

Building trust for sample voting

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Abstract

This work explores how to build popular trust for voting systems that rely heavily on statistical tools, those being generally counter-intuitive to the general population (and even to experts). By trying out the voting system in public and letting people fiddle with it, a first level of familiarity can be achieved. To go further, integration into a larger debating platform held by a national party could give first-hand experience to the majority of the people, and would progressively build trust as the political stakes grow higher. Preliminary results seem encouraging and point out the importance of psychological and sociological factors in election organization, and the influence of user interface design.

Introduction

As citizens of many countries get more and more disappointed in our current political institutions, the desire for a more participatory democracy is surging [5]. New political entities such as the Five Stars Movement in Italy or the Public Opinion Platform [1] are trying to use this popular interest to reform political practice and return direct power to the citizens. Those entities need an extensive set of online tools to handle registration, discussion, drafting of legislation and voting when necessary, and to help organize public meetings. In parallel, new voting tools are being developed, such as Random Sample Voting [6] which offers new possibilities in term of verifiable online voting. Although the security and representativity of this system are both proved mathematically, most people wouldn't be ready to trust it for important decisions, and establishing its legitimacy is an arduous task. The goal of this research is to see how to establish a popular appeal for the system and prove its legitimacy to voters. Moreover, we seek to study how the Public Opinion Platform could use it to form a mutually beneficial relationship.

Random Sample Voting

Random Sample Voting (RSV) is a voting protocol developed over the past few years by David Chaum and the RSV Project. It features end-to-end verification and integrates voting with the sortition of a reduced voter pool from the general electorate. As such, the result of a vote cannot be modified through hacking – as there are public audits and a paper trail – and it is hard to force a denial of service as it handles long voting periods, which are too costly for polling place voting. Moreover, as with all sortition-based systems, it is possible to have very frequent votes – each on an independently generated sample – to guarantee a representative opinion while limiting voter fatigue.

The user experience is relatively simple: using the complete list of eligible voters, public random bits are used to draw a reduced group of random citizens whose identities are kept

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secret. Every member of this reduced voting pool receives one ballot with a secret ID and four voting codes (two for YES, two for NO)¹. They then go to the voting website, input their ID and one of the two voting codes corresponding to their choice. They can also give this ID and code to a third party to securely vote for them (without knowing what they voted for). This means that the voting part can be done over any medium: online, by phone, by mail, or by asking your neighbour, negating the usual problems with online systems.

This system has many advantages – such as being mathematically secure – but needs more testing, and the randomness at its core might make it seem illegitimate to a part of the electorate. One way to counter that is to give the people a way to try out the system. To this end I created a graphical sampling simulator that allows users to set up a fake electorate and see how RSV would perform when compared to usual voting methods (on either user-created or historic elections). The hope is that by trying it out themselves, interested citizens could get an experimental conviction of the correctness of the system. A beta version can be found at <http://koliaza.com/rsvp>. The other way is naturally to use it in real elections, or in parallel to them. RSV has been tested in public three times so far. The first two were at international cryptography conferences where no one opposed its legitimacy, but where most of the reactions concerned the security (no vulnerability was found). This legitimacy was questioned in the third test, which targeted a general audience composed of non-specialists.

Lessons from the San Sebastián Experiment

The Global Forum on Modern Direct Democracy [3] was held in San Sebastián between the 16th and the 19th of November 2016, gathering more than 200 participants from 27 countries, including political scientists, journalists, activists and people from many other backgrounds. The RSV Project was officially invited to present our technology by running a public demonstration of the voting system, and I was chosen to represent the team and organize the vote. The first problem arose with the absence of a list of participants (or even of their expected number), which meant that we had to simulate the random drawing of the sample. We decided to do that by holding two concurrent votes on different questions: "Should voting in national elections be compulsory?" and "Should negative campaigning be prohibited?", with people getting to vote on one of the two randomly. The process went as follows:

- 146 ballots of each type were printed and put inside identical envelopes and then shuffled, no one knowing in the end what each envelope contained, thus simulating the random selection, and making sure that everyone had a chance to participate.
- During the introductory talk about RSV on the first day those envelopes were distributed to all the people in the room, ensuring that everyone got a ballot, but that no one knew who had what (around 130 ballots were distributed in the end).
- The polls opened at 00:00 on the night of the first talk and stayed open for nearly two days until 21:00 on the penultimate day.
- People could vote on their phones or computers and a public polling station was established for those who didn't have internet access, but they were also encouraged to vote through a third person (that often being me), to demonstrate that feature.

Two things happened which hindered the voting process: just before the start of the conference errors were found in the voting parameters – thankfully we had just enough time to change

¹It is also possible to have more than two choices but the binary case is simpler.

those before the daily publication of the random bits – forcing us to redraw and reprint all ballots. Another problem was that on some devices the voting interface would hide the last numbers of the input. We found a solution before the second day – which was as simple as holding one’s phone horizontally – but many were confused.

Overall the process was a success as we got a lot of valuable data. Of the 130 ballots distributed, 34 were used, an abstention rate was on par with previous tests. However, this time we were able to analyze the different reasons behind it by getting feedback:

- The voting site’s web address written on the ballots was long and people didn’t want to write a long string into the browser.
- People were mistaking ‘g’ and ‘q’ in that link, and couldn’t access the voting interface.

Those problems, along with the interface bug, meant that voters got frustrated. Some were ready to try voting again after the fix was released (we recorded 6 ballots before the fix and 28 afterwards), but most had given up after the first try. Moreover, we could observe – but not measure – additional psycho-social factors: the concept of negative campaigning was foreign to people from countries where such practice is forbidden, resulting in low turnout. More importantly, the timeline of the vote was badly chosen: people did not vote on the first night as it was not urgent, and they often forgot their ballots in their rooms on the second day, meaning that a few dozen couldn’t get to their codes before the deadline.

The simulator was also presented, but our preoccupation with fixing the voting system meant that little feedback was collected on it (the people who did use it generally said they were convinced). During the conference someone remarked that they got a ballot for one question and were upset that they didn’t get the other. They thought it would be a common feeling, and the crowd voiced concerns about the popular reaction if the result of a vote differed from the popular expectation. We set up a feedback collection website accessible from the voting page, and found that people mostly trusted the accuracy and security of the system but were nearly all on the fence on its legitimacy for a mass election, meaning that we need to improve the popular appeal of the system.

The Public Opinion Platform

The public trial attracted the attention of one of the participants at the forum, Géza Tessényi, initiator of the Public Opinion Platform (POP) [1]. This new kind of institution for real-time democracy, created in 2015, aims to hack indirect democracy by acting as a political party whose members are elected normally but pledge to vote for the measures adopted by the population. Those measures are discussed on an online platform open to all – and not just to members of the party – and then voted upon. The platform is young and multiple technological decisions need to be made, to satisfy the following constraints:

1. Everyone has to be able to easily access and contribute to the discussion and voting. This means including ways to counter the digital divide and promote public access.
2. The online debate has to be productive, with concise arguments, and a system of expertise evaluation might be useful, as well as protection against lobbying.
3. The whole system must be resistant to hacking and denial of service attacks. Moreover, there must be strong public trust in the results of the votes.
4. Popular involvement should not be costly: both the time and the level of expertise needed to engage and contribute should be kept as low as possible.

The first constraint is far from easy to satisfy as any web-based platform will be inaccessible to a non-negligible proportion of the people – in 2013 at least 17% of the French population

didn't use internet at all, and about 10% didn't have a mobile phone [4]. However, it is crucial for the legitimacy of POP that its decision-making processes aren't discriminatory. To achieve this it is necessary to distinguish between participation in the debates and participation in the voting process. It might be possible to partially forgo the first, but the second is essential.

As it happens, some of the technologies to solve the other constraints are already being used. For the second constraint, a potential system for public debate over legislation comes from République Numérique. It is also possible to go even further by condensing similar opinions with AI, raising the possibility of large scale debating. This kind of technology, developed by pol.is and vTaiwan [2], is starting to show its usefulness and reliability, and we are currently collaborating with them to check potential adaptations. We need to test whether individual expertise evaluation is needed, potentially through a karma system. The last two constraints could be solved by using RSV, if we manage to make it seen as legitimate.

Future Work

Current plans are twofold. The first part concentrates on how to make RSV more palatable to the public. The interface changes have been made, and a general website listing all current votes is planned (with shortened URLs and maybe QR codes), to answer the problems raised in San Sebastián. However, there are some deeper issues: so far in France the strongest proponents of sortition tend to be in fringe parties, which changes the focus of the debate and could damage the idea by association. To change this, I'm in the process of publishing a book, which will hopefully move the debate closer to the general public's interest. The RSV simulator is also being improved and will soon be advertised to check its effectiveness. Finally, a tool is being developed to work jointly with the simulator, whose objective is to let people create their own RSV votes on a limited scale. A psychological study of the effects of such tools on people's opinion might be a good idea once they are already well tested.

Work with POP focuses on a technological watch and cooperation with major actors in debating and AI software to settle on an architecture and launch its first public interface. I am also trying to foster exchanges between both projects as the use of RSV by POP would make the voting system more familiar and hopefully allow it to be tested in real-world situations of increasing importance as the influence of the platform-party grows. To improve the accessibility for people with limited online access I am also considering authentication alternatives, such as sending code books by physical mail and letting people vote by phone, and whether a multi-tiered authentication system could work. This could introduce some vulnerabilities in the system but a smart design might limit those. More theoretical work is also underway on infrastructure design for a global governance system in the context of the Global Challenges Foundation. Most of the resources used for this research are internal work documents relevant to the different organizations, but the following resources are available.

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