

A data study of terrorism and its tendencies

A Network Tour of Data Science
22th of January 2018

Zahra Farsijani
Joëlle Hanna
Dorsan Lepour
Amin Mekacher



Interests and motivation



- Hot topic in today's world.
- Global phenomenon with multiple causes and targets.
- Various organizations and modes of operation.

Data science allows to build models and extract useful information.

No historical review, nor geopolitical analysis

Answer specific questions and reach conclusions

3 data sets explored

- **Terrorists Relationships**
- **Terrorists Attacks**
- **Global Terrorism Database**



Provided by Mind Lab



Real data collected
worldwide during 50 years



3 data sets explored

- **Terrorists Relationships**
- **Terrorists Attacks**
- **Global Terrorism Database**

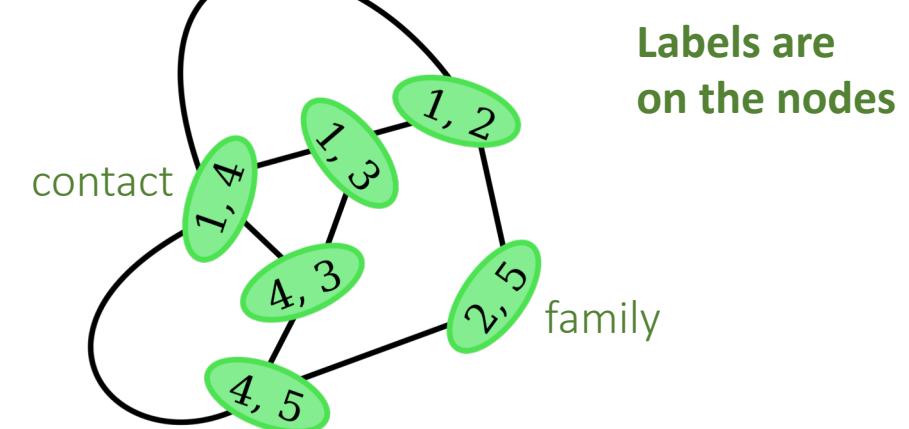
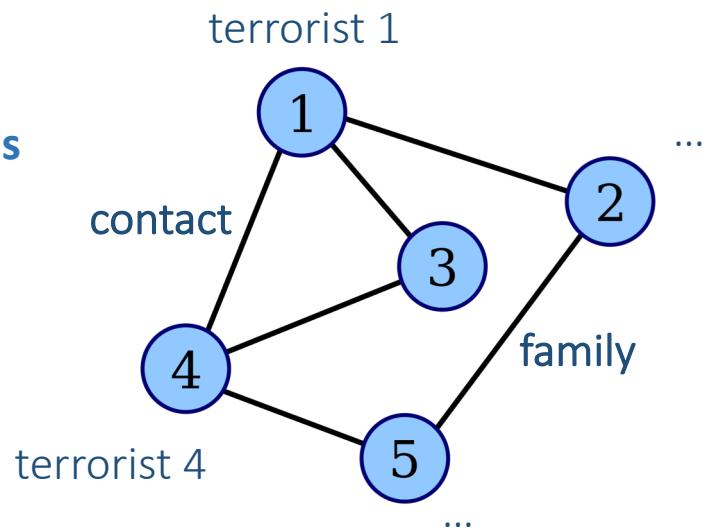


Terrorists Relationships

- 851 nodes (pair of terrorists)
- 4 labels (relationship type)
- 8592 edges (link nodes with a common individual)

Line graph

Labels are
on the edges



Labels are
on the nodes

Terrorists Relationships

Possible to construct the line graph. But limitations due to lack of information !

- The 1124 attributes (details on the relationship) are unknown.
- Much more features than the number of nodes (851).
- Binary value indicating presence or absence of a feature.
- Very sparse vector.

No highly correlated features → difficult to deduce their meaning.
Scattered data set → no reliable data processing.

3 data sets explored

- **Terrorists Relationships**
- **Terrorists Attacks**
- **Global Terrorism Database**



Terrorists Attacks

- 1293 nodes (terrorist attack)
- 6 labels (type of attack)
- 106 features (details of the attack)
- 3172 edges (link co-localized attacks)

First observations :

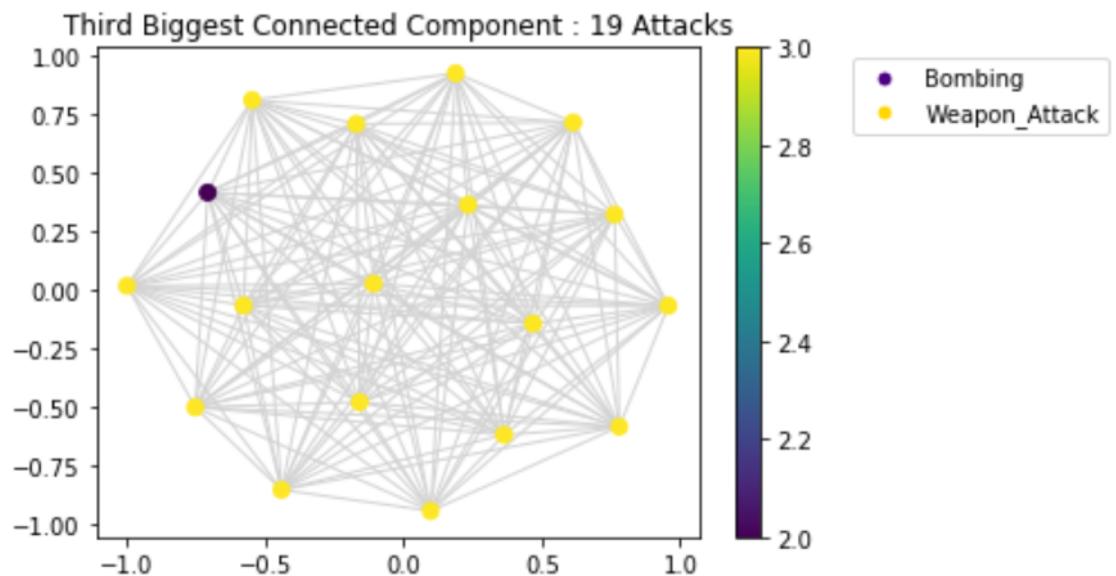
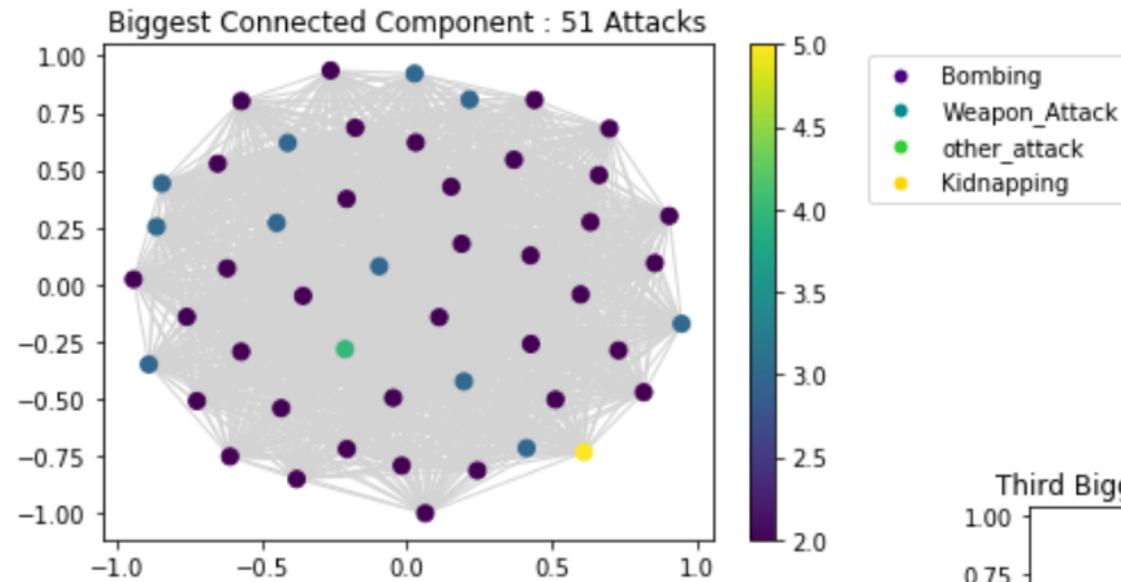
- 787 connected components (one for each region)
- 51 nodes contained in giant component

Terrorists Attacks

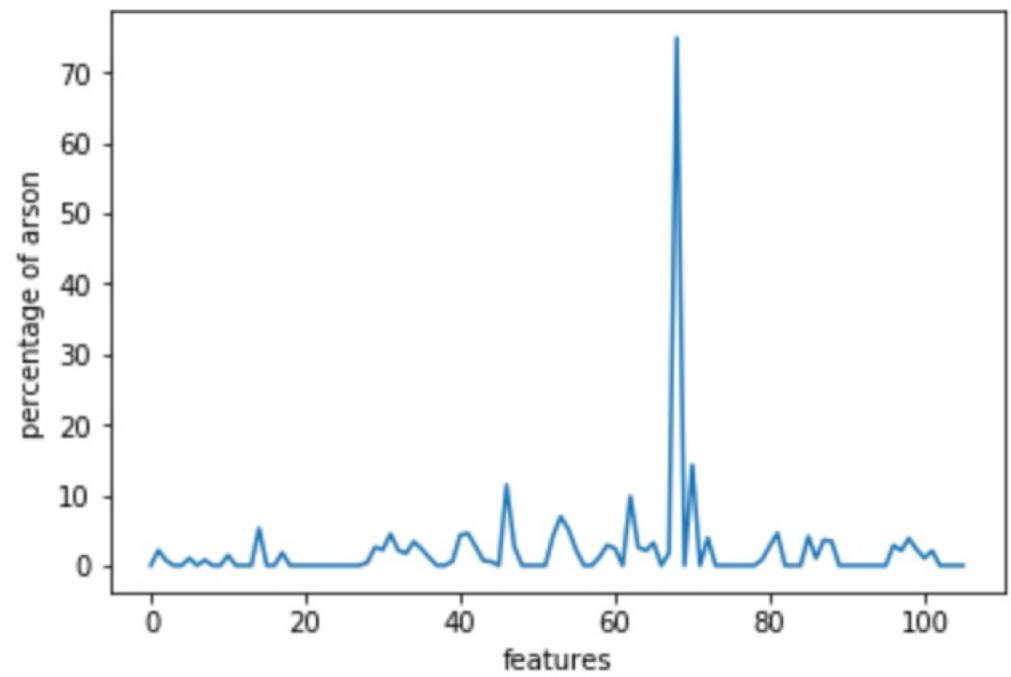
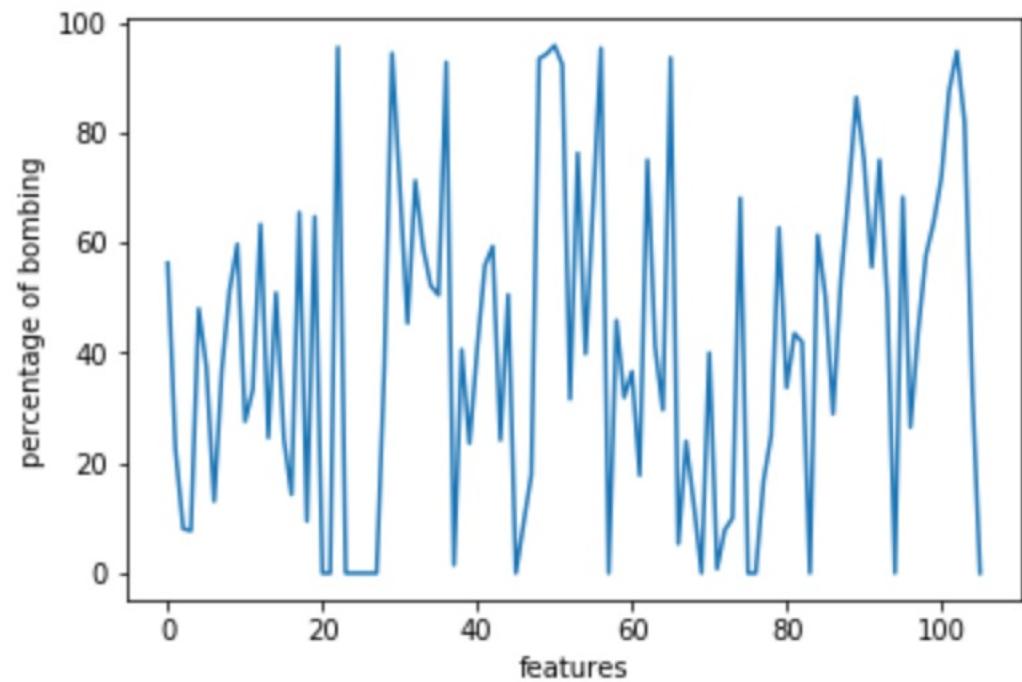
Questions :

- 1) Single label for each node
 - Are certain regions dominated by a specific kind of attack ?
- 2) Less numerous features and greatly smaller than number of nodes
 - Is it possible to interpret the meaning of some features ?

Terrorists Attacks



Terrorists Attacks



3 data sets explored

- **Terrorists Relationships**
- **Terrorists Attacks**
- **Global Terrorism Database**



Global Terrorism Database

Open-source data base on terrorist events around the world from 1970 through 2017.

No graph structure but a massive amount of data :

- More than 180,000 cases
- Precise details (109 features, some binary, some not)

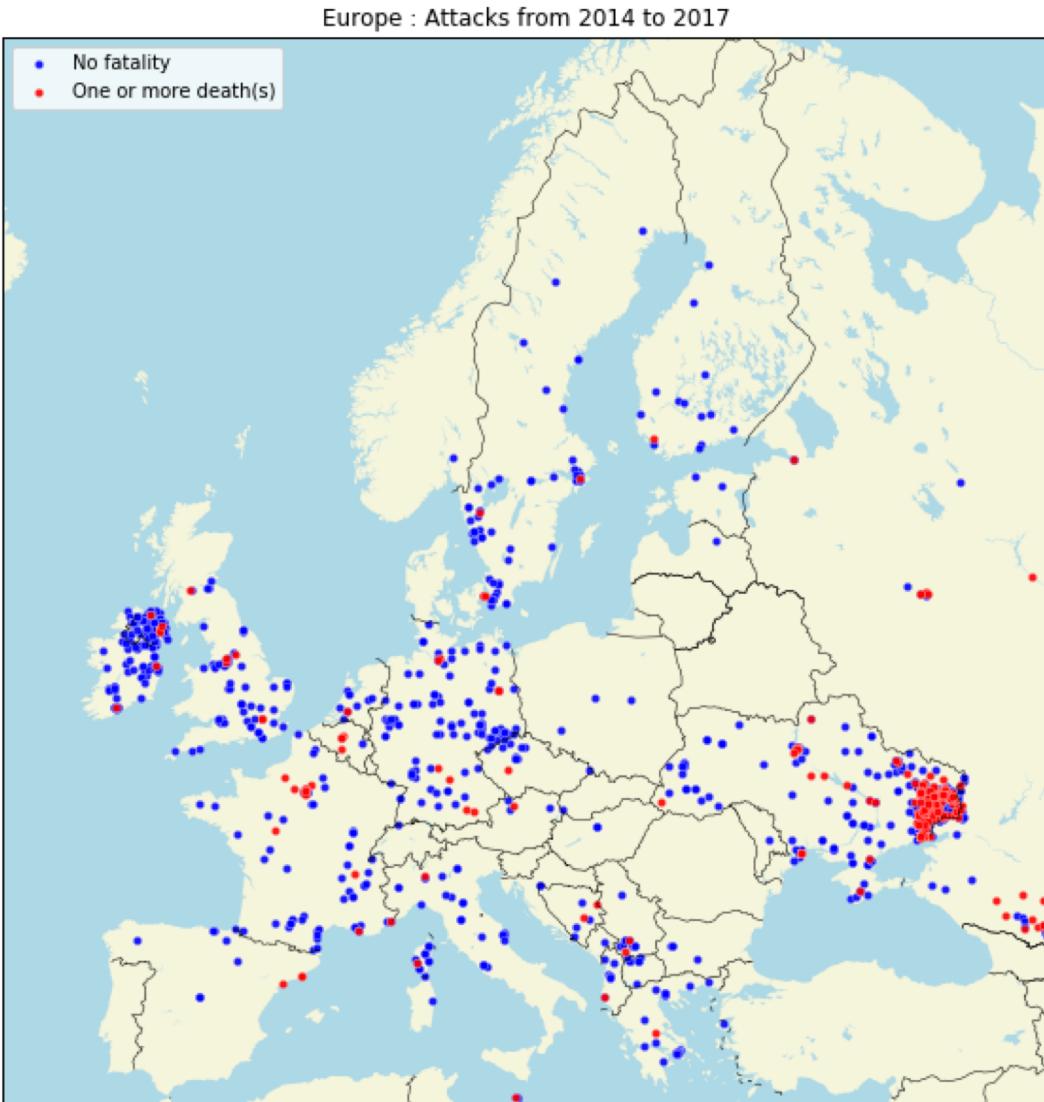


Need of a very specific data selection.
Which criteria for downsampling ?

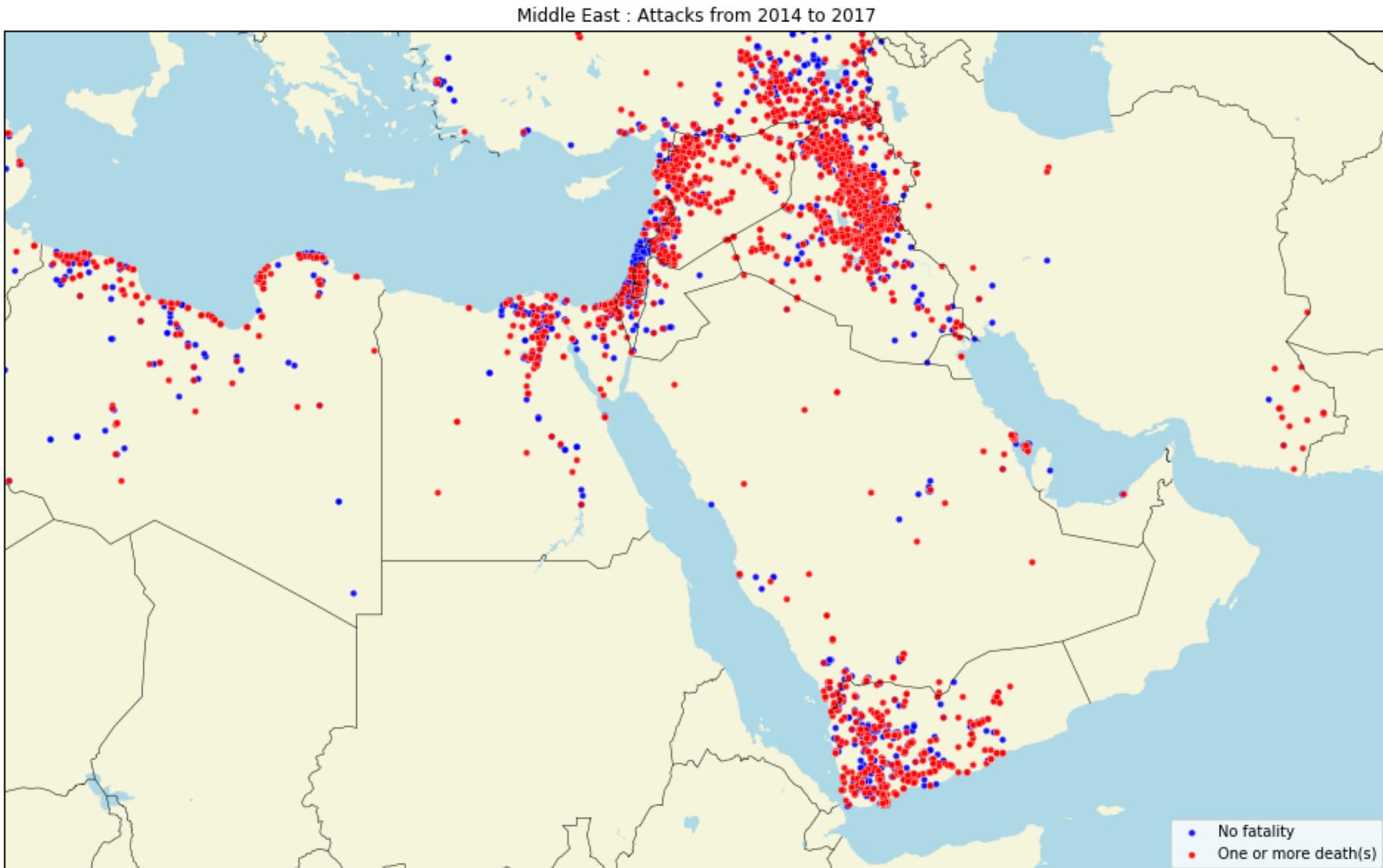
Data selection

- Limitation to 2014-2017
- Localized regions
 - Europe
 - Central-Africa and Middle-East
 - South-America
- Keep particular features
 - Geographical informations (country, precise coordinates)
 - Mode of operation (type of attack, weapons)
 - Target (nationality, success, casualties)
 - Responsible (organization, motivation, claimed)

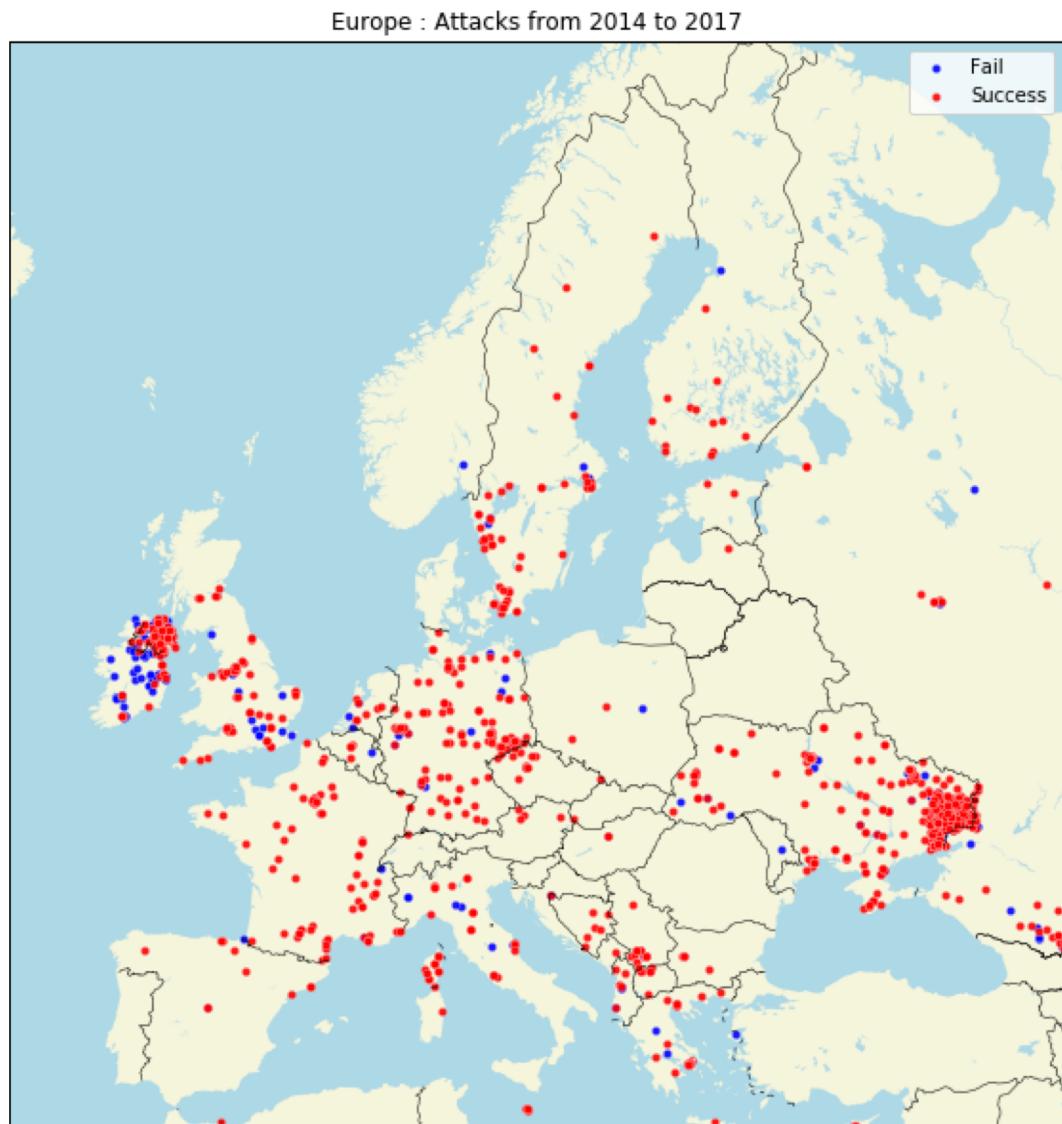
First overview : fatalities



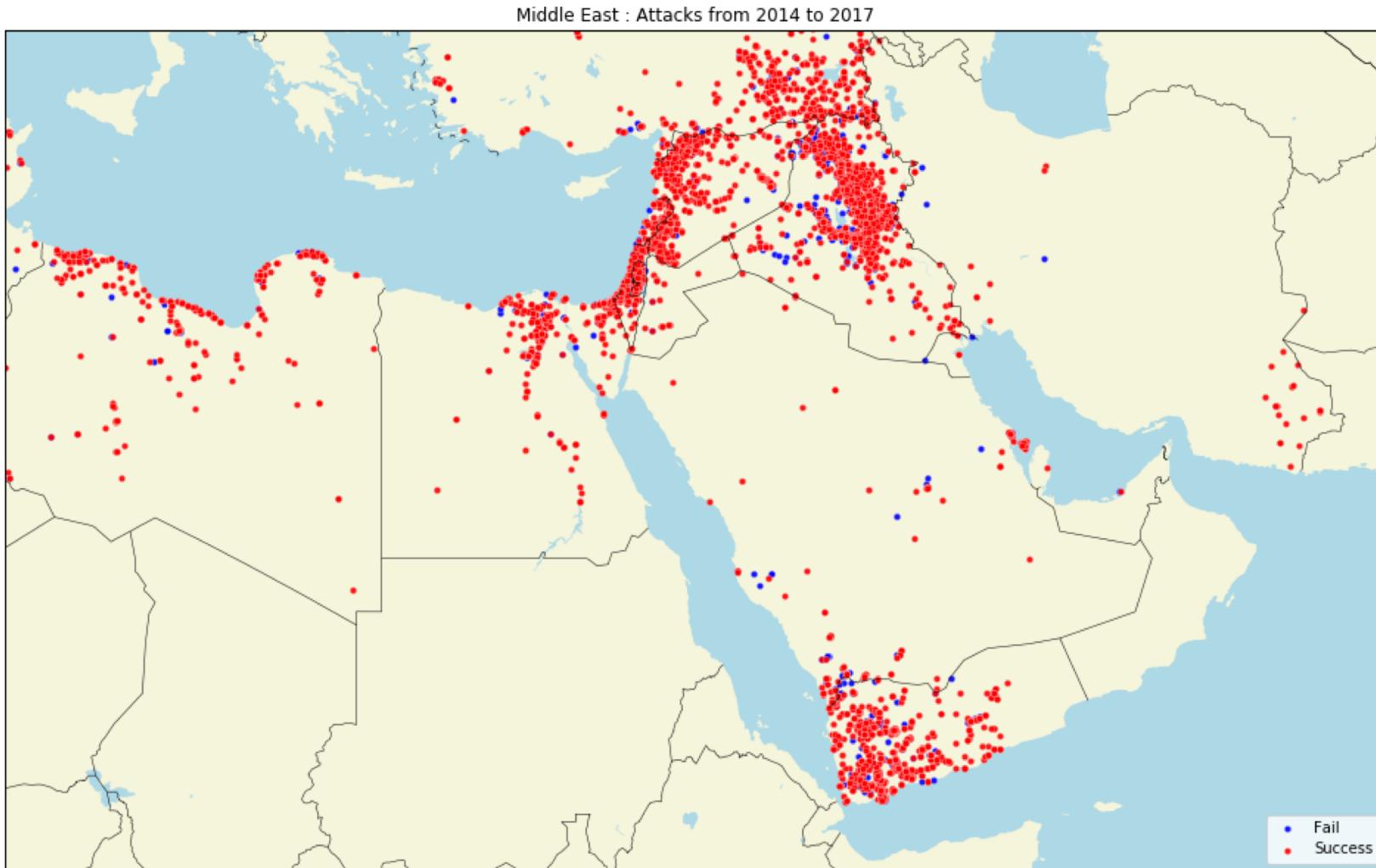
First overview : fatalities



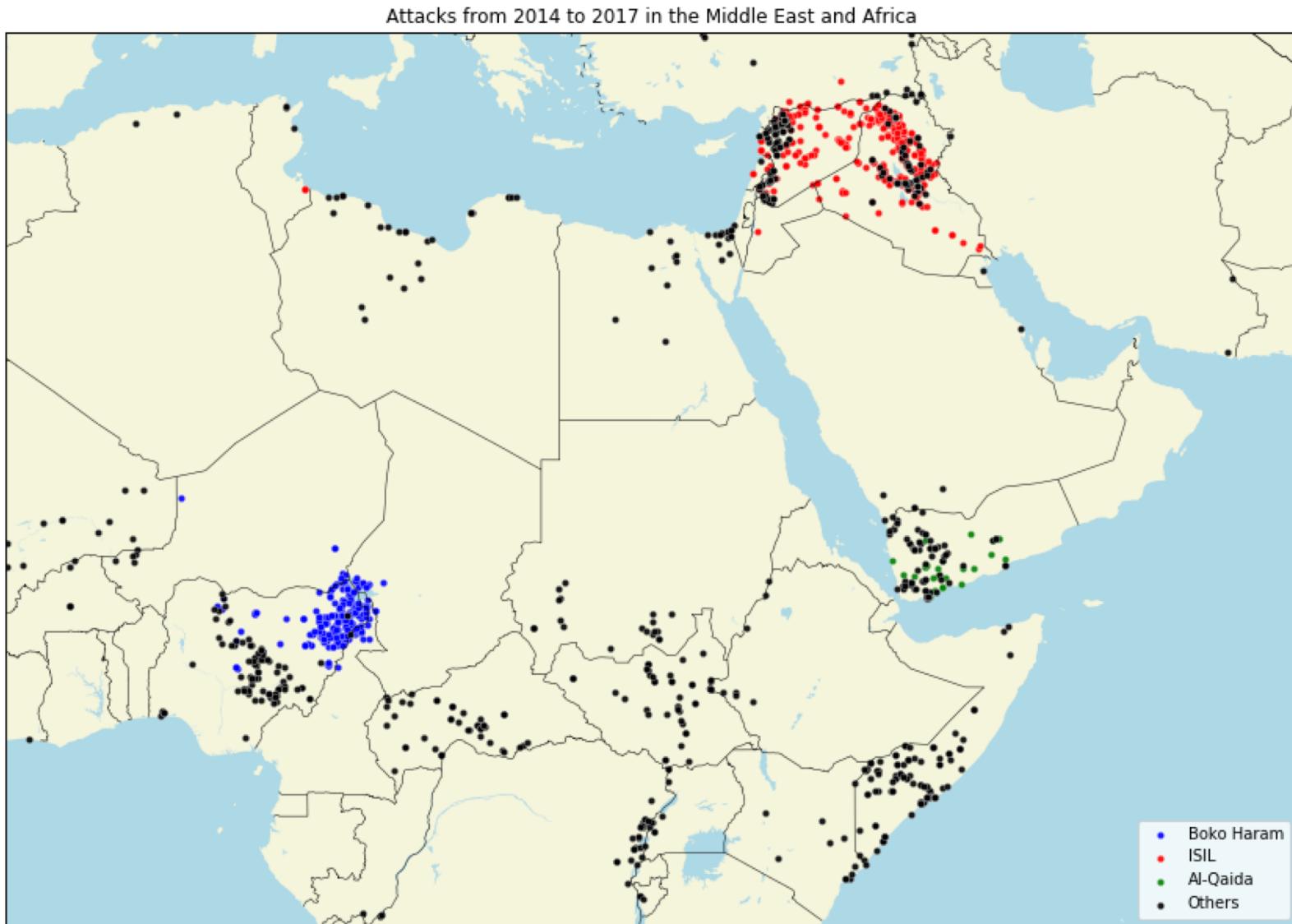
First overview : success



First overview : success



Focus on terrorist groups in a specific region

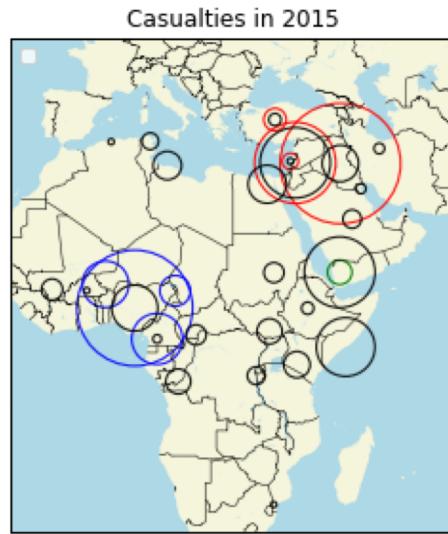


Civilian casualties



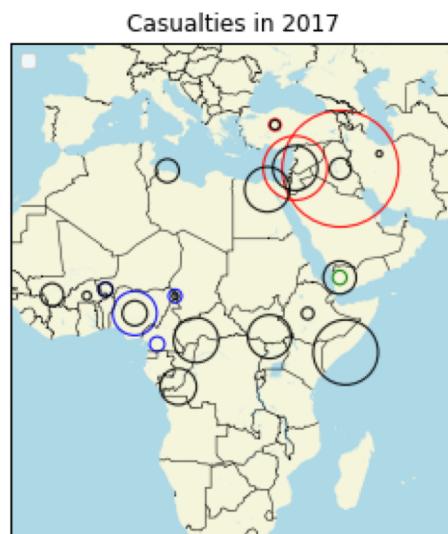
Number of casualties

- 100
- 600
- 2000

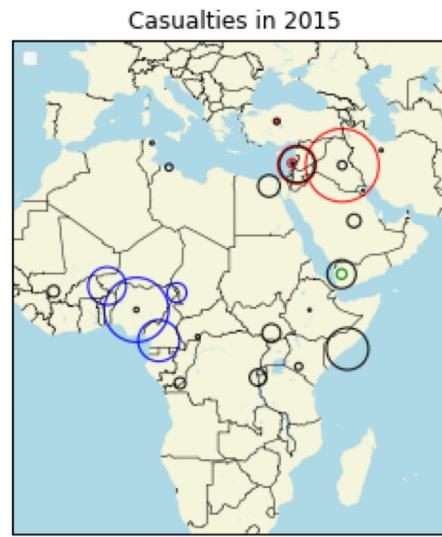


Number of casualties

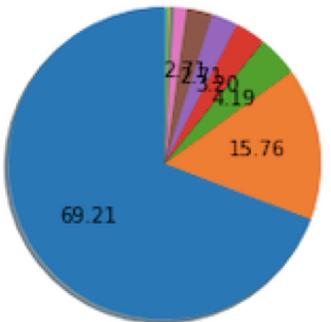
- 100
- 600
- 2000



Terrorists casualties

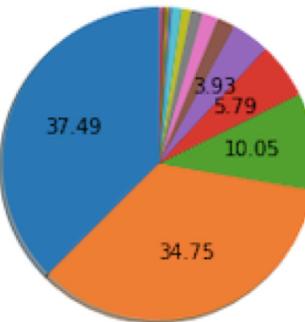


Extraction of relevant features



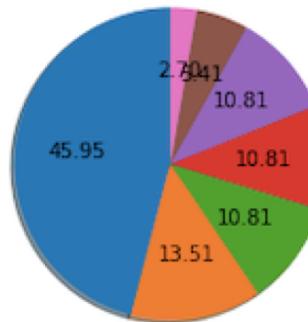
Boko Haram Targets

- Private Citizens & Property
- Military
- Religious Figures/Institutions
- Transportation
- Business
- Government (General)
- Police
- Educational Institution
- Terrorists/Non-State Militia
- Government (Diplomatic)
- Food or Water Supply
- Airports & Aircraft
- Violent Political Party
- Journalists & Media
- Utilities



ISIL Targets

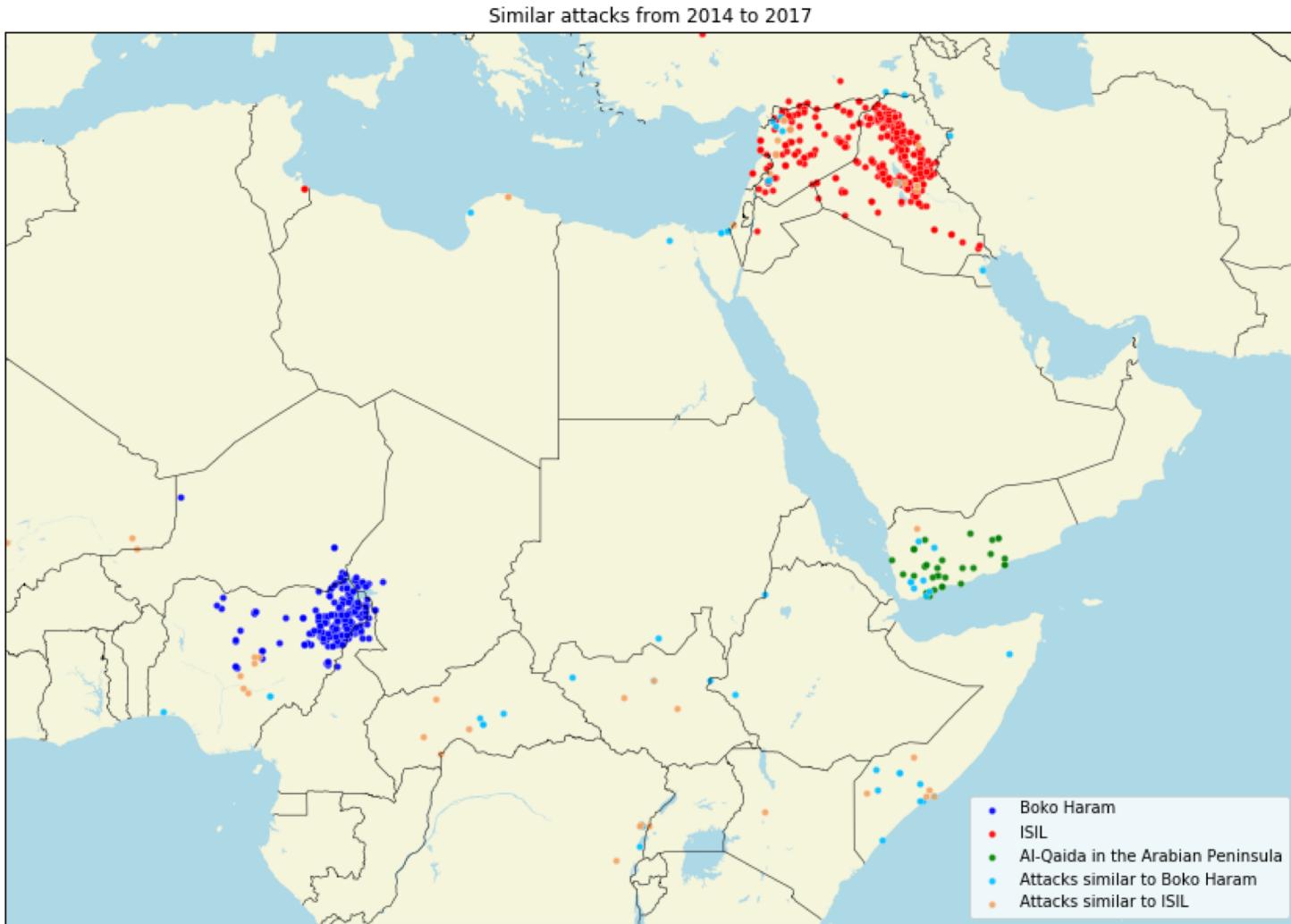
- Military
- Private Citizens & Property
- Religious Figures/Institutions
- Business
- Terrorists/Non-State Militia
- Government (General)
- Police
- Utilities
- Educational Institution
- Unknown
- Transportation
- Violent Political Party
- Journalists & Media
- Airports & Aircraft
- Government (Diplomatic)
- Food or Water Supply
- Tourists
- Educational Institution



AQAP Targets

- Military
- Terrorists/Non-State Militia
- Religious Figures/Institutions
- Business
- Private Citizens & Property
- Government (General)
- Police
- Utilities
- Journalists & Media
- Educational Institution
- Journalists & Media
- Airports & Aircraft
- Government (Diplomatic)
- Food or Water Supply
- Tourists
- Educational Institution
- Other

Results



Conclusion



Conclusion

Using data network analysis on GTD : powerful tool to study the evolution of terrorist groups.





Thanks for your attention.