

# Civic Participation I: Participatory Budgeting

Ashish Goel

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*These notes are based off a presentation by Ashish Goel (Stanford, Department of Management Science and Engineering) for the section on “Civic Participation” in the Mechanism Design for Social Good Reading Group. The notes are taken by members of the reading group with some figures and texts taken from the accompanying paper. Questions and comments from reading group members during the presentation are labeled as such. Please contact the reading group organizers with any questions or comments.*

Overview: This talk will focus more on problems that aren't yet well-understood, rather than what Ashish and his collaborators have solved.

## Participatory Democracy

Participatory democracy broadly deals with the problem of increasing citizens' involvement in political decisionmaking.

Algorithmically, the tools that are brought to bear are for *decisionmaking at scale*:

- How can we make complex decisions using the input of a large number of people?
- How can we do this in the face of disagreement and extreme opinions?
- How can we do this with provable guarantees?

This will involve more complex mechanisms than we're used to in social choice.

## Example: Participatory Budgeting

How it's typically done ( $k$ -approval voting):

- A community must choose between a set of spending proposals.
- Every voter chooses  $k$  projects (for some fixed  $k$ ).
- Proposals are implemented based on the number of votes (see below).

Used by many cities, including Seattle.

Issues:

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- This doesn't encourage voters to think about tradeoffs between value and cost of the different projects.
- $k$ -approval voting has strange incentives. It is possible for:
  - A voter to favor alternative  $a$  over alternative  $b$ .
  - Alternative  $a$  to be currently winning.
  - It to be in the voter's interest to vote for  $b$  anyway.

We say  $k$ -approval voting is not “weakly strategyproof.”

How do you choose what wins? Do you go by:

- Maximizing the total votes of the set of projects chosen?
- Greedy by number of votes?
- Greedy by bang-per-buck?

*Comment:* Gibbard-Satterthwaite implies that there is no strategyproof mechanism for general utilities. There are no impossibility results for weakly strategyproof mechanisms, though.

Knapsack voting:

- Each voter submits their own proposed budget (subject to the budget constraint).
- Aggregation:
  - Break each project into individual dollar parts.
  - A vote for  $m$  dollars for project  $i$  can be thought of as a vote to include the first  $m$  dollars of project  $i$ .
  - Take the dollars in order of votes.

This is simply approval voting over dollars of the various projects.

Since approval voting is weakly strategyproof, this yields a guarantee for knapsack voting as well.

*Comment:* Knapsack voting only works well with complements, not with substitutes, or with dependencies.

Theoretical and empirical results: Knapsack works well.

[Ashish skipped this part of the presentation to get to discussion.]

## Future Directions and Discussion

### Empirical evaluation:

- Easier question: Did we do a good job aggregating what society wants?

- Harder question: Does society make good long-term decisions?  
How do you even measure this?

*Question:* What is the right notion of social welfare?

- Utilitarian social welfare?
- Fairness?
- Diversity?
- (As above) Long-term wellbeing?

*Answer:* The mechanism likely can be adjusted to fit an alternative social welfare function.

### **How do you advertise to encourage a diverse electorate?**

This is a common concern among public officials.

Example: Valeo, CA.

- Valeo is majority-minority.
- Rich people, white people, and women are disproportionately represented.
- Online voting makes it worse.

Approach: A facebook campaign, targeted to hispanic and black voters.

- You can't target people explicitly by race, but hispanic voters are easy to target because of language and other cultural differences.
- Black voters less so.

Result: A boost in hispanic but not African-American turnout.

Two questions:

1. How do you use weak targeting mechanisms to produce a representative population sample?  
(Algorithmic problem)
2. Is this the right thing to do? (Ethical/moral question)

On question 2. Is it more ethical/democratic to:

- Target underrepresented groups.
- Advertise broadly.

*Question:* How do you handle projects which are not accessible to groups which society considers worth including? (e.g. people with disabilities.)

*Answer:* Nothing totally vital is handled via participatory budgeting. But if you were really worried, you might consider a different utility function, e.g. Nash welfare.

Idea: "Supervised" vs. "unsupervised" minorities.

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- Supervised minorities are those you can identify by demographic characteristics without seeing their vote.
- Unsupervised minorities are those who are a minority in how they vote, but might not be outwardly identifiable.

Example: Snowmobiles in Finland. Deciding where people should be allowed to drive their snowmobiles is a contentious issue in Finland. Those who were against wider snowmobile access were a coalition of women, environmentalists, and landowners. But this group was not outwardly identifiable.

Question: Should you be focusing your targeting on people with minority opinions?

## Discussion

*Comment:* Is it valid to make civic participation a goal in and of itself? Do you try to set up the system such that individuals feel compelled to participate?

What's the objective function for such a problem? Whose participation do you value?

*Comment:* Should we be looking to the political science literature?

*Comment:* Nash social welfare seems like a solution to many of the questions raised by the audience. How do you implement it in practice? There may be voting languages with a market flavor that implement such a thing. Work in progress.

*Comment:* Does targeting specific groups actually pose an ethical problem? It seems like the reason some groups are already overrepresented is because they're being targeted well. So targeting underrepresented groups would not be any different from the status quo, really.

*Comment:* Why not take a welfare approach? Pick a social welfare function, and then target to maximize that social welfare function.

*Comment:* Do you want to equalize impressions (who sees what ad), or voter turnout?

*Question:* Different, but normatively important question: how do you cope with the fact that some people will always have a harder time voting than others? How much of the disparate voting turnout is due to access?

*Answer:* Based on experience, I would guess that access to voting is not the obstacle.

*Question:* How widespread do we expect online voting in participatory budgeting, to see this grow in the future?

*Answer:* I do not see online civic engagement processes larger than small scale participatory budgeting (e.g. a big constitutional reform) increased in the US, partly due to distrust of the system. Currently, small scale participatory budgeting itself is doing well in the US, and civic processes are doing very well outside the US.

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## Deliberation

How do you design a system for making a complex decision while leaving space for negotiation and deliberation without the system designer knowing the details of the decision space/preferences?

An idea: Sequential deliberation.

- Start with  $n$  agents.
- Have each agent come up with their ideal solution, put them all in an urn.
- Pick 2 agents at random, and a solution at random from the urn of solutions.
- Have the two agents bargain, with the existing solution as the outside option.
- If the two agents agree on a solution, replace the outside option with the agreed-upon solution in the urn.
- Eventually, this process will converge to some distribution.

Result: For “median spaces,” sequential delegation converges to the median opinion, and that this outcome is within 20% of optimal social welfare.

Open question: How do you make this practically applicable?

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