Democratising budgetary decisions with Handivote

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Outline

- Motivation
- HandiVote Voting Protocol
- HandiVote Application
- Trials
- Future Work
Why do we need referenda?
Why do we need referenda on economic decisions?

Budget 2013: 'UK government should build more homes'

Boosting homebuilding and infrastructure spending should be the main goal of the forthcoming Budget, according to business lobby groups.

The CBI and the British Chambers of Commerce (BCC) want tens of thousands of new homes to be built to create new jobs and provide affordable homes.

But they say that the government should stick to its plans to cut borrowing.

California governor sees tax referendum as sign of changing tide

Posted by CNN's Gregory Wallace

(CNN) -- Gov. Jerry Brown sees California voters' openness to temporarily increasing taxes on wealthy individuals' income as a sign voters nationwide may be open to the idea.

"The cutting and the deficits are out of control," the California Democrat said Sunday on CNNs "State of the Union."
Why we need a more transparent electronic voting?

FOX: Diebold Electronic Vote Fraud Confirmed

Nearly Two Million Dead People Registered to Vote in America

Feb 14, 2012 11:48 AM EST

Watch Voting Machine Change Obama Votes To Romney Votes

A Pennsylvania voting machine has been removed after it was found turning votes for President Obama into a vote for Romney. Internet user, centralpavote, recorded the malfunction on his smartphone and uploaded the video to popular content aggregator, Reddit.com. The posting shot to instant fame (with 4800 ‘up votes’ on Reddit as of the time of this writing), and MSNBC confirms that the machine has since been taken out of service.

The integrity of our voting system is called into question with reports of millions of dead people being registered to vote in different states. According to Pew, there are more than 24 million registered voters across the country, and along with the millions of dead people registered to vote, there are inaccuracies in the system that need to be addressed. That's nearly one in four, or 24 percent of the eligible population.

There also are more than 1.8 million deceased people who still have active registration on voter rolls, Pew found. And, Becker said, the outdated, inefficient systems currently in place are "not acceptable."
Problems with computers:

- Complex, one can not be sure that voting software preserves anonymity
  - there could be a back channel to the secret police saying who votes which way.

- Expensive - internet computers are not as widely used as phones
Why should we vote on mobile devices?

- More cost effective
- Higher accessibility
- Higher participation
- Time and location independence
<table>
<thead>
<tr>
<th>Registration</th>
<th>Voting</th>
<th>Publication</th>
</tr>
</thead>
<tbody>
<tr>
<td>Present ID</td>
<td>Phone</td>
<td>HTML</td>
</tr>
<tr>
<td>Choose HandiVote Card</td>
<td>QR Code</td>
<td>Pie Chart</td>
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</tbody>
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HandiVote Voting Protocol

University of Glasgow
Voting Process

- Vote by sending an SMS message with your card id.
- Since nobody knows the ID this is anonymous.
- Verification by publication of which card ids voted which way. You can check vote correctly recorded.
- Since all votes published independent verification of the count is possible.
You point your smartphone camera at the card and can open the voting interface automatically with your card number filled in. You can also do it by SMS.
Please vote below on how any spare funding in this year’s equipment budget should be allocated:

**Question 1.** What percentage of any extra funding should be spent on Additional Storage Capacity on the file servers?

- Please select one...

**Question 2.** What percentage of any extra funding should be spent on Additional Processing Power in the form of compute servers?

- Please select one...

**Question 3.** What percentage of any extra funding should be spent on more Personal Machines for staff?

- Please select one...

Please use the Voting Card you have received from us to vote. The Card Number and PIN can be found there. Please keep your Voting Card safe, as you will need the Card Number to verify your vote was recorded. If you lose your Voting Card, you can request a replacement. Click here to find out how.

Card Number: 0123 4567
PIN: 0000
Scan QR code:
or SMS to: 0745 006 8260
or go to: tinyurl.com/handivote

Submit Vote
Budgetary Referenda

Revenues and Expenditures
Income and Bills
Q1. How should Council Tax be adjusted?
   a) Increase to 22%
   b) Decrease to 18%
   c) Leave as it is

Q2. How should Spending on Libraries be adjusted?
   d) Increase by 5%
   e) Decrease by 5%
   f) Leave as it is
Inconsistent wishes

- Will people simply vote to spend more than they vote in taxes?

- Well you can solve this mathematically by a formula in analytic geometry which I will not go into here but simply show a picture illustrating how it works.
Suppose people vote to increase expenditure by 4% and only increase taxes by 2%. The geometric procedure works out the compromise: increase both by 3%.

The software can handle multiple types of taxes and multiple categories of expenditure and yield the combination that is closest to revealed popular preference.
"Name the Robot"

1. Pick a Name!
   1. Arcteryx (Greek God of Clothing)
   2. Dexterous Blue
   3. MARFF (Mechanical Automated Robot for Folding)
   4. Segmentation Fold
   5. The Smurf Bunny

2. Vote!
   send SMS to 0745 006 8260 with:
   » your barcode
   » your matric number
   » the number corresponding to your choice (between 1 and 5)
How should any spare funding be allocated?
This vote was in March and was a community organised poll to test opinion about a proposed building development on a local meadow. Cards were distributed door to door by community volunteers.
The summarised results were as follows:

For Building: 32
Against Building: 451
Abstentions: 2
Erroneous votes: 29

The return rate was 18.3%. To put this figure into context, the typical return rate for an unsolicited paper poll via mail is 1-2%. Furthermore, due to the delivery being via volunteers (we are an unfunded research project), around 800 of the voting cards were not delivered until the last 5 days of the vote, with 400 of those not being delivered until 24 hours before the deadline.


**Under Review:**

A Medium-Scale Trial of Handivote.