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Eric & Wendy Schmidt

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# Data Science For Social Good

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Summer Fellowship

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THE UNIVERSITY OF  
**CHICAGO**

# Legislative Influence Detector

Sunlight Foundation



**Matthew Burgess**



**Eugenia Giraudy**



**Julian Katz-Samuels**



**Joe Walsh**



**Lauren Haynes**

# State laws matter

states spend more than \$1.5 trillion on  
programs and services  
pass 75 times more bills than Congress

## Wisconsin SB 179 (2015)

Child's entire body nociceptors are present no later than 16 weeks after fertilization and nerves link these receptors to the brain's thalamus and subcortical plate by no later than 20 weeks. (b) by 8 weeks after fertilization, the unborn child reacts to stimuli that would be recognized as painful if applied to an adult human, for example, by recoiling. (c) in the unborn child, application of painful stimuli is associated with significant increases in stress hormones known as the stress response.

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## Louisiana SB 593 (2012)

Child's entire body - - by no later than sixteen weeks after fertilization and nerves link these receptors to the brain's thalamus and subcortical plate by no later than twenty weeks. (9) by eight weeks after fertilization, the unborn child reacts to touch. After twenty weeks post fertilization, the unborn child reacts to stimuli that would be recognized as painful if applied to an adult human, for example, by recoiling. (10) in the unborn child, application of such painful stimuli is associated with significant increases in stress hormones known as the stress response.

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## Kansas HB 2218 (2012)

(a) Pain receptors (nociceptors) are present throughout the unborn child's entire body by no later than 16 weeks after fertilization and nerves link these receptors to the brain's thalamus and subcortical plate by no later than 20 weeks; (b) by eight weeks after fertilization, the unborn child reacts to stimuli that would be recognized as painful if applied to an adult human, for example, by recoiling

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18 (2012)

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http://sunlightfoundation.com/lid



Insert Query

Search





http://sunlightfoundation.com/lid



Pain receptors known as nociceptors are present throughout the unborn child's entire body by no later than sixteen (16) weeks after fertilization

Search





Pain receptors known as nociceptors are present throughout the unborn child's entire body by no later than sixteen (16) weeks after fertilization

| Bill Id | State | Year |
|---------|-------|------|
| SB 192  | AK    | 2014 |
| HB 243  | IL    | 2012 |
| SB 76   | TX    | 2013 |
| HR 43   | FL    | 2010 |





Pain receptors known as nociceptors are present throughout the unborn child's entire body by no later than sixteen (16) weeks after fertilization

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| SB 76   | TX    | 2013 |
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pain receptors known as nociceptors are present throughout the unborn child entire body - - - by - - - - - no later than sixteen (16) weeks

pain receptors - - (nociceptors) are present throughout the - - - body and are linked by functioning nerves to the brain's thalamus and subcortical plate no later than - 20 weeks

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Child's entire body nociceptors are present prior to fertilization and nerves link these receptors to the brain's thalamus and subcortical plate by no later than 20 weeks. (b) by 8 weeks after fertilization, the unborn child reacts to stimuli that would be recognized as painful if applied to an adult human, for example, by recoiling. (c) in the unborn child, application of painful stimuli is associated with significant increases in stress hormones known as the stress response.

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Georgia HB 954 (2012)

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Oklahoma HB 1888 (2011)

## Kansas HB 2218 (2012)

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Idaho SB 1165 (2011)



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Arkansas HB 1037 (2013)

Georgia HB 954 (2012)

West Virginia HB 2568 (2015)

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Texas HB 2 (2014)

Idaho SB 1165 (2011)

Wisconsin SB 179 (2015)

Louisiana SB 593 (2012)

Child's entire body nociceptors are

Oklahoma HB 1888 (2011)

pre-  
fertilization and nerves link these

Illinois HB 3565 (2015)

receptors to the brain's thalamus and subcortical structures

Georgia HB 954 (2012)

than 20 weeks. (b) by 8 weeks after

Kentucky HB 393 (2015)

to similar that would be recognized as an adult human recoiling.

Kansas HB 2218 (2012)

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Maryland HB 492 (2015)

Oregon HB 2388 (2015)

Idaho SB 1165 (2011)

Wisconsin SB 179 (2015)

Louisiana SB 593 (2012)

Michigan HB 5343 (2012)

Oklahoma HB 1888 (2011)

Arkansas HB 1037

Virginia HB 2321 (2015)

Illinois HB 5565 (2015)

Mississippi SB 2427 (2014)

Georgia HB 554 (2012)

Illinois HB 3565 (2015)

West Virginia HB 2568 (2015)

Kentucky HB 393 (2015)

Kansas HB 2218 (2012)

Iowa SB 91 (2015)

Minnesota HF 936 (2011)

New Mexico SB 222 (2011)

HB 2 (2014)

Maryland HB 492 (2015)

Florida SB 1948 (2011)

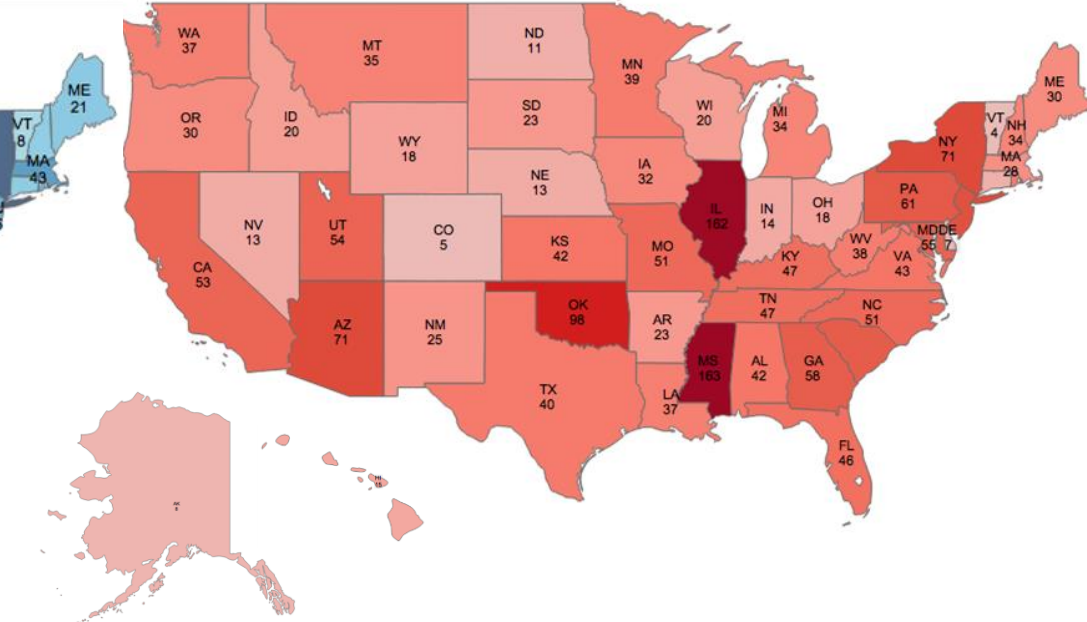
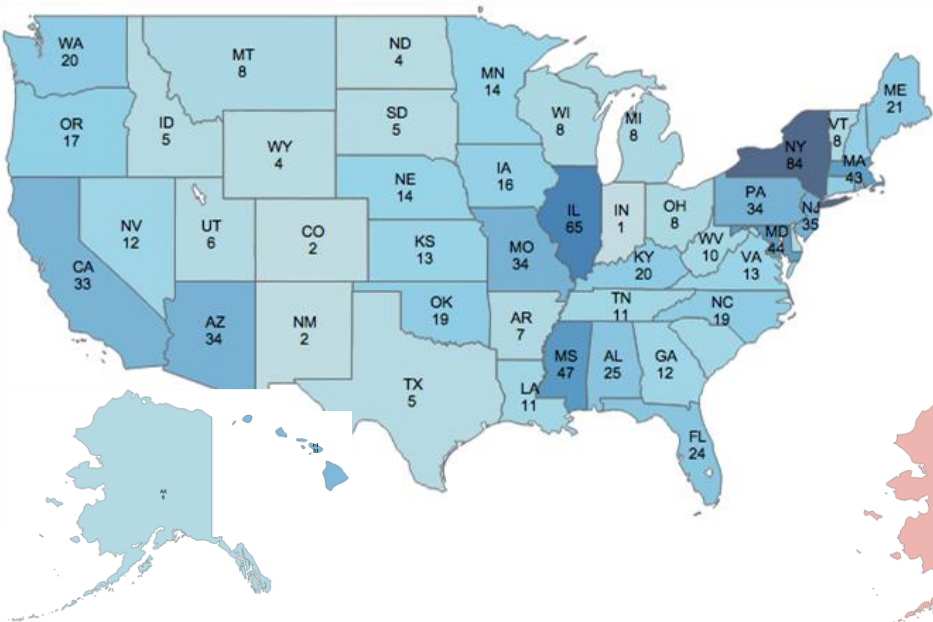
Oregon HB 2388 (2015)

South Carolina B 130 (2015)

Idaho SB 1165 (2011)

Number of Introduced Bills drafted by ALICE  
2010-2015

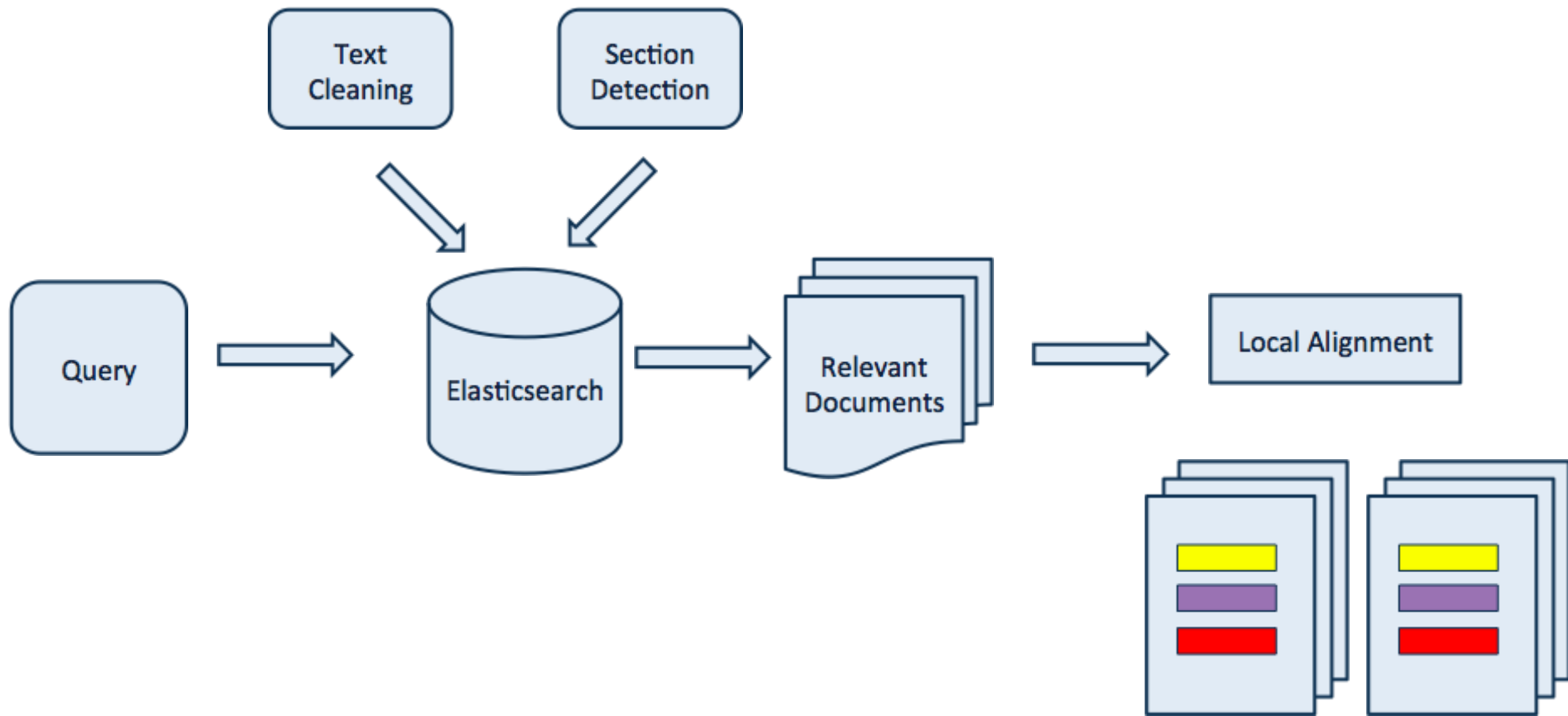
Number of Introduced Bills drafted by ALEC  
2010-2015



Number of Bills  
1 84  
Total: 960

Number of Bills  
2 163  
Total: 1816

# Pipeline



# Indexing Bills

(A) the federal land manager of each such area shall develop a plan for evaluating visibility

the federal

federal land

land manager

⋮

the federal land

federal land manager

⋮

the federal land manager

federal land manager of

ElasticSearch

# Definition of Alignment

“I love the New  
York Knicks”

“I like the Knicks”

I

love

the

New

York

Knicks

I

like

the

--

--

Knicks

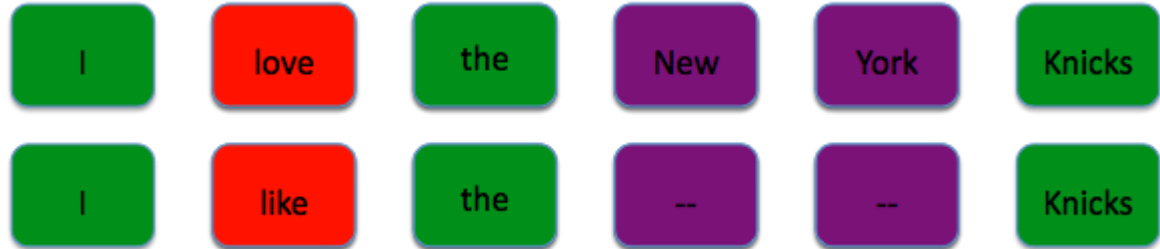
# An Optimal Alignment

Scoring of alignment:

match score

mismatch score

gap score



Goal:

given two texts, find the alignment of two subsequences that has the optimal score.



# Example

|        |   |   |      |     |        |
|--------|---|---|------|-----|--------|
|        | 0 | I | like | the | Knicks |
| 0      | 0 | 0 | 0    | 0   | 0      |
| I      | 0 | ? |      |     |        |
| love   | 0 |   |      |     |        |
| the    | 0 |   |      |     |        |
| New    | 0 |   |      |     |        |
| York   | 0 |   |      |     |        |
| Knicks | 0 |   |      |     |        |

Match Score: 2  
Mismatch Score: -2  
Gap score: -.5

# Example

|        |   |   |      |     |        |
|--------|---|---|------|-----|--------|
|        | 0 | I | like | the | Knicks |
| 0      | 0 | 0 | 0    | 0   | 0      |
| I      | 0 | 2 |      |     |        |
| love   | 0 |   |      |     |        |
| the    | 0 |   |      |     |        |
| New    | 0 |   |      |     |        |
| York   | 0 |   |      |     |        |
| Knicks | 0 |   |      |     |        |

Match Score: 2  
Mismatch Score: -2  
Gap score: -.5



# Example

|        |   |   |      |     |        |
|--------|---|---|------|-----|--------|
|        | 0 | I | like | the | Knicks |
| 0      | 0 | 0 | 0    | 0   | 0      |
| I      | 0 | 2 | ?    |     |        |
| love   | 0 |   |      |     |        |
| the    | 0 |   |      |     |        |
| New    | 0 |   |      |     |        |
| York   | 0 |   |      |     |        |
| Knicks | 0 |   |      |     |        |

Match Score: 2  
Mismatch Score: -2  
Gap score: -.5



# Example

|        |   |   |      |     |        |
|--------|---|---|------|-----|--------|
|        | 0 | I | like | the | Knicks |
| 0      | 0 | 0 | 0    | 0   | 0      |
| I      | 0 | 2 | 1.5  |     |        |
| love   | 0 |   |      |     |        |
| the    | 0 |   |      |     |        |
| New    | 0 |   |      |     |        |
| York   | 0 |   |      |     |        |
| Knicks | 0 |   |      |     |        |

Match Score: 2  
Mismatch Score: -2  
Gap score: -.5

I

like

I

--

# Example

|        |   |   |      |     |        |
|--------|---|---|------|-----|--------|
|        | 0 | I | like | the | Knicks |
| 0      | 0 | 0 | 0    | 0   | 0      |
| I      | 0 | 2 | 1.5  | ?   |        |
| love   | 0 |   |      |     |        |
| the    | 0 |   |      |     |        |
| New    | 0 |   |      |     |        |
| York   | 0 |   |      |     |        |
| Knicks | 0 |   |      |     |        |

Match Score: 2  
Mismatch Score: -2  
Gap score: -.5

I

like

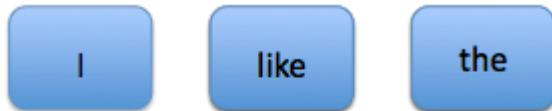
I

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# Example

|        |   |   |      |     |        |
|--------|---|---|------|-----|--------|
|        | 0 | I | like | the | Knicks |
| 0      | 0 | 0 | 0    | 0   | 0      |
| I      | 0 | 2 | 1.5  | 1   |        |
| love   | 0 |   |      |     |        |
| the    | 0 |   |      |     |        |
| New    | 0 |   |      |     |        |
| York   | 0 |   |      |     |        |
| Knicks | 0 |   |      |     |        |

Match Score: 2  
Mismatch Score: -2  
Gap score: -.5



# Example

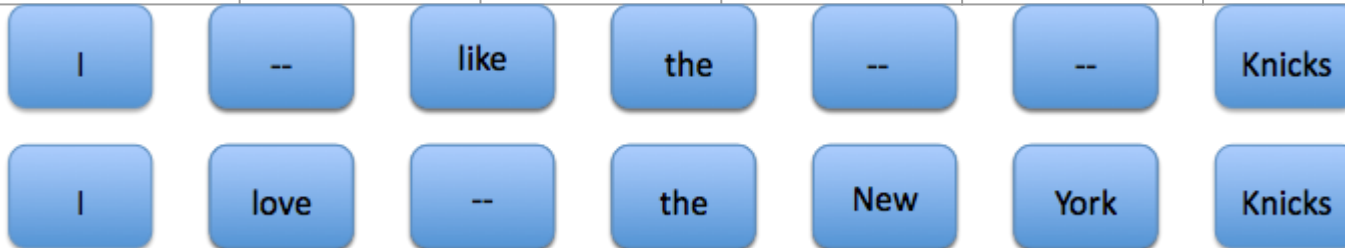
|        |   |     |      |     |        |
|--------|---|-----|------|-----|--------|
|        | 0 | I   | like | the | Knicks |
| 0      | 0 | 0   | 0    | 0   | 0      |
| I      | 0 | 2   | 1.5  | 1   | 0.5    |
| love   | 0 | 1.5 | 1    | 0.5 | 0      |
| the    | 0 | 1   | 0.5  | 3   | 2.5    |
| New    | 0 | 0.5 | 0    | 2.5 | 2      |
| York   | 0 | 0   | 0    | 2   | 1.5    |
| Knicks | 0 | 0   | 0    | 1.5 | 4      |

Match Score: 2  
Mismatch Score: -2  
Gap score: -.5

# Example

|        |   |     |      |     |        |
|--------|---|-----|------|-----|--------|
|        | 0 | I   | like | the | Knicks |
| 0      | 0 | 0   | 0    | 0   | 0      |
| I      | 0 | 2   | 1.5  | 1   | 0.5    |
| love   | 0 | 1.5 | 1    | 0.5 | 0      |
| the    | 0 | 1   | 0.5  | 3   | 2.5    |
| New    | 0 | 0.5 | 0    | 2.5 | 2      |
| York   | 0 | 0   | 0    | 2   | 1.5    |
| Knicks | 0 | 0   | 0    | 1.5 | 4      |

Match Score: 2  
Mismatch Score: -2  
Gap score: -.5





# Is LID useful for Social Science?

a new tool for measuring legislative influence  
variable in a regression?  
networks of legislators?  
limitations

# How can computer science help SS?

well known quantitative tools of SS:

econometrics

statistics

less well known quantitative tools of SS:

algorithms and machine learning

# Advice for learning more

Online courses

Projects

Thank you