



Geo-semantic surveillance and clustering of crime locations and social risk hotspots using print media reports

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Problem Statement



- Nigeria has been gripped by a persistent surge in Kidnapping incidents over recent years
- Crime reporting sources are not effectively utilized

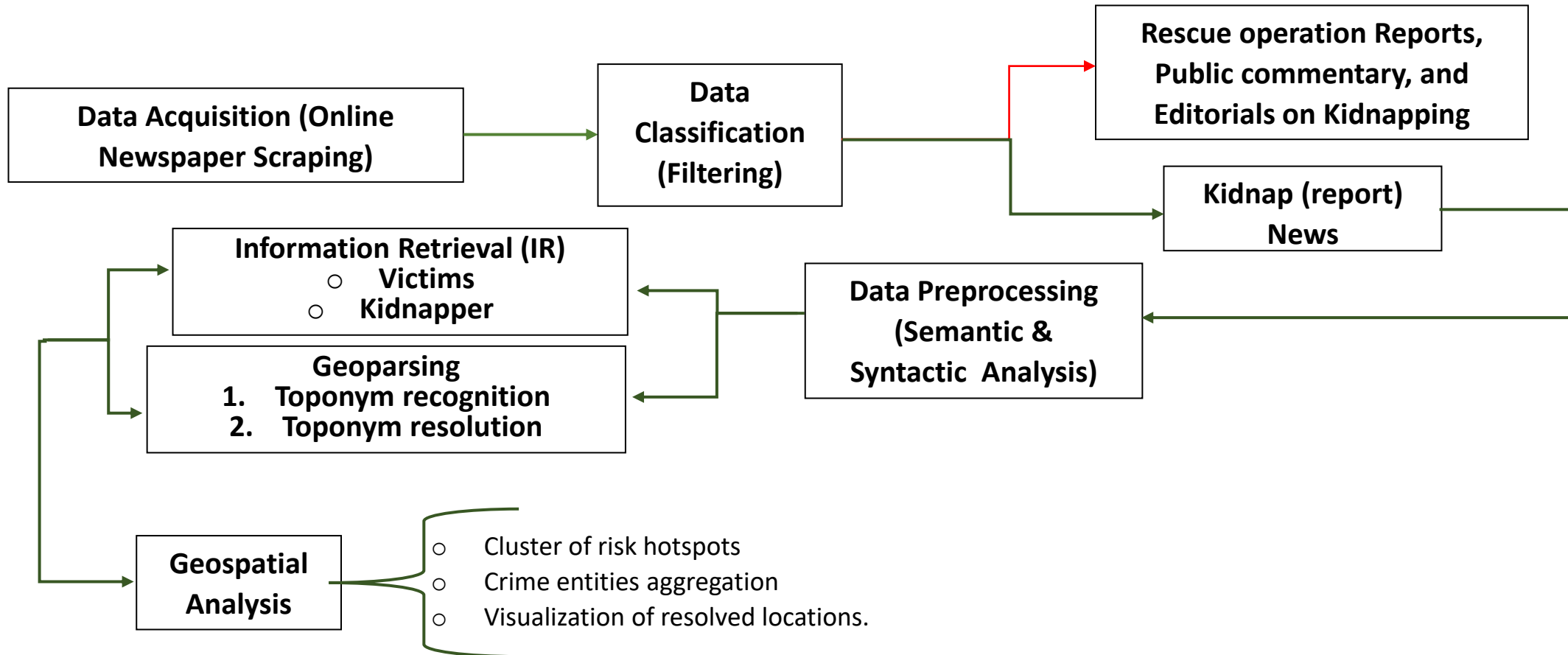


Related works

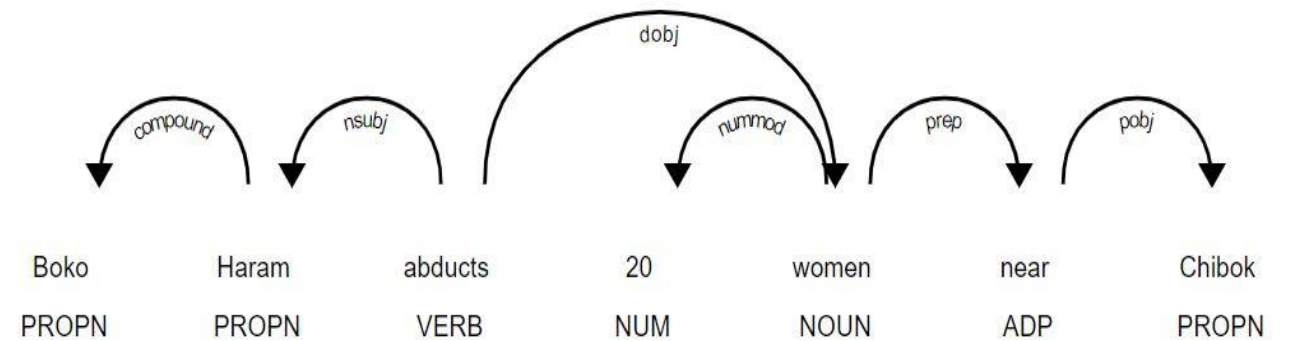


S/N	Citation	Work	Summary
1	Faisal T. et al 2022	Crime Prediction using Machine Learning with a Novel Crime Dataset. https://doi.org/10.48550/arxiv.2211.01551	Manually extracted entities from various newspapers related to crime
2	Pinheiro et al. (2010)	Natural language processing based on semantic inferentialism for extracting crime information from text. https://doi.org/10.1109/isi.2010.5484783	A web-based platform for recording aggregated crime information in Portuguese text
3	Asharef et al 2012	Arabic named entity recognition in crime documents.	Rule-based Arabic NER for crime entity extraction.
4	Arulanandam et al 2014	Extracting crime information from online newspaper articles.	Classify theft related sentences and extracted location from news articles in New Zealand
5	Shabat and Omar 2015	Arabic Named Entity Recognition for Crime Documents Using Classifiers Combination. https://doi.org/10.15866/irecos.v10i6.6767	Naive Bayes, Support Vector Machine, and K-Nearest Neighbor for crime NER and type identification tasks
6	Goncalo C. et al 2019	An Annotated Corpus of Crime-Related Portuguese Documents. https://doi.org/10.3390/data6070071	trained an NER module to identify entities from Portuguese police reports

What we did



Semantic & Syntactic Analysis



Information Retrieval



Geo-parsing: Identifying the Latitude and Longitude



Search coordinates ⁱ or address

wamba nassarawa

Geocode

► Advanced options

RESULTS

MAP

Full response in the JSON Response section

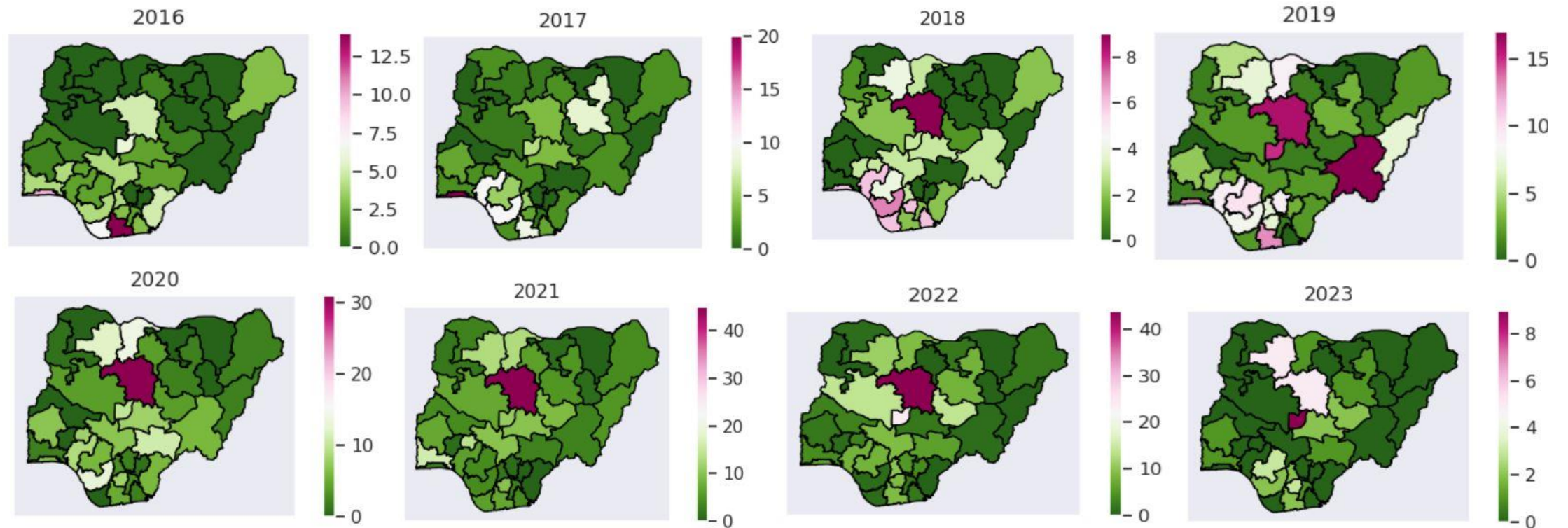
1. NG Lafia, Nasarawa State, Nigeria
8.566667, 8.45
_category: place
_type: village
2. NG Wamba, Nasarawa State, Nigeria
8.93333, 8.6
_category: place
_type: city

Sample Dataset



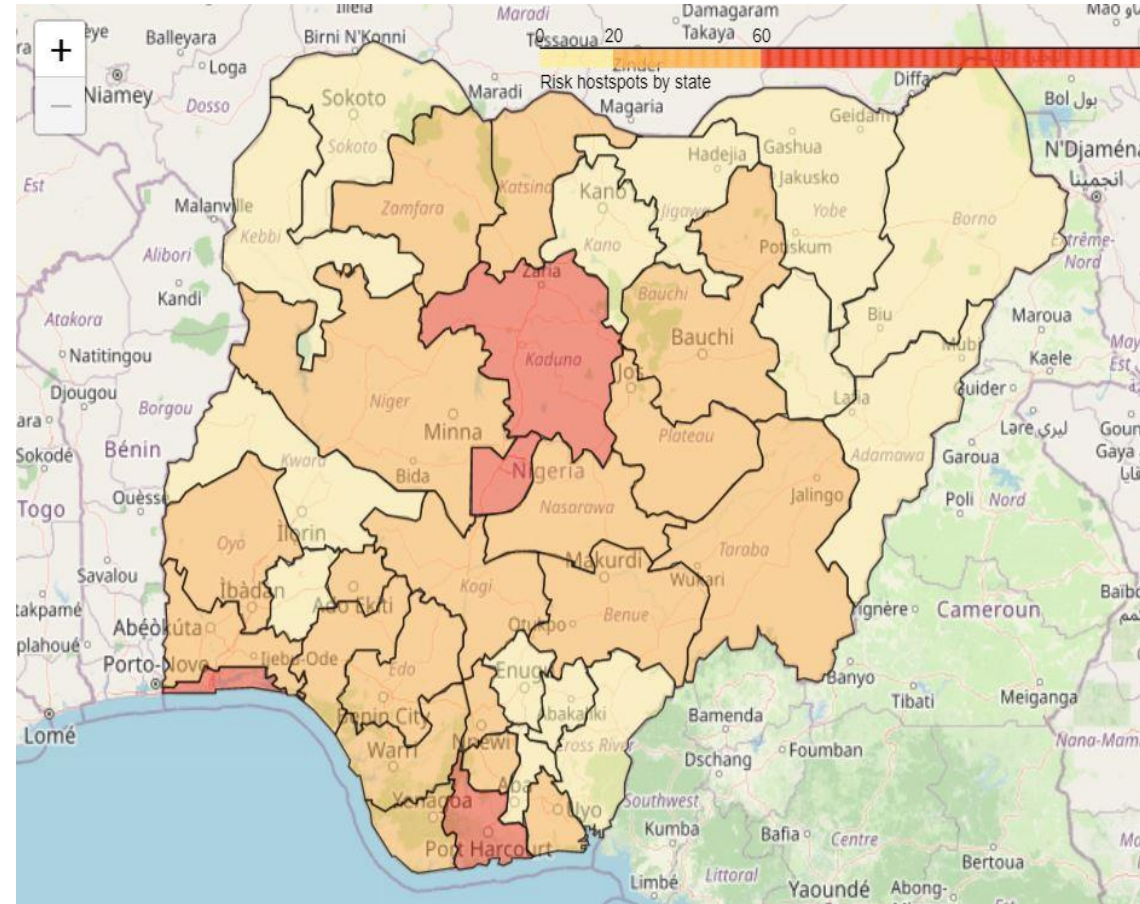
publish_ date	headline	victims	kidnapper	address	Latitude, Longitude
5/9/2023	Bandits kidnap 40 Kaduna worshippers, nine emirâ€™s children	40 Kaduna worshippers, nine emir â€™s children	Bandits	Chikun, Kaduna, Nigeria	10.2703859, 7.179026
4/7/2023	Gunmen kidnap Nasarawa ex-deputy governor, Gye-Wado	Nasarawa ex-deputy governor, Gye-Wado	Gunmen	960134, Wamba, Nasarawa, Nigeria	8.93333, 8.6
3/12/2023	Gunmen kidnap nine in Abuja estate	nine	Gunmen	Grow Home Estate, Bwari Area council, 901101, FCT, Nigeria	9.1921367, 3.8858955

Geo-spatial Analysis & Risk hotspots



What we find out

- Banditry and Kidnapping cases in Kaduna
- Effect of COVID-19 induced economic hardships
- Cost of living in a location affects the crime rate of the location



Limitations

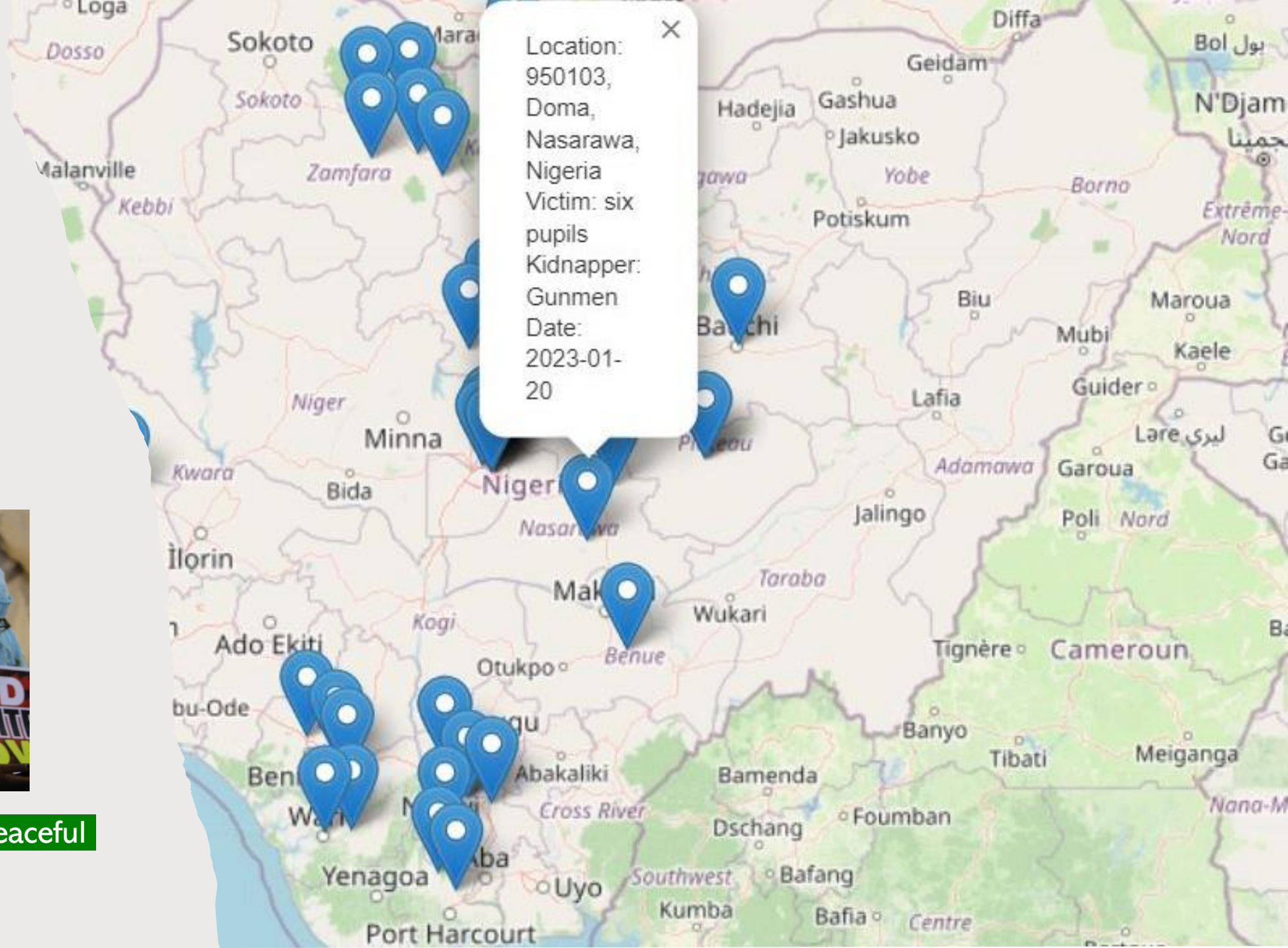
- Our approach is heavily dependent on the accuracy and non-misleading nature of newspaper articles.
- This paper focused on Kidnapping reports from the punch newspaper report
 - English based reports
 - Cut off news beyond 2016
 - Crime-types
- Audio Crime reporting sources



Tracking Kidnapping cases with a real time Dashboard



SDG #16: Promote Just, Peaceful and Inclusive societies



Thank You

