Net Voting

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Abstract

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1 Introduction

1.1 Introduction

Modern cell phones has come to completely replace home telephones, nowadays it's not rare that people entirely skip using a home telephone[10]. E-mail are replacing the traditional mail service[3]; now even some important information from the government are sent by e-mail and by mail. The Internet has revolutionized the way people socialize, especially people born during the 1980's have adapted a totally new way of satisfy their social needs; I'm of course speaking of Facebook. People are becoming more and more efficient (or lazy someone would claim), today it requires a certain amount of importance or urgency to make a phone call to your beloved ones and friends - instead information, concern and affection is carried out using text messaging.

It would be quite natural to presume that these now new modern ways of communicating and interacting with each other are restricted to the wealthy and industrialized countries of the west world - but this not the case. Allow us to quote the character "Marylin Delpy" (a jurist involved in the lawsuit against Mark Zuckerberg) from the movie "Social Network" which tries to tell the story of the creation of Facebook:

"Bosnia. They don't have roads, but they have Facebook."

According to Time magazine[4] over 90.000 Chinese are active Facebook users even though the Chinese government has blocked access to the site, i.e. those users have actively done something to bypass this blockade. In the same article one can read that Haiti has over 119.000 active users even though it's the poorest country of the Western Hemisphere[5].

There's certainly no doubt that we live in a digitalized and Internet dependent world, where time is of the essence and where connectivity plays an essential role in peoples' every day life. Having this said we want to draw attention to how other areas of the society appears to, on a technological and practical level, be behind in comparison.

One of the most fundamental constitutions of a democratic state are the elections. Even though these seldom occurs more often than every third year they involve a huge amount of bureaucratic work and resources. A vast quantity of papers have to be manually handled to be processed later on by some automatic (or manually, in some countries/elections[7]) counting systems. Parts of the papers are being processed and counted centralized i.e. resources have to be spent on logistics in order to ship votes between cities. Stating that elections are associated with being Sisyphean task for those participating in counting of the votes would maybe not be to overestimate the task.

This essay will try to cover the option of digitalizing and modernising voting in order to dramatically decrease the effort and resources needed for an election.

1.2 Approach

A theoretical design of a complete net voting system will be presented. Recommended choices in the design will be presented and why they are recommended will be shown. Discussion of advantages and disadvantages associated with each choice will take place. Existing net voting systems or suggestions for theoretical net voting systems will be used to help identify weaknesses in a design or to find inspiration for good design choices. Information found about other theoretical or implemented net voting systems will be analyzed.

1.3 Terminology

E-voting is an abbreviation for 'electronic voting'. This term is synonymous to 'net voting'. E-voting means that the voting result is stored electronically and the result is computed from

the electronically stored votes.

I-voting is an abbreviation for 'internet voting'. Voters are allowed to vote from any device with internet connectivity.

Controlled voting will be used to signify that the environment where the voting is taking place is a controlled place where the privacy and vote integrity of voters are secured. This is usually a poll office.

Uncontrolled voting signifies an uncontrolled environment where there are no guarantees of integrity or privacy. This could be the home of a voter or a public internet café.

2 Background

2.1 Implementation attempts

2.1.1 Earlier attempts

The first election to ever use e-voting was the municipal elections in Estonia in 2005[13]. In a study about this election[2] one can read that 1.85 percent of the voters used the e-voting system and voted over the internet. A very large proportion of e-voters, over 80 percent, declared that they wanted to use e-voting in the future and for all types of elections in which it would be proposed as an alternative means of participation. In the same study it was presented that the authors found out that the e-voting was "completely neutral with respect to such crucial variables as gender, income, education and the type of settlement". The outlook for a world were e-voting is globally and commonly used is looking good.

2.1.1.1 Nedap

In 2002 Germany used an e-voting machine called 'Nedap' in the federal election. Over one million voters used this e-voting system. Three years later in the federal election 2005 an additional one million voters used the system.

The NEDAP voting machine was developed by a dutch company.

2.1.1.2 Diebold AccVote-TS

The american company Diebold has developed a voting machine called 'Diebold AccVote-TS'[1]

2.1.2 Why they failed

not quite sure yet

2.2 Systems in use

3 Problems

3.1 General analysis

The problem with the current ballot voting system is that it is inefficient[12]. Every voter has to get to the polling place and mark their votes on a ballot. Their identity is then confirmed by checking the ID of the person voting and comparing it to a pre-printed list of eligible voters. The ballot is then placed in the ballot bin and the person voting marked as "has voted". After the polling place has closed the votes are counted manually or scanned. After the initial counting

the ballot papers are sent to a central location for storage in case a recounting of the votes is requested.

The problem consists of designing a net voting system that has no serious drawbacks when compared to the traditional ballot voting system but improves on the drawbacks of the traditional ballot voting system. It should shorten the handling time, lower the cost and lower the time required to perform a nation-wide vote. A digital replacement of the ballot voting is not an easy system to design.

3.2 Security issues

3.2.1 Identification issues

A voter has to be identified as an eligible voter. This is true for any net voting system and the traditional ballot voting system.

To identify users electronically some kind of electronic identity for each voter is needed. To create electronic identities to facilitate net voting alone is probably not necessary however, since electronic identities are increasingly used as means of identification when using electronic resources. KÄLLA? The same identities could be used to identify voters.

"Any system which lacks a means for the voter to verify that their vote has been correctly recorded is fundamentally and irreparably flawed" - Margaret McGaley, spokesperson on ICTE[1] (Irish Citizens for Trustworthy) when the Dutch e-voting machine NEDAP was hacked.[6]

3.2.2 Integrity and privacy issues

There are several ways the integrity and privacy of a voter can be violated. When voting is taking place in an uncontrolled environment, which we call uncontrolled voting, the voter can be influenced, coersed or by other means forced to vote in a certain way or display their vote to others. This is a big issue when uncontrolled voting is used. It does not however suggest that the voting system itself is bad, but rather that there are issues in the country that allow such coersion or forcing to exist in the first place.

3.3 Usability challenges

3.4 Performance requirements

We do not consider the hardware performance requirements to be a key feature, however, the system must be scalable. This means that our solution must not depend on a single piece of hardware and it must be able to increase its voter capacity by simply increasing the allocated hardware and bandwidth.

4 Conclusion

4.1 The perfect system

The perfect system will be described here.

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[1] http://evoting.cs.may.ie/

4.2 Utilization likelihood

The adaption to utilization of a net voting system is inevitable, the question is only when? 5 years? 10 years?

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[15] Wikipedia. Voting system — wikipedia, the free encyclopedia. `http://en.wikipedia.org/wiki/Voting_system,`, 2011. [Online; accessed 29-January-2011].

6   Summaries

[1] This pfd is an article about e-voting that refers to some statistics from the Estonian elelection 2005.

[2] This is a detailed report/essay about the Estoninan election in 2005. The author presents detailed statistics and a discussion about e-voting in general and some conclusions.

[3] Site were we found information about the trend to skip using paper letters and electroncial means of carrying out information instead.

[4] Tells the story of Mark Zuckerberg and how he created Facebook. Also gives detailed statistics of Facebook and its usage around the world.

[5] Gives detailed statistics about Haiti's population. Religion, health, education, economy and other various of information are stated.

[6] This is a report from 2006 about the concerns raised when the voting machine "NEDAP" was hacked.

[7] Reports that Cote d'Ivoire's votes are to be counted manually because other technological means were rejected.

[8], [10] Reports that mobile phones are replacing land lines at a higher rate than before. In 2006 a third of phone traffic was by mobile phones, versus a quarter in 2005.

[9] Highlights important issues and possible complications when designing electronic voting systems. Also gives a thorough description of electronic voting systems, the terms used and common definitions.

[11] Gives information on how various ballot systems work and what kinds are common. Also describes that ballot voting started in Rome, 139 BC.

[12] Describes electronic voting and its general meaning. Analyses the different problem areas when using electronic voting. Mentions some used electronic vote systems and recommendations for improvements.

[13] This is a wiki article about the Estonian election 2005.

[14] Describes that polling places are locations where people go to cast their ballots to vote. A polling place is usually located in facilities that have some other purpose when there's no election running.

[15] Describes various voting systems used around the world. Technical information about voting systems and different implementations are listed.