Ballot Initiative Project

Automating Petition Validation Process

Civic Tech DC — **Project Night— Wed, January 22, 2025**

Initative 83

A voter-approved ballot initiative in Washington DC, that permits ranked-choice voting and opens primaries to independent voters

Ranked-Choice

1. Candiate A
2. Candidate B
3. Candidate C
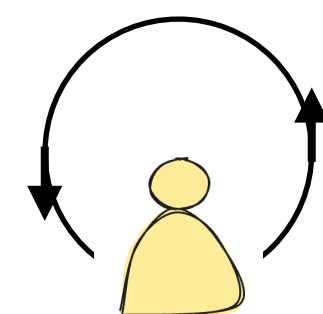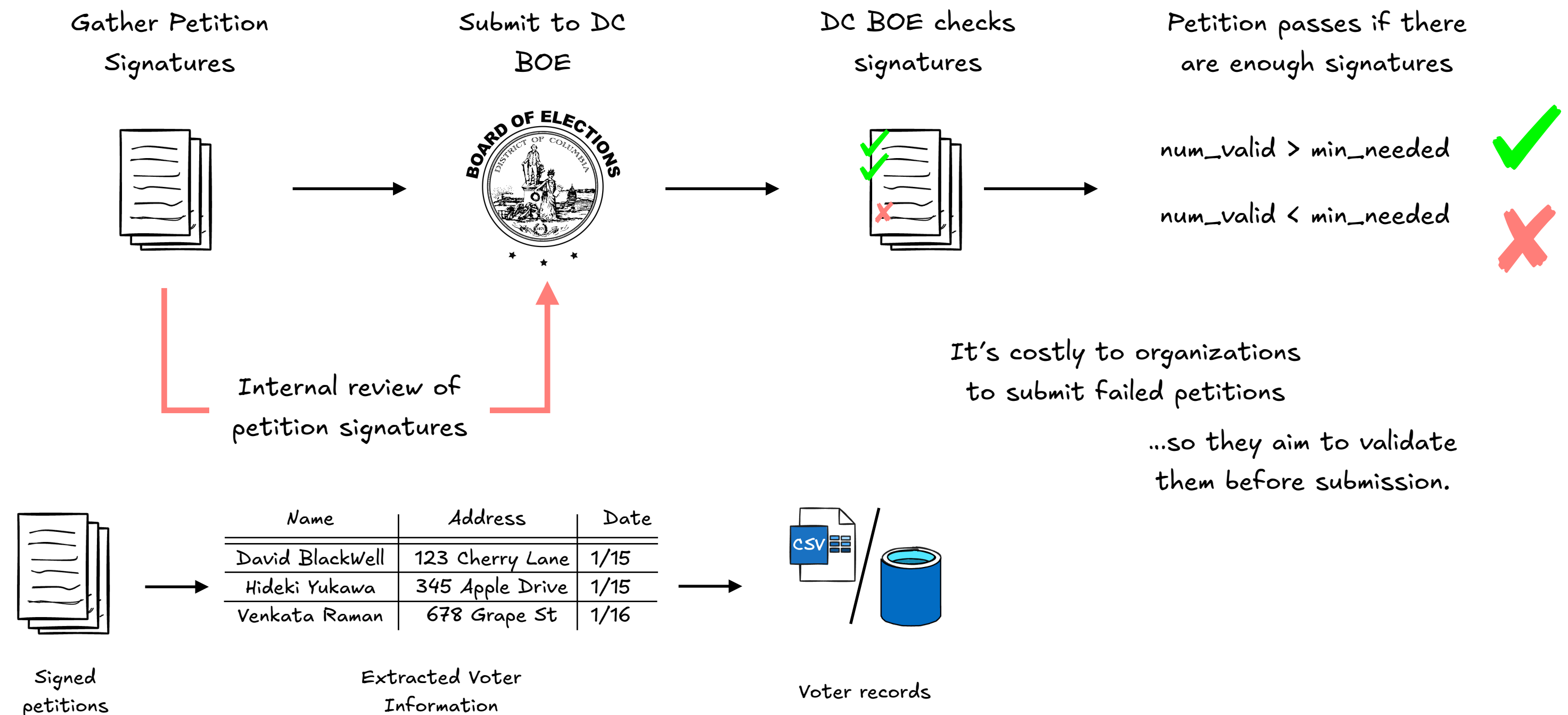
Traditional

o Candiate A
✗ Candidate B
o Candidate C

Before the initiaive could even make it onto the ballot it needed to be approved by DC Board of Elections

Campaign for Initiative 83 organized by

MAKE ALL VOTES COUNT DC

Required the organization to collect 40,000 signatures which were submitted to the DC Board of Elections

2024 ELECTION **ELECTIONS 2024** **WASHINGTON D.C.**

DC passes Initiative 83 bringing ranked choice voting and semi-open primaries to the District

Ella Robinson   November 7, 2024   4 min read

(https://thewash.org/2024/11/07/dc-passes-initiative-83-bringing-ranked-choice-voting-and-semi-open-primaries-to-the-district/)

Current Validation Process

Initative 83

A voter-approved ballot initiative in Washington DC, that permits <u>ranked-choice voting</u> and opens primaries to independent voters

Ranked-Choice	Traditional
1. Candiate A	○ Candiate A
2. Candidate B	✘ Candidate B
3. Candidate C	○ Candidate C

Before the initiaive could even make it onto the ballot it needed to be approved by DC Board of Elections

Campaign for Initiative 83 organized by

Required the organization to collect 40,000 signatures which were submitted to the DC Board of Elections

Organization's Process

Gather Petition Signatures → Submit to DC BOE → DC BOE checks signatures → Petition passes if there are enough signatures

$num\_valid > min\_needed$ ✔

$num\_valid < min\_needed$ ✘

Internal review of petition signatures

It's costly to organizations to submit failed petitions

...so they aim to validate them before submission.

Name	Address	Date
David BlackWell	123 Cherry Lane	1/15
Hideki Yukawa	345 Apple Drive	1/15
Venkata Raman	678 Grape St	1/16

Signed petitions → Extracted Voter Information → CSV / Voter records

People have to manually go through this process many, many times.

<u>"They want to change how D.C. votes — one signature at a time" (WaPo 2024)</u>

" After a person signs on the dotted line, **each signature must then be linked by name and address to an actual D.C. voter.** Though the Board of Elections will verify signatures when it receives petitions, Mintwood Strategies verifies them first.

… the initiative's field director, **typed names from the signature sheets into a database that linked the signature to a voter and checked for duplicates.**

It was slow, painstaking work… "

Automating this Process

"They want to change how D.C. votes — one signature at a time" (WaPo 2024)

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>
> … the initiative's field director, **typed names from the signature sheets into a database that linked the signature to a voter and checked for duplicates.**
>
> It was slow, painstaking work…

At Civic Tech DC we wanted to simplify this process by automating it.

Ultimately our goal was to…

Provide a cheap, quick, and accurate way to validate signed petitions for local ballot measures

Ballot Initiative Project (Automated Process)

PDF scans of signed forms → OCR Engine → Text on Name, Address, Ward, and Date
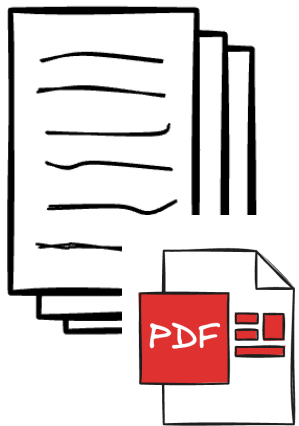
```
[{'Name': 'John Smith',
'Address': '132 Picket Lane',
'Ward': '2',
'Date': '11/01/2024'},
{'Name': 'Jane Plain', ...
```
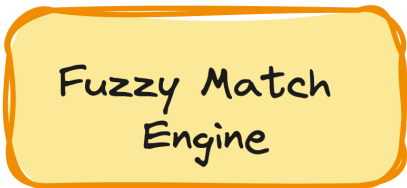
Database (or CSV) of voter records → Fuzzy Match Engine → Scores for signatures and valid status

Name	Address	Score	Valid
John Smith	132 Picket Lane	0.75	True

Application Page

We wrote some code to implement this process

(https://github.com/Civic-Tech-Ballot-Inititiave/Ballot-Initiative)
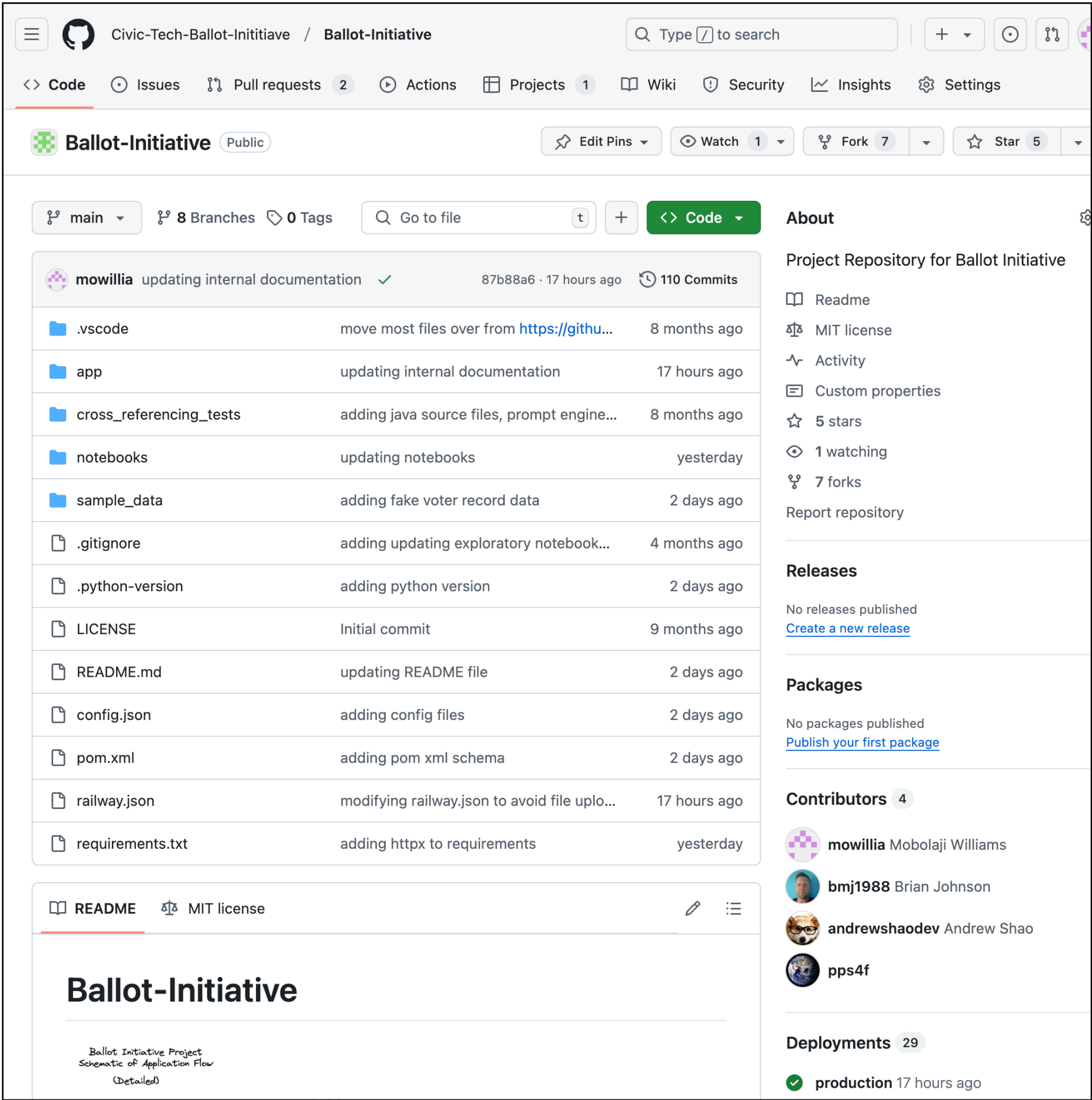
We built a simple web-application to demo this process

(https://ballot-initiative.streamlit.app/)

Demo Video

Reviewing the Goals

Ultimately our goal was to

> *Provide a cheap, quick, and accurate way to validate signed petitions for local ballot measures*

How well did we achieve this?

Grade for current approach: **B+**

Improvements in vision models and algorithmic approaches should reduce costs over time.

Cheap: How much does it cost to run the automation?

(https://llmpricecheck.com/openai/gpt-4o-mini/)

Using LLM vision models, it takes about **$1 to process 500 signatures**

(Based on 5 million input tokens and 12k output tokens)

Quick: How long does it take to run the process (for 500 signatures)?
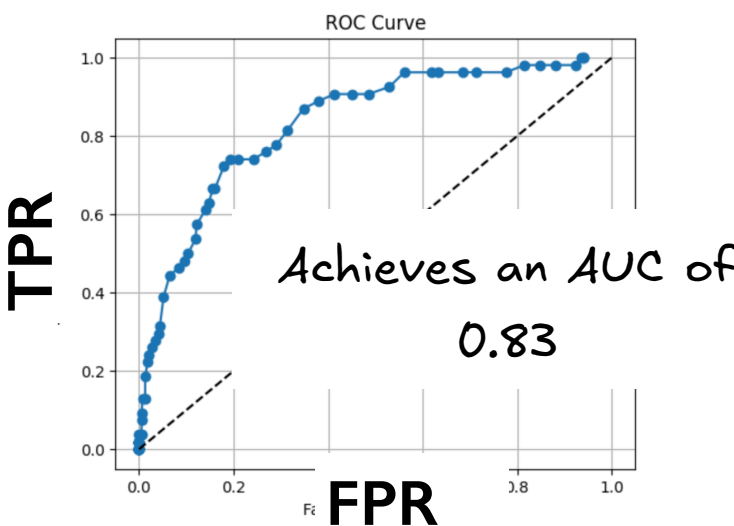

(application screenshot)

It takes about **3 minutes to process 500 signatures**

(A *very* efficient human checker would take about 40 minutes (~5 secs per signature))

Accurate: How many signatures does it correctly validate?

*For Data Sci folks

Achieves an AUC of 0.83

Using manually created voter validation tables, we find
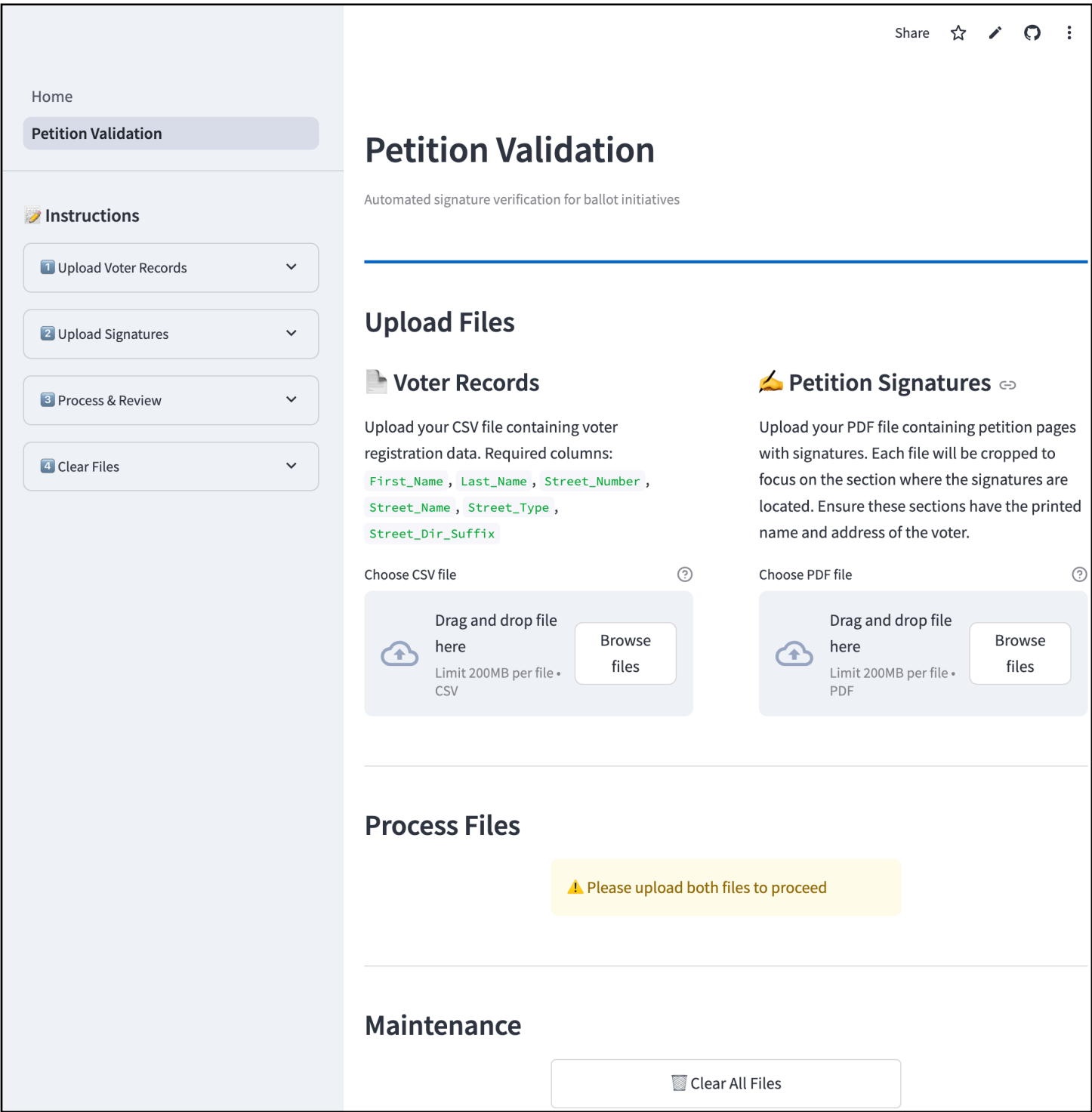
accuracy	precision	recall
0.861048	0.924084	0.916883

(Results from validation analysis; on Github)

It can capture **90% of valid signatures** and about **90% of the predicted-valid signatures are indeed valid**
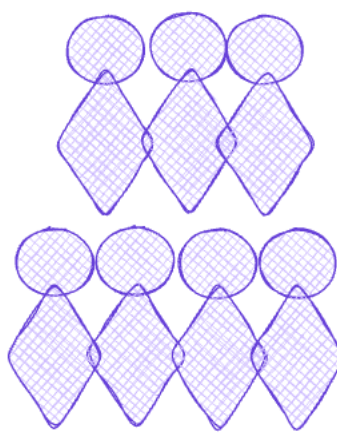
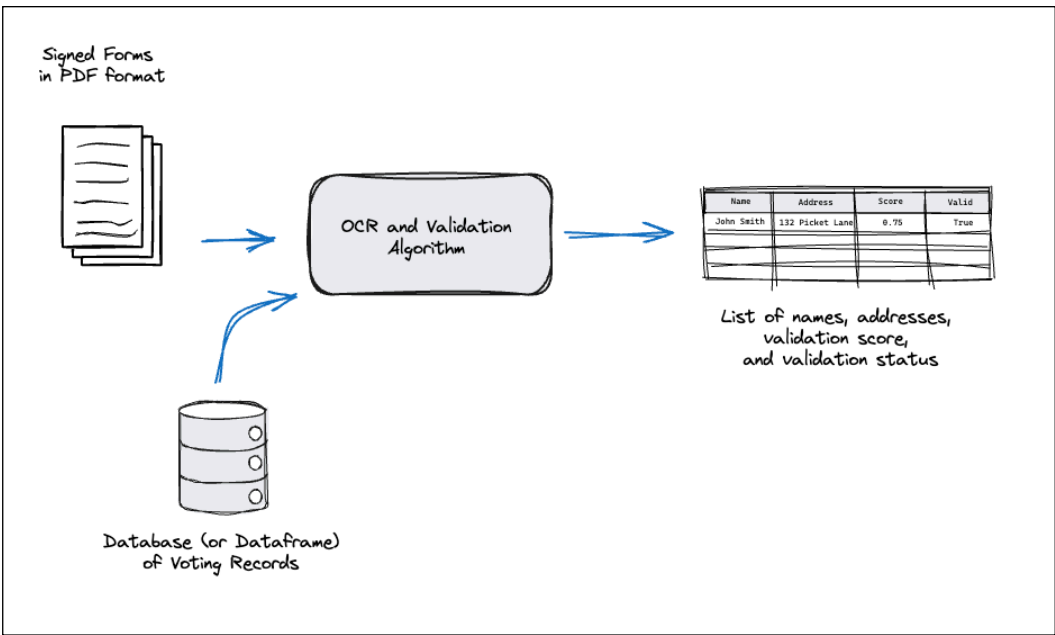(Changing score threshold changes both of these values)

Next Steps

What comes next in the project?

- Organization Outreach (outside DC)

- Algorithm Improvements

- Cleaner and More Scalable Application

Thanks to Project Contributors

- Mike Deeb
- Kevin Yu
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