

Automating Retroactive Conviction Relief in Utah

Project Overview from Code for America

July 19, 2021

CODE *for*
AMERICA

Clear My Record

PASSING BILLS



Clean Slate Policy
paves path to clear eligible
convictions at specified
time, automatically



IMPLEMENTING LAWS



Courts & Repositories
update records to reflect
relief granted

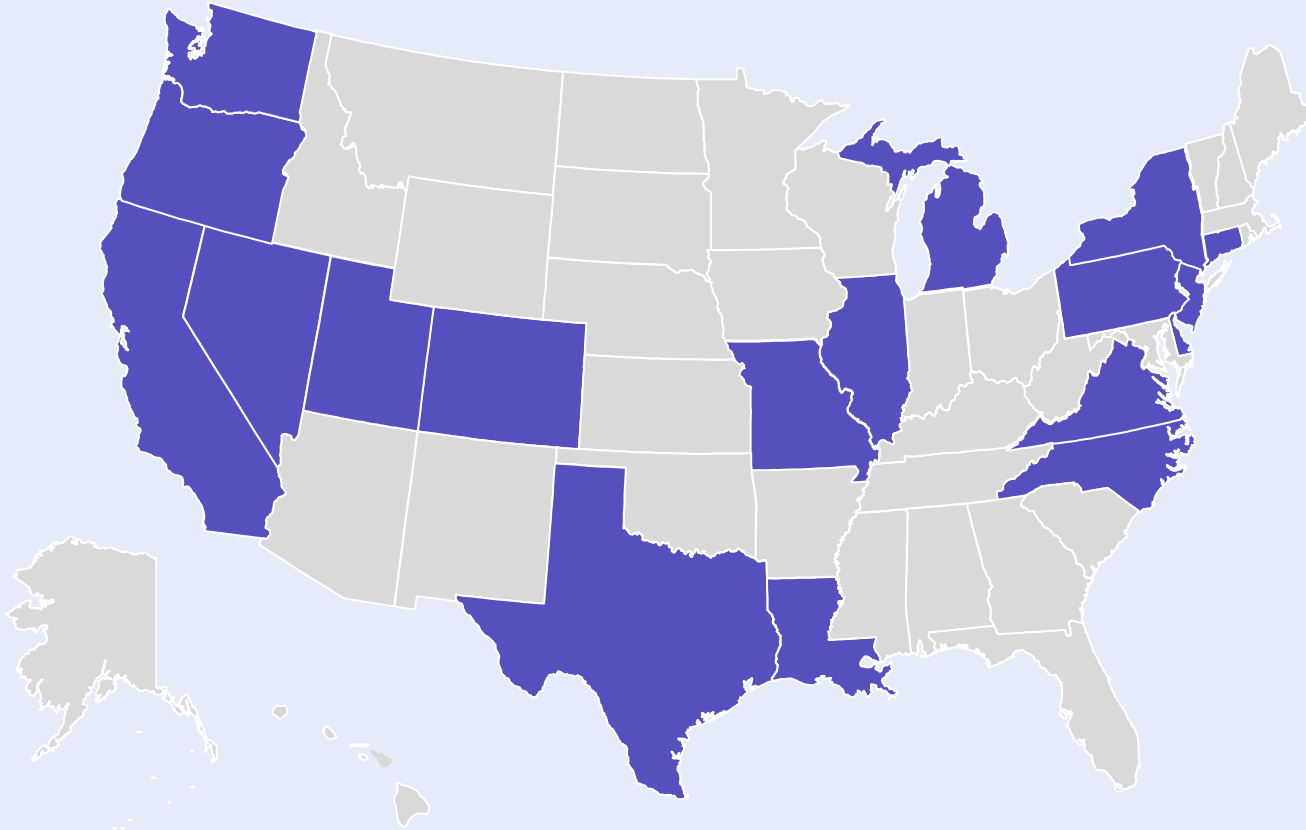


INFORMING & CONNECTING PEOPLE



Millions of people
can get the job or housing
they were previously
blocked from

States we've worked with on Clean Slate



	Task Force	Tech Assessment	Impact Analysis	Implementation
California			X	X
Connecticut		X	X	
Delaware		X		
Illinois				X
Louisiana	X	X		
Michigan		X	X	
New Jersey	X	X		
North Carolina		X		x
Oregon		X	X	x
Texas		X	X	
Utah			X	X
Washington		X		
Vermont				x

Technology Team in Utah

→ **Michael James Cowden: Director of Solutions Engineering**

Twenty five years of experience as a technologist executing successful software projects, including patented Internet messaging technology, as a founder of several early-stage startups, Fortune-500 companies and the Federal Government. Lead the development of the US SBA's online certification program, the first successful project among a dozen attempts to move the agency off of a paper based process.

→ **Maximilian Hell, PhD: Senior Data Scientist**

Trained at Stanford and Oxford, his research focuses on the economic consequences of incarceration ; co-authored a study published in Science on long-term trends in income mobility in the US.

Code for America's data science team is comprised of many renowned experts in this space including academics from the University of Denver, Columbia University, and the founding member of Google's quantitative research team.

**How do we confidently match
individuals in a messy data set?**

Specific challenges

1. How do you match across **multiple fields**?
2. How do you handle **empty fields and bad data**?
3. How do you handle **mis-entered names**?
4. How do you handle **inaccurately provided** information?
5. How do handle **data-entry and transcription errors**?
6. How do you handle data that **changes over time**?

Entity Resolution

How does it work?

1. Matching on Multiple Data Points

Name, dob, ssn, address, drivers license, otn, gender, phone + email

2. Handling Common Data-Entry Errors

Date transpositions, one number off, misspellings, address variations, etc.

3. Intelligent Name Matching

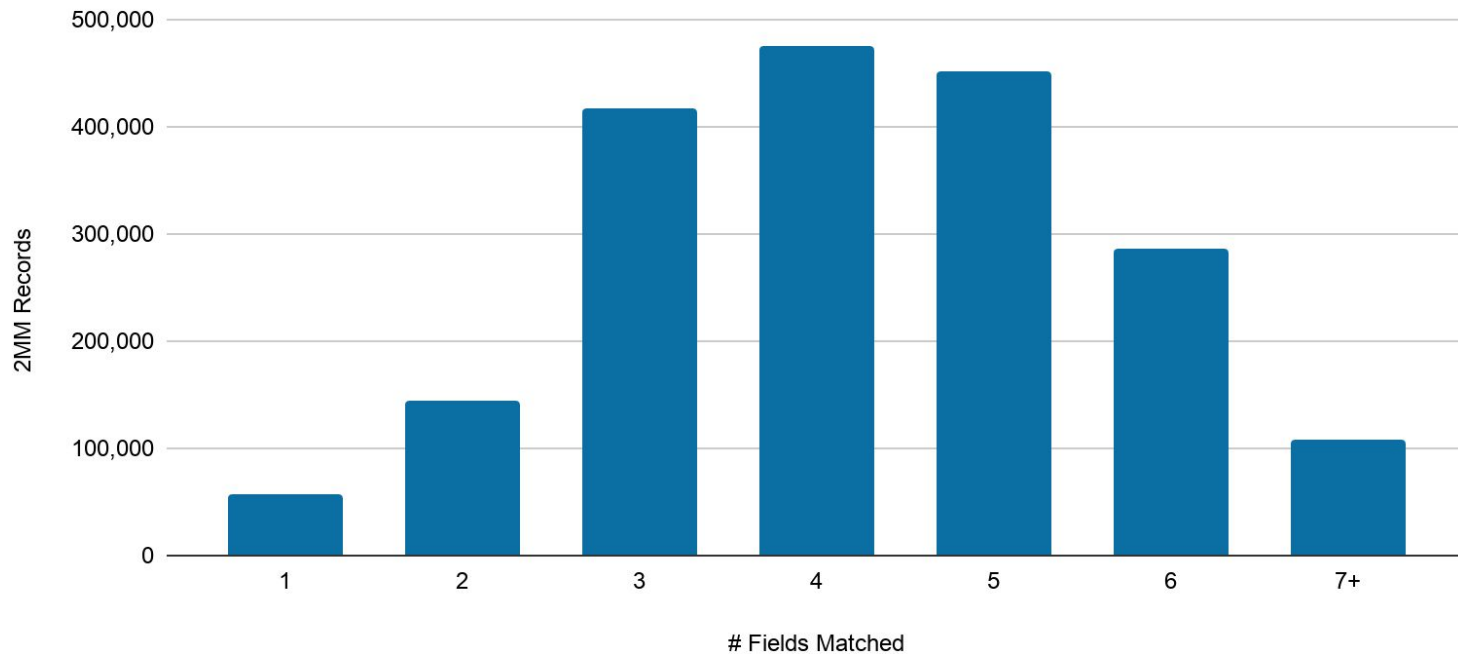
- Common sense matching: William, Bill, Will
- Cultural awareness for compound surnames
- String distance comparisons for mis-entered data

4. Entity-Centered Learning

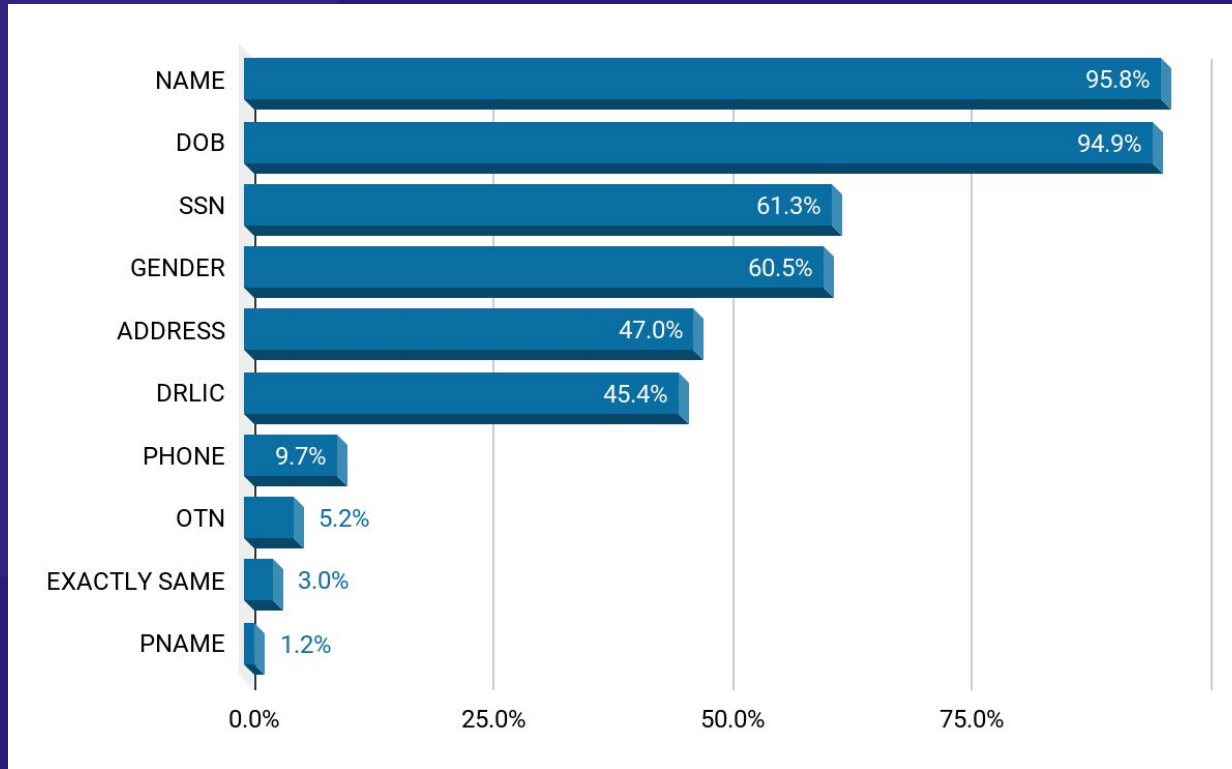
- Tracking changes to an individual's info over time

**Some high-level stats &
specific examples.**

90% Matched on 3+ Fields



Most Commonly Matched Fields



576 Unique Combinations of Fields

Algorithm	Count	
+NAME+DOB+GENDER+SSN+DRLIC	205,461	11%
+NAME+DOB+GENDER+ADDRESS+SSN+DRLIC	203,609	11%
+NAME+DOB+GENDER	131,059	7%
+NAME+DOB	122,499	6%
+NAME+DOB+ADDRESS	115,555	6%
+NAME+DOB+GENDER+SSN	110,921	6%
+NAME+DOB+SSN	109,551	6%
+NAME+DOB+GENDER+ADDRESS	85,205	4%
+NAME+DOB+GENDER+ADDRESS+PHONE+SSN+DRLIC	80,321	4%
+NAME+DOB+GENDER+ADDRESS+SSN	74,482	4%
+NAME+DOB+ADDRESS+SSN	65,769	3%
+NAME+DOB+SSN+DRLIC	65,197	3%
+NAME+DOB+ADDRESS+SSN+DRLIC	61,193	3%
+EXACTLY_SAME	57,827	3%

Individuals in the UT Court System

National Average
(2018)

77,700,000

37.2%

UT Courts
(2020)

838,823

37.6%

BCI Estimates
(2018)

819,800

36.8%

Sources: [2018 US CENSUS Data](#) [2014 FBI III](#) [2018 BJS Survey of CHIS](#)

What matches?

Numerical Data Entry Errors

1951-01-08
1951-02-05
1951-02-08
1951-02-09
1951-07-08
1951-12-08
1961-07-08

These are actual dates matched to a single individual based on common data entry errors:

- One digit off
- Digits that look alike during transcription
- Adjacent numbers on a numeric keypad

Similar data errors can be found with other identifiers, like SSN. The entity-resolution software was able to account for these as well.

123-45-6789
124-45-6789
123-45-6784
001-23-4567
XXX-45-6789

Address Matches

Variations in addresses can be quite complex, as well.

Here is an example of the different forms of a single address the software was able to match...

1234 S 250 W Magna, Ut 84084

1234 S 250 W W Jordan, Ut

1234 S 250 W W Jordan, Ut 84084

1234 S 250 W West Jordan, Ut

1234 S 250 W West Valley City, Ut

1234 So 250 W West Jordan, Ut

1234 So 250 W Wj, Ut 84084

1234 South 250 West Slc, Ut 84120

1234 South 250 West West Jordan, Ut

Name Matches

- Antoine Steve Bombs
- Stephen A Bombs
- Stephen A Bomes
- Stephen Antione Bombs
- Stephen Antoine Bombs
- Stephen Antoine Bomes
- Stephen Bomb
- Stephen Bombs
- Stephen Bombs Willowtree
- Stephen Bomes
- Stephen Boombs
- Stephen H Bomes
- Steve A Bombs
- Steve A Bomes
- Steve A Boombs
- Steve A Willowtree
- Steve A. Bomes
- Steve Anthony Willowtree
- Steve Antione Bomes
- Steve Antoine Bombs
- Steve Antoine Bomes
- Steve Antoine Boomb
- Steve Antoine Boombs
- Steve Anton Willowtree
- Steve Antone Bombs
- Steve Antonie Bombs
- Steve Antonine Bombs
- Steve Antonio Bombs
- Steve Bomb
- Steve Bombs
- Steve Bomes
- Steve Boombs
- Steve Willowtree
- Steven A Boombs
- Steven A Bombs
- Steven A Bomes
- Steven A Boombs
- Steven Andrew Bombs
- Steven Andrew Boombs
- Steven Anthony Bombs
- Steven Antione Bombs
- Steven Antoine Bombe
- Steven Antoine Bombs
- Steven Antoine Boombs
- Steven Anton Willowtree
- Steven Antone Bombs
- Steven Antone Bomes
- Steven Antone Boombs
- Steven B Boombs
- Steven Bomb
- Steven Bombe
- Steven Bombs
- Steven Bomes
- Steven Boombs

Entity-Centered Learning

NAME	DOB	SSN	ADDRESS
Debbie Stringer	1965-12-03	999-929-9999	101 E 909 S Salt Lake City, Ut 84100
Debbie C Stringer	1965-12-30		101 E 909 S Salt Lake City, Ut 84100
Debbie C Stringer	1965-12-30		101 E 909 S Salt Lake City, Ut 84100
Debbie C Stringer	1965-12-03		101 E 909 S Salt Lake City, Ut 84100
Debbie Cassidy Hall	1965-12-03	999-929-9999	50 Bradley Street Salt Lake City, Ut 84101
Debbie Cassidy Hall	1965-12-03	999-929-9999	50 S Bradley St. Slc, Ut 84104
Debbie Cassidy Dawson	1965-12-03		828 38th Street Ogden, Ut
Debbie Cassidy Hall	1965-12-03	999-929-9999	50 So Bradley St Salt Lake City, Ut 84104
Debbie M Baker	1965-12-03		980 Maple Street Ogden, Ut 84401
Debbie M Baker	1965-12-03		980 Maple Street Ogden, Ut 84401
Debbie C Dawson	1965-12-03		828 38th Street Ogden, Ut 84401
Debbie C Dawson	1965-12-03		

Project Timeline

**Technical Evaluation
& Data Processing**

**Iterative Review &
Feedback from AOC**

**Eligibility
Determination**

Feb-Mar

Apr-May

Jun-Aug

Sep-Nov

Dec-Feb

Feb-Mar

Apr-Jul

2020

2020

2020

2020

2020-2021

2021

2021

Entity Resolution

**Manual Record
Review by Court**

**Human Expert
Review & Report**

How did the software do?

Internal Reviews of Matches & Eligibility

- ★ Court staff reviewed **43,833** individual records
- ★ Only **42 of records were flagged** that had five or fewer cases: *those eligible for conviction relief*
- ★ Court Data Services Team reviewed over **30k** charges
- ★ **Zero unexpected ineligible charges** were found

In Summary

1. Employed a modern technical solution, based on 75 years of statistical and computer science research and shown more effective than clerical methods at matching individuals.
2. Selected entity-resolution software vendor that focuses on matching individuals, at scale, in the criminal justice space.
3. Participated in multiple rounds of internal and external review by court staff and external researchers.
4. Matched individuals in the court system to within 1% of the 2018 state and national averages.
5. Achieved a success rate for eligibility determination of over 99.9% versus a rate of 97.3% for human expert review.

Final Steps for Retroactive Conviction Relief

1. Fix all eligibility code issues related to ineligible charge types, bringing code accuracy rate to 99.7%
2. Finalize code updates to reflect the outstanding legal decision around cases “Dismissed without prejudice,” bringing the accuracy rate to 99.9%
3. Pull latest data and perform final eligibility determination for retroactive conviction relief
4. Hand this eligible set of convictions to the Administrative Office of Courts to begin the expungement process

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