elaborative, concise and valuable.

How can a voter know about the contribution of representatives and vote to remove or assign new representatives?

Voters can track the availability and contributions from the website with the calendar and can make the decision based upon their contributions.

The voting process is “difficult in but an easy out process” for representatives.

It’s difficult to become a representative in a department without expertise, but it’s easy to remove the frivolous one.

Voters will vote for outer representatives and outer representatives will vote to assign inner representatives. Voters will also remove representatives with low approvals using approval voting.

Per voting process can be held in 6 months, 16% of representatives in a department will be removed. A lower percentage will retain the stability of the government.

What about the voting process of states and districts?

There will be different elections for states, districts and smaller administrative regions. Voters need to be local, but representatives can be nonlocal, but must have the necessary expertise and must be available in locality or work remotely for the locality till they are in the job.

States can have the same departments that of the center. But districts and smaller administrative regions can have only required departments.

Responsibilities of representatives in states and districts:

Inner representatives of districts and smaller administrative regions are not law approvers, (but inner representatives of center and states are law approvers), but they can assign the task for implementing policies to their outer representatives.

How new policies be implemented?

Implementation will be done by both outer and inner representatives, and inner representatives can assign different task to outer representatives where needed. All inner representatives of center, state, district, and smaller administrative regions per department can help each other to assign a task for implementation.

Representatives are leaders who collect evidence, data, and feedback, design policy on evidence, test and improve it or implement it through collaboration, without conflict of interest.

There is also an extended outer group, where common citizens can work part-time to provide solutions for the government and get incentives after approval from inner representatives of concerned departments. Extended outer group work will also come under open auditing.

How to scale and simplify the election?

Ab initio election requires about 500 representatives per department. Applicants can be some 2000 or more for a department. **Approval voting will be done on the blockchain using commit and reveal method.** An index book with every applicant's portfolio analogous to question paper will be available on the website. This index book should be available 2-3 months before the election so that voters get enough time to evaluate the applicants. UI will be designed for better information discovery of their profiles and portfolios.

The voters need to analyze the applicants and vote within 15 days.

Some 500 representatives with the highest votes will be selected per department.

After ab initio, the assignment process will be more simple. The election should be held every 6 months so that enough time is available for the representatives (before removing them) to search and understand the environment and then design the policy and implement it. There will be two kinds of the election after ab initio, **removal** and then **assignment** to fill those who are removed.

In the removal process, for every voting session, 16% of representatives are removed using approval voting. Representatives with lowest approvals are removed till it reaches 16%. People should be requested to get all the contribution details of all representatives and vote everyone per department or sub-department. All voters should analyze the contribution and expertise of the representatives in solitude and collaboration with other experts and data analysts and then fill the voting sheet and all should participate in voting and should avoid voting or submitting the filled voting sheet of a department or sub-department without knowing about it and representatives contribution.

The assignment process will be the same as that of ab initio with approval voting.

Why will experts and scientists join the democracy network? What are the incentives?

Scientists and experts will join democracy for building the professional reputation and gain incentives for their work. Department scientists can crowdfund their solutions to gain incentives for solving problems through volunteering and working on it.

Funding pool for each department (which can include its subdepartment) will be created and Quadratic Voting (QV) will be used to fund the projects. With a single vote sheet, you can vote for 20 projects or tasks where you have to score -0.02 or +1 while voting.

Total cost for voting = (Number of voting sheets)²

Here, only KYC is needed to vote and voters don't need to have the expertise of departments. As voters have to pay for the votes, and the cost of votes aligns with your preferences, all good and favorite projects, ideas or plans will get sufficient funding due to the quadratic nature of voting.

Expert representatives for other departments and regions can do the scientific review and evaluate projects so that people have all the information and can make better decisions while voting.

One can fund not just the projects of representatives, but external projects relevant to the department after it is approved by representatives.
 Funding for the project goes to the leader of the project, multiple leaders are allowed.
 The app will also have its own ERC20 coin that can be used for the voting process.
 Some funds will also be allocated for marketing to raise funds going door to door or through online social media. The marketer will get incentives (0.5 to 1%) based on the amount funded through them.
 It also reckons the logic of collective action. According to it individuals in the group will not act unless 1. The group is small. or 2. The individual is coerced or 3. There are individual incentives. It is the individual's best interest to be a free rider. As governance is divided into smaller regions, the desired smaller groups can be made. Individuals are given nudges through marketers and advertisements and there are individual incentives due to quadratic voting.

References

1. Max Roser and Esteban Ortiz-Ospina (2019) - "Global Extreme Poverty". Published online at OurWorldInData.org. Retrieved from: <https://ourworldindata.org/extreme-poverty> [Online Resource]
2. New Methodology Shows 258 Million Children, Adolescents and Youth Are Out of School, Fact Sheet no. 56 September 2019 UIS/2019/ED/FS/56, <http://uis.unesco.org/>
3. Shepherd, A., Ivins, E., Rignot, E. et al. Mass balance of the Greenland Ice Sheet from 1992 to 2018. Nature (2019) doi:10.1038/s41586-019-1855-2
4. 7 principles for building better cities (Peter Calthorpe | TED2017) <https://tinyurl.com/qp5unxh> [Online Resource]
5. Hannah Ritchie, Joe Hasell, Cameron Appel and Max Roser (2019) - "Terrorism". Published online at OurWorldInData.org. Retrieved from: <https://ourworldindata.org/terrorism> [Online Resource]
6. Ambient (outdoor) air pollution in cities database 2014. WHO. 2014. Retrieved 31 May 2015
7. Klaus Gründler, Niklas Potrafke (2019) - "Corruption and economic growth: New empirical evidence", European Journal of Political Economy Volume 60, December 2019, 101810
8. This Is Not A Drill: An Extinction Rebellion Handbook By Extinction Rebellion
9. Cardinale, B J.; Duffy, E.; Gonzalez, A. et al. (2012) Biodiversity loss and its impact on humanity. Nature. Volume: 486, Number: 7401, pp 59-67. <http://dx.doi.org/doi:10.1038/nature11148>
10. Bradshaw, Samantha, and Philip N. Howard. "Challenging truth and trust: A global inventory of organized social media manipulation." The Computational Propaganda Project (2018).
11. Jonas T. Kaplan, Sarah I. Gimbel & Sam Harris (2016) Neural correlates of maintaining one's political beliefs in the face of counterevidence <https://www.nature.com/articles/srep39589>
12. Clay Shentrup, Evaluation of Voting methods: Theory and Practice https://youtu.be/HyBm_Hcu4DI
13. Arrow, Kenneth J. (1950). "A Difficulty in the Concept of Social Welfare". Journal of Political Economy. 58 (4): 328–346. doi:10.1086/256963. JSTOR 1828886.
14. Lalley, Steven; Weyl, E. Glen (2017-12-24). "Quadratic Voting: How Mechanism Design Can Radicalize Democracy". Rochester, NY.
15. Schelling point is a game theory concept, The Strategy of Conflict By Thomas C. Schelling
16. The Myth of the Rational Voter – Why Democracies Choose Bad Policies, Princeton University Press, ISBN-10: 0691138737