

IOWA CAUCUS APP

Garrett Hoffman & Andrew Sang

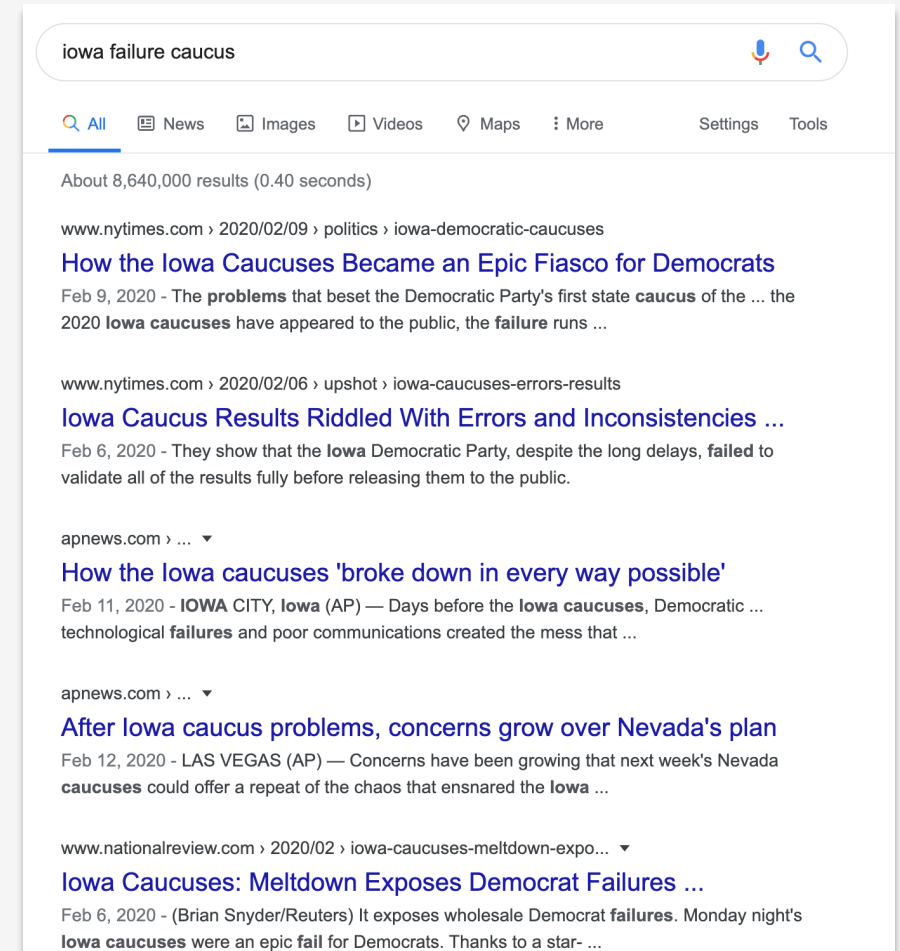
03/12/2020

Background

- Why are there primaries and caucuses?
 - What is the history behind them?
- What are delegates?
- How does the Iowa caucus process currently work?
 - What are State Delegate Equivalents (SDEs)
 - [NYTimes Demo](#)

Problem

- Iowa Caucus Chaos¹
 - App failure
 - Server downtime, reporting, & troubleshooting issues
- Data Recording Errors
 - User and translation error creating data reliability concerns



Our Approach

- Understand by replication
- Improve capability and data access
- Key features:
 - Determines 15% precinct threshold for end users
 - Automatic conversion of votes to SDEs per precinct
 - Built-in data quality checks
 - Live results and API data access

Logging In

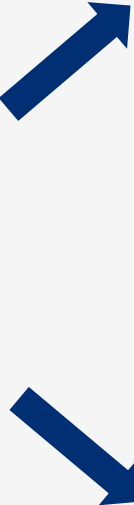
Incognito

localhost:5000/login?next=%2F

Login

Username:

Password:



Incognito

localhost:5000/login?next=%2F

Login failed

Incognito

localhost:5000

Iowa Caucus Results

County:	<input type="text" value="Please Select"/>
Precinct:	<input type="text" value="Please choose from above"/>
Round:	<input type="text" value="1"/>
Peter Buttigieg:	<input type="text" value="0"/>
Elizabeth Warren:	<input type="text" value="0"/>
Amy Klobuchar:	<input type="text" value="0"/>
Joe Biden:	<input type="text" value="0"/>
Andrew Yang:	<input type="text" value="0"/>
Bernie Sanders:	<input type="text" value="0"/>
Tom Steyer:	<input type="text" value="0"/>
Tulsi Gabbard:	<input type="text" value="0"/>
Uncommitted:	<input type="text" value="0"/>

Live Results

Recording Votes

First Preference

Iowa Caucus Results

County: Black Hawk

Precinct: X201

Round: 1

Peter Buttigieg: 120

Elizabeth Warren: 80

Amy Klobuchar: 20

Joe Biden: 10

Andrew Yang: 5

Bernie Sanders: 10

Tom Steyer: 20

Tulsi Gabbard: 100

Uncommitted: 50

Submit

Live Results

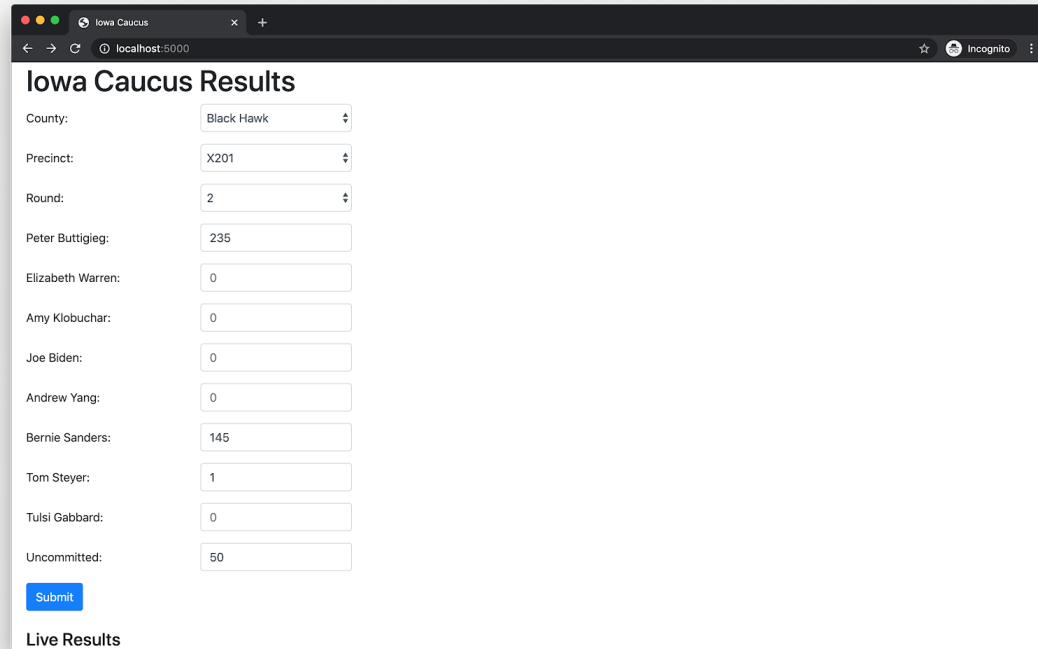


Successful Submission

	county	precinct	round	variable	value	qual_cand	valid_submit
0	Black Hawk	X201	1	buttigieg_votes	0.289157	1.0	1.0
1	Black Hawk	X201	1	gabbard_votes	0.240964	1.0	1.0
2	Black Hawk	X201	1	warren_votes	0.192771	1.0	1.0
3	Black Hawk	X201	1	uncommitted_votes	0.120482	1.0	1.0
4	Black Hawk	X201	1	klobuchar_votes	0.048193	0.0	1.0
5	Black Hawk	X201	1	steyer_votes	0.048193	0.0	1.0
6	Black Hawk	X201	1	biden_votes	0.024096	0.0	1.0
7	Black Hawk	X201	1	sanders_votes	0.024096	0.0	1.0
8	Black Hawk	X201	1	yang_votes	0.012048	0.0	1.0
9	Black Hawk	X201	1	other_votes	0.000000	0.0	1.0

Recording Votes

Round Two - Invalid

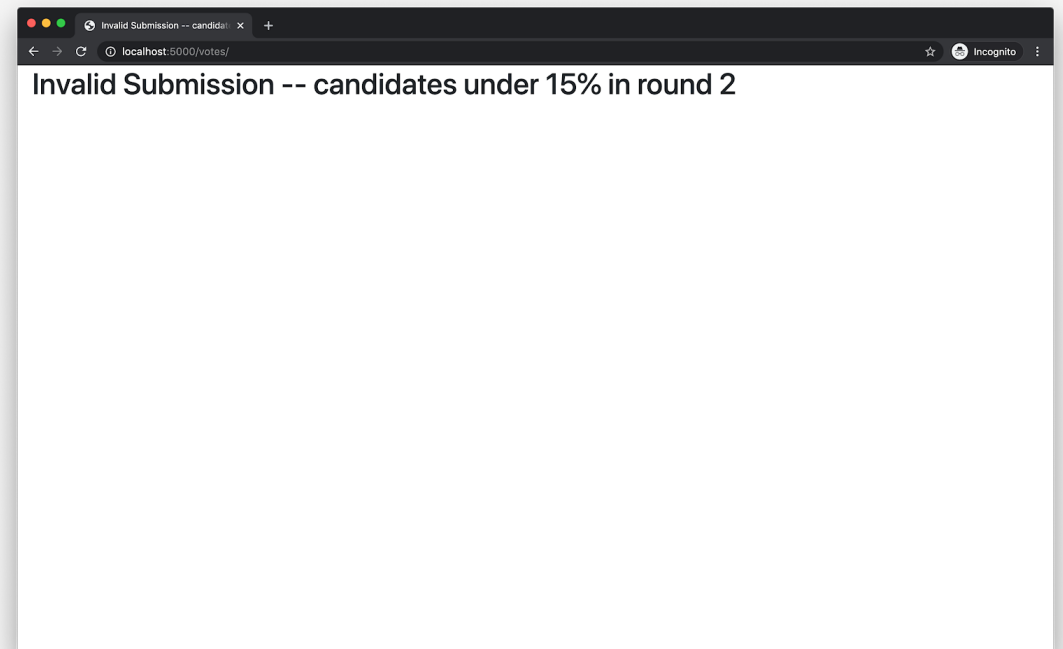


A screenshot of a web browser window titled "Iowa Caucus" showing a form for recording votes. The form includes dropdown menus for "County" (Black Hawk), "Precinct" (X201), and "Round" (2). Below these are input fields for candidates: Peter Buttigieg (235), Elizabeth Warren (0), Amy Klobuchar (0), Joe Biden (0), Andrew Yang (0), Bernie Sanders (145), Tom Steyer (1), Tulsi Gabbard (0), and Uncommitted (50). A blue "Submit" button is at the bottom left. The browser address bar shows "localhost:5000".

County:	Black Hawk
Precinct:	X201
Round:	2
Peter Buttigieg:	235
Elizabeth Warren:	0
Amy Klobuchar:	0
Joe Biden:	0
Andrew Yang:	0
Bernie Sanders:	145
Tom Steyer:	1
Tulsi Gabbard:	0
Uncommitted:	50

[Submit](#)

Live Results



A screenshot of a web browser window showing an error message. The browser address bar shows "localhost:5000/votes/". The message reads: "Invalid Submission -- candidates under 15% in round 2".

Invalid Submission -- candidates under 15% in round 2

Recording Votes

Round Two - Valid

Iowa Caucus Results

County: Black Hawk

Precinct: X201

Round: 2

Peter Buttigieg: 235

Elizabeth Warren: 0

Amy Klobuchar: 0

Joe Biden: 0

Andrew Yang: 0

Bernie Sanders: 145

Tom Steyer: 0

Tulsi Gabbard: 0

Uncommitted: 50

Submit

Live Results



Successful Submission

	county	precinct	round	variable	value	qual_cand	valid_submit
0	Black Hawk	X201	2	buttigieg_votes	0.546512	1.0	1.0
1	Black Hawk	X201	2	sanders_votes	0.337209	1.0	1.0
2	Black Hawk	X201	2	uncommitted_votes	0.116279	1.0	1.0
3	Black Hawk	X201	2	warren_votes	0.000000	0.0	1.0
4	Black Hawk	X201	2	klobuchar_votes	0.000000	0.0	1.0
5	Black Hawk	X201	2	biden_votes	0.000000	0.0	1.0
6	Black Hawk	X201	2	yang_votes	0.000000	0.0	1.0
7	Black Hawk	X201	2	steyer_votes	0.000000	0.0	1.0
8	Black Hawk	X201	2	gabbard_votes	0.000000	0.0	1.0
9	Black Hawk	X201	2	other_votes	0.000000	0.0	1.0

Live Results

- Statewide aggregate delegate counts
- Full precinct level results
- Most accurate pollsters based on current statewide results
- Least accurate pollsters based on current statewide results

Aggregate

	Candidate	Statewide Delegates
0	buttigieg	1.83
1	warren	2.72
2	klobuchar	0.00
3	biden	0.75
4	yang	0.00
5	sanders	3.51
6	steyer	0.00
7	gabbard	0.00
8	other	0.00
9	uncommitted	0.00

Results

	county	precinct	buttigieg_votes	warren_votes	klobuchar_votes	biden_
0	Polk	ANK 12	194	111	0	80
1	Johnson	IC.21	0	269	0	0

Best Pollster

	display_name	rmse
0	Gravis Marketing	8.28
1	Quinnipiac University	9.36
2	University of Iowa	9.79

Worst Pollster

	display_name	rmse
0	Emerson College	14.63
1	YouGov	15.90
2	Siena College/New York Times Upshot	23.86

Community Access via API

- Ability to access data via API to allow for future analyses and development
- End user can search via round or just opt to return all records

← → ↻ ⓘ 127.0.0.1:5000/api/v1/1

```
[{"biden_votes":66,"buttigieg_votes":148,"county":"Polk","gabbard_votes":0,"klobuchar_votes":63,"other_votes":0,"precinct":"ANK 12","round":1,"sanders_votes":107,"steyer_votes":5,"uncommitted_votes":1,"uuid":"PolkANK 121","warren_votes":91,"yang_votes":37}, {"biden_votes":13,"buttigieg_votes":72,"county":"Johnson","gabbard_votes":4,"klobuchar_votes":23,"other_votes":0,"precinct":"IC.21","round":1,"warren_votes":238,"yang_votes":45}]
```

Benefits

- Accuracy of data (built-in checks)
- Centralized and fast reporting of results
- Automatically performs voting and delegate math for end users
- API access for open community development

Drawbacks

What is left unsolved?

- Doesn't opportunity for human input error
- No paper backups limit recanvassing accuracy and leave opportunities for bad actors^{[1](#)}
- Does not change fundamental flaws with caucus systems
 - Confusing system and 3-4 hour time commitment creates barriers to voting and lowers turnout^{[2](#)}
 - Rounding of SDEs can create a difference between state delegate and populate vote winners^{[3](#)}

Potential Improvements

- More data validation (verify data consistency)
- Allow for the deletion of records (if someone made a mistake)
- More specialized and customized data outputs (e.g. geographical plot)
- Paper record backups

Caucus Alternatives

- Primary system
 - Open all day
 - Usually less time commitment
 - Can incorporate early voting
- Mail-in voting
 - More accessible and less time constrained voting
 - Paper backup
 - Higher voter turnout
- Ranked choice voting
 - More detailed understanding of voter preferences