The background of the slide is a high-angle aerial photograph of a complex multi-level highway interchange. The roads are grey with white dashed lines, and several cars are visible on the lanes. The interchange is built over a river, with green trees and some buildings visible in the surrounding area.

*General Assembly, November 2019*

# Optimizing Evacuation Routes Using Real-Time Traffic Information

Nick Cote  
Fausto De La Rosa Mañòn  
Ilya Kvyatkovskiy

# Project Statement

- ❖ During an emergency, time is of the essence. A lag of even just a minute can be catastrophic in an emergency, or disaster. Emergency services need access to the most up-to-date information, especially when on route to / from certain destinations.
- ❖ Leveraging social media, can we provide real-time information on road conditions and provide the best possible routes in the moment? If so, how?



David Tapia San Martin / Unsplash

# Project Work Flow

- ❖ Initial Data Collection
- ❖ Data Cleaning
- ❖ Modeling with Data
- ❖ Extracting Location Information
- ❖ Plotting with Data
- ❖ Next Steps



John Doyle/Unsplash

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# Our Approach

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## TEST CASE - THE GREAT STATE OF NEW JERSEY

- ❖ Scraping official traffic-related Twitter channels
- ❖ Building and training a classifier to identify relevant tweets
- ❖ Extracting location information
- ❖ Mapping road closures

# Initial Data Collection



## Official NJ Twitter Account

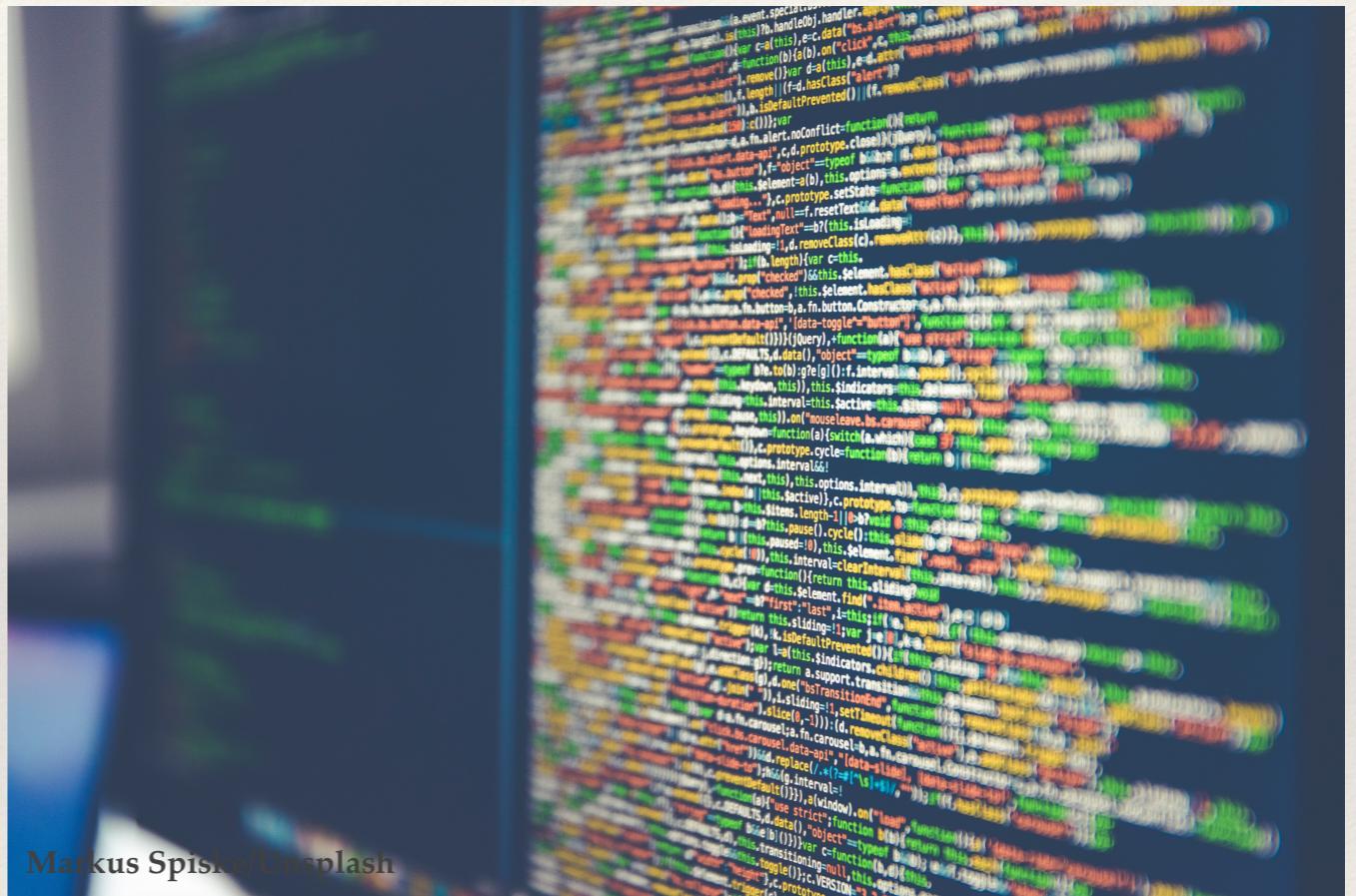
511NJ  
(17 accounts)  
NJDOT\_Info  
NJTRANSIT  
(14 accounts)  
511-516 NJ Partners  
(6 accounts)

**TOTAL:**

**20\_000 tweets**

# Twitter Scraping

- ❖ Library: GetOldTweets3
- ❖ keywords
- ❖ max\_tweets
- ❖ setSince / setUntil



Markus Spiske/Unsplash

# Data Cleaning and Pre-Processing

TWEETS



SPAM

HAM



NEG Class

DATA

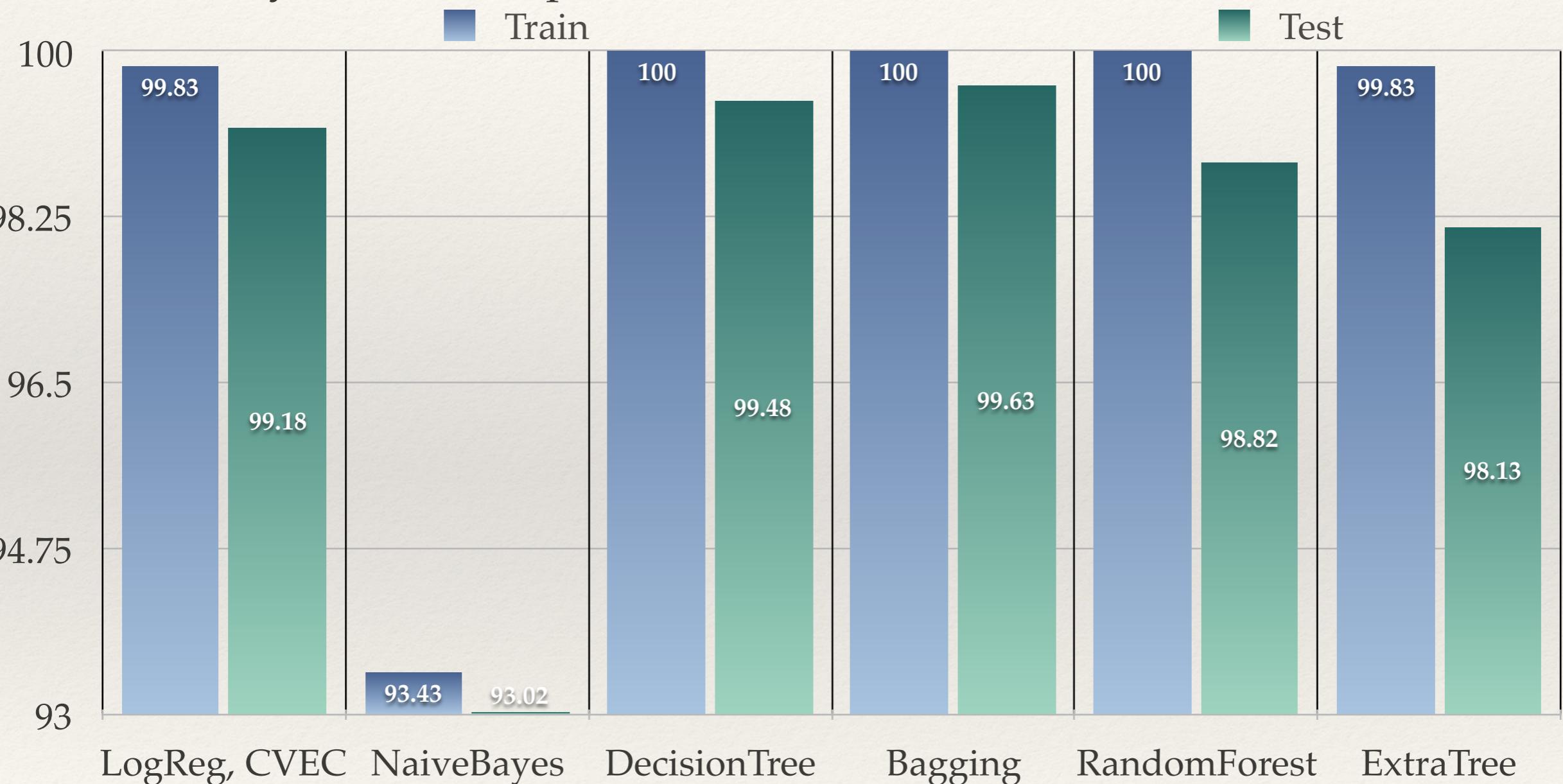


POZ Class



# Modeling with Data

Accuracy Scores Comparison



Best model - Bagging Classifier

# Location Extraction

# spaCy

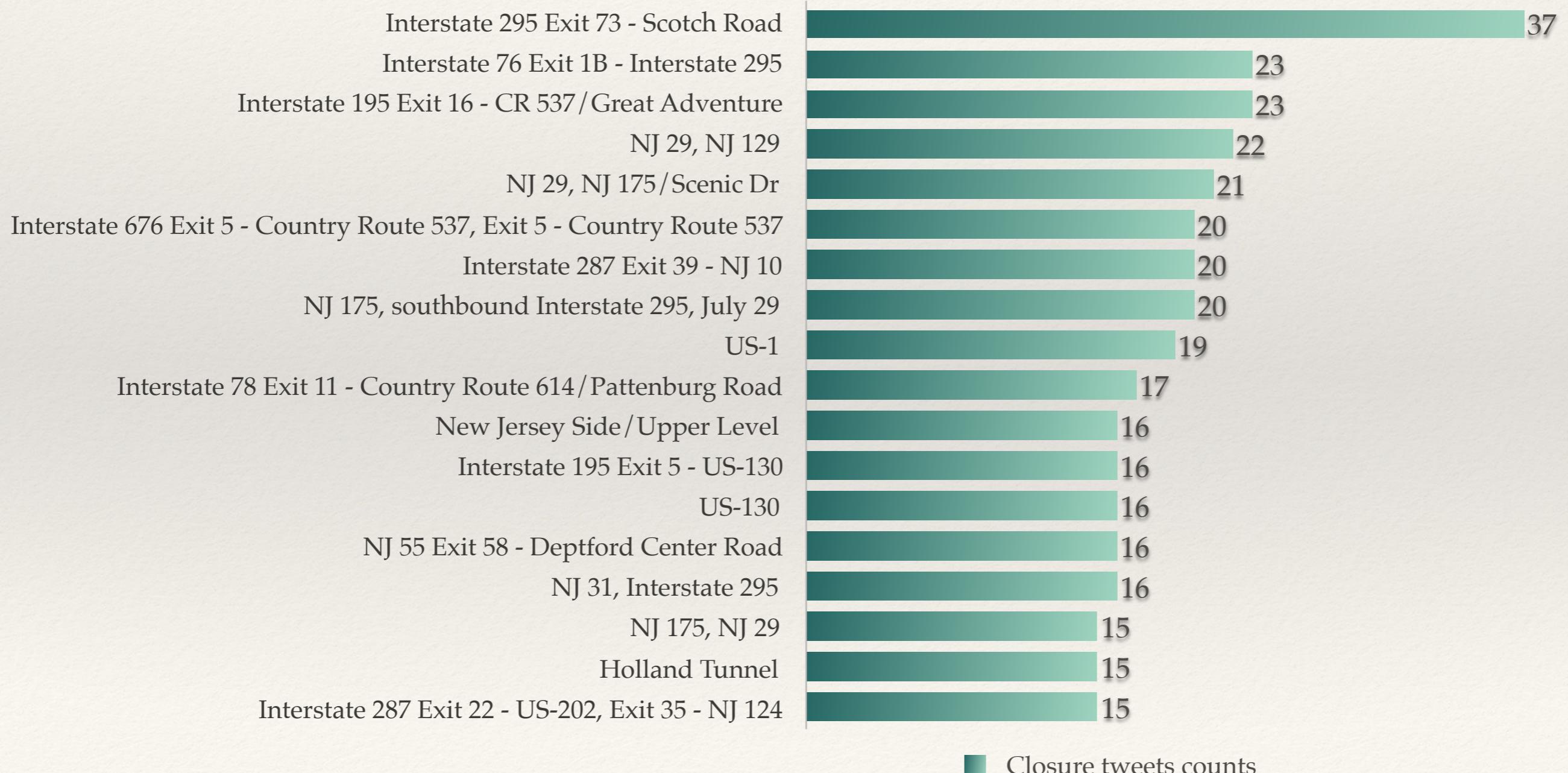
- Natural Language Processing tool
- Named Entity Recognition feature
  - Allows us to detect patterns in language
- Create custom spaCy library with language tags needed to extract locations

## Language Tags Created for Model Training

- TWN for towns/cities
- LOC for places of interest
- HWY for Highways
- DIR for directions of highway/roads in question
- LN to denote specific lane closures
- ST for streets/roads
- EXT for highway exits
- RELOC for relative locations

# Location Extraction - Deliverable

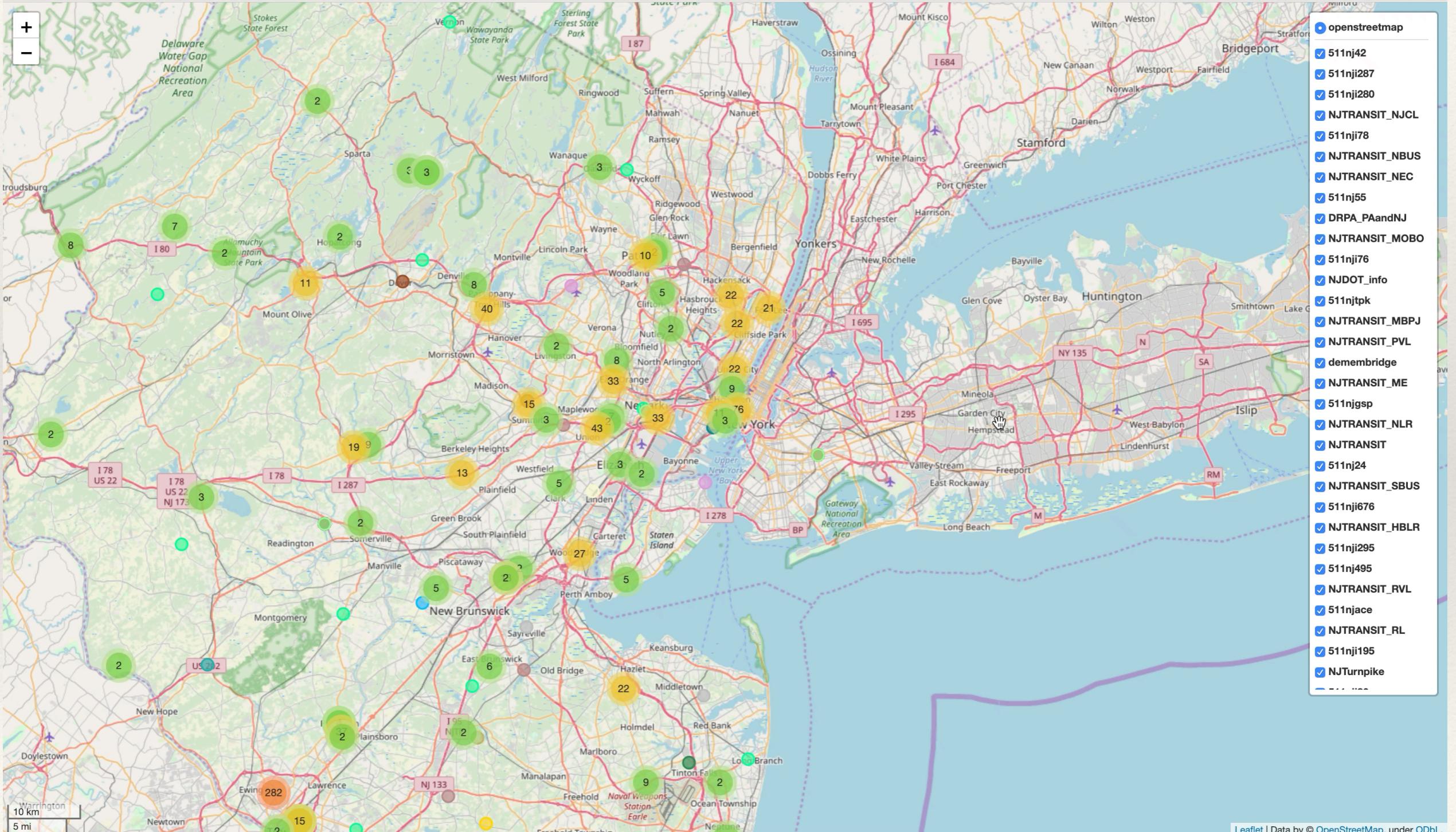
## Most Frequent HWY Exits Closures (Last 2 Weeks)



# Location Extraction - Deliverable

▲	▼	username	tweet	datePosted	expandedText	highway	▼	street	exits	direction	loc	lanes	▼	relocs	town	▼
0		511nji295	Crash on...	2019-11-06 2...	Crash on In...	Interstate 295		Exit ...	southbou...		right lane		Sou...			
1		511njace	Construc...	2019-11-06 2...	Constructio...		Atla...	Exit ...	westbound		right lane		bet...	Hamilton Township, ...		
2		511njtpk	Roadwor...	2019-11-06 2...	Roadwork ...	New Jersey ...			northbound		ramp		from	Mansfield Township		
3		511nji76	Crash on...	2019-11-06 2...	Crash on In...	Interstate 76		Exit ...	eastbound		right shoul...			Camden		
4		511njtpk	Roadwor...	2019-11-06 2...	Roadwork ...	New Jersey ...			Southbo...		all lanes		bet...			
5		511njtpk	Roadwor...	2019-11-06 2...	Roadwork ...	New Jersey ...			Northbou...		all lanes		Nort...	Mansfield Township		
6		511nji76	Crash on...	2019-11-06 2...	Crash on In...	Interstate 76		Exit ...	eastbound		right shoul...			Camden		
7		511njtpk	Emergen...	2019-11-06 2...	Emergency...	New Jersey ...			southbou...		ramp, exit ...			Edison Township		
8		511nji76	Crash on...	2019-11-06 2...	Crash on In...	Interstate 76		Exit ...	eastbound		right shoul...			Camden		
9		511nji78	Crash on...	2019-11-06 2...	Crash on In...	Interstate 78		Exit ...	westbound		left lane		Wes...	Berkeley Heights To...		
10		511nji78	Crash on...	2019-11-06 2...	Crash on In...	Interstate 78		Exit ...	westbound		left lane		Wes...	Berkeley Heights To...		
11		511nji78	Crash on...	2019-11-06 2...	Crash on In...	Interstate 78		Exit ...	westbound		left lane		Wes...	Berkeley Heights To...		
12		511nji295	Crash on...	2019-11-06 2...	Crash on In...	Interstate 295		Exit ...	northbound		right shoul...		Sou...	Bellmawr		
13		511nji76	Crash on...	2019-11-06 2...	Crash on In...	Interstate 76		Exit ...	eastbound		right lane			Camden		
14		511nj42	Disabled ...	2019-11-06 2...	Disabled ve...	NJ 42		Exit ...	southbou...		partial ramp			Gloucester Township		
15		511nji287	Emergen...	2019-11-06 2...	Emergency...	Interstate 28...			southbou...		right lane			Edison Township		

# Plotting with Data - Deliverable



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# Next Steps

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- ❖ Location extraction
  - ❖ Continue training spaCy model
  - ❖ Additional domain knowledge on locations
- ❖ Mapping
  - ❖ More precise intersection plotting