Election Security Research at Georgia Tech

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More information https://scp.cc.gatech.edu/
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Cybersecurity, privacy, secure operations, cyber physical systems

Vulnerability
Assurance
Voter Behavior
Operations and logistics
Field studies
Policy and standards
Safe and Secure Election Project*

- Security threats to voting technology and external events like the COVID-19 pandemic have increased the complexity of conducting elections by orders of magnitude.
- Tools for polling place layout and operations management are virtually non-existent.
- Develop tools for election-day poll logistics for the 2020 General Election to protect voters and election workers in times of pandemic and civic unrest.
- Focus on Fulton County.
- Beyond their immediate application in this site, the results will be broadly applicable to jurisdictions nationwide, leading to increased public confidence in the outcome of elections.

*New America Foundation: Public Interest Technology University Network (Profs. Best, DeMillo, Kolesnikov, Montefleur, Nazal, Zegura)
Teams & Goals

**ISYE Teams**
- **Simulation**
  - Simulate the voting process using facility layout under different scenarios in order to minimize waiting time, queue length etc
- **Facility Layout**
  - Preliminary objective is to design facility layout by abiding to social distancing measures.
- **Architectural Design**
  - Build high quality 2D, 3D and animated models of polling facilities.
- **Scenario Forecasting**
  - Develop and forecast voter’s arrival for main elections.

**CoC and HCI**
- **Website**
  - Create a desktop and mobile-friendly web page to get current and/or predicted wait times out to voters.
- **Data**
  - Analyze historical data, such as data from the June 9th primary, to understand the busiest times and locations.
- **Policy**
  - Understand the legal and political landscape of the Fulton County elections in order to provide the best recommendations.
Conventional Polling Site Layout

Understanding the elements at polling sites:

Type of Queues:
1. Check in wait
2. Voting wait
3. Ballot scanning wait

Objects:
1. Check in counters
2. Voting machines
3. Scanning machines
Facility Layout Challenges

Objective:
1. Preliminary objective is to design facility layout by abiding to social distancing measures.
2. The resources on polling site should be located such that there will be continues and unobstructed flow of voters.
3. As a part of analysis it is of prime importance to find the trade off between the queue capacity and voting stations.

Hellen Mill 2D Drawing
Hellen mill 3D virtual tour

Scanning with Social Distance
Check in with Social Distance
Hellen Mill Facility Study

Hellen Mill 2D Drawing

Hellen mill 3D virtual tour
Precinct Layout with Social Distancing

Layout Standards Recommended by Election Board:

**Entrance and Exits**
- The entrance and exit are at opposite ends of the voting area, to allow a one-way progression of voters through the voting area.

**Supervisory Staff**
- Table should allow effective oversight of all staff and voter activity.

**Voting Compartments**
- Positioned so that voters can complete their votes in secret.
- Activity around the voting compartments can be monitored by polling officials.
- Wherever possible should be located between the voting materials issuing area and the ballot box(es).

**Ballot Boxes/Scanners**
- Ballot boxes should be set up in a position in full view of polling officials and observers.

Layout of Hellen facility Version 1

- Entrance
- Exit
- Scanning
- Manager
- Observer
- Check-in
- Voting
3D Tour of Hellen Mill Polling Layout
Results to date

• 3D Covid-safe layouts of most large polling places in Fulton County
• Wait time simulations for likely scenarios
• Predictive wait time modeling
• “What-if” analysis: continuing operations when disaster occurs
• Voter-facing tools
#SMARTer Together
Voter Research & Technology
October 13, 2020

Dr. Richard Barke
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VIP VoterTech: 5 instructors, 30 students, 2 semesters, 1-credit course

Goals
The goal of the VoterTech team is to investigate factors that affect voter turnout among college students and develop technologies to facilitate:

- Voter registration
- Transportation to the Polls on Election Day or for Early Voting (via ride sharing)
- Early and Absentee voting
- In-person voting

Issues Involved or Addressed
- What percentage of eligible college students are registered to vote and where?
- If registered at home, what percent vote early, by absentee ballot, on election day, or not at all?
- What factors affect college students’ likelihood of voting?
- What are the information needs of college students when voting?
- What are the differences in awareness between local issues (local to place of registration) and national issues? Does that difference impact desire to vote?

Academic Majors of Interest
City and Regional Planning, Computational Media, Computer Science, Human-Computer Interaction, Literature, Media, and Communication, Psychology, Public Policy
Smartphone app

Design options
“Is more technology a panacea?
Or is it a Pandora’s box?”

What are the objectives?
“democracy”: all votes, all equal
elections: functioning
process: perceived legitimacy

*Fair, accessible, convenient, familiar*
*Accurate, legitimate, secure*
*Efficient, transparent, accountable*
“Is more technology a panacea? Or is it a Pandora’s box?”

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VOTING “TECHNOLOGY”

Not just engineering
Postage stamps
Human systems and processes

What is the problem?
  Reality
  Perception

*Technologies operate within a complex environment moderated by social and behavioral variables.*

Voting, and voting technology, occur in a difficult environment of constant change and intense partisanship, involving differing laws and political cultures, government agencies that sometimes overlap or leave gaps, voting equipment vendors, nonprofit groups, and citizen activists – and of course the media and elected officials that can have very different perspectives of the problems and solutions.
VOTING “TECHNOLOGY”

A successful public policy / technology needs to be consistent with:

• Science
• Engineering
• Economics
• Constitution
• Statutory law(s)
• Organizational capabilities
• Ethics
• Norms and traditions
• Cognitive capacities
• Politics
EXAMPLE 1: Voting Places:

100,000 in the U.S.
20,000 in California
2,300 in Georgia
404 in Fulton County
136 in Cobb County

How many systems of registration, polling places, voting rules, training, etc.?

EXAMPLE 2: Registration
1993 National Voter Registration Act
registration at motor vehicle agencies
mail-in
Electronic Registration Information Center (half+ states)

Why hasn’t the problem been fixed?
Should we have a national voter registration list?
Is this a purely technological problem?
EXAMPLE 2: "Double-voting"

Most states prohibit voting more than once “in the same election.” But is voting in more than one state, but on the same day, voting in the “same election”? Or is each state-run election a separate election? What if voting occurred on different days, i.e. a voter cast an absentee ballot in one state and voted in person in another state on Election Day?

11 states explicitly prohibit voting in more than one state
7 states prohibit voting twice within the state or for the same office
31 states and Washington, D.C., prohibit voting twice in the same election

So what about a voter who voted in two states on the same federal election date?
· If neither state prohibits “voting more than once.” In this scenario, no crime has occurred, because there is no federal statute prohibiting double-voting. Voter registration in multiple states is not itself a crime, and thus no one can be prosecuted for simply having two open voter registrations in different jurisdictions.
· At least one state prohibits “voting more than once,” but the prohibiting state does not define “voting more than once.” Whether or not the voter violated the law varies by jurisdiction. In 2015 an Arizona woman cast an absentee ballot in Colorado and in-person in AZ. AZ Supreme Court: she did not vote "in the same election" twice because the elections were unique to each state and the AZ statute didn't apply to situations other than voting "for an office twice." AZ changed the law the next year.