Network analysis of the November 13, 2015 terror attacks in Paris

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Introduction

The terrorist attacks of Nov. 13, 2015 in Paris, France caused over 125 deaths and more than 350 injuries. As this is written, more information is coming to light continuously, and the attackers are aggressively being pursued by the security services in France and worldwide.

Although the attack plot is still very poorly understood, considerable amount of detail is already available. In particular, it may be possible to apply network analysis to study the current terrorist plot, because the method has been applied successfully in the past (Sageman 2011). This analysis is particularly relevant because the Nov. 13 attacks are the largest ever carried out by the Islamic State group (Daesh) in Europe. Even with limited data, network analysis may provide a useful graphical representation of the events and suggest lines of investigation.

Network analysis was applied here to first, represent the plot, and second, to understand the relationship between the agents involved in the plot. The data is drawn from credible open media sources accessible through the Internet. There is still considerable uncertainty about the events in this plot because some of the individuals are still not apprehended, and while many have been arrested, little about their identities or activities was revealed in the media. As more data becomes available, this report will be updated.

The focus of the analysis is
- Provide a visual summary of the overall plot
- Understand the structure of the agent network
- In the longer term, provide a dataset for further research
(c.f. Krebs 2002, Rodriguez 2004, Gutfraind 2010, Sageman 2011)

Methods

Data from media sources was organized in a graphical event database (Neo4j version: 2.2.5). This database is a multimodal network and contains:
1. All known individuals involved in the attack
2. Any persons connected to this plot as possible accessories
3. Locations such as safe houses and staging sites
4. The individual attack sites

From the database, I constructed an "agent network" - the social network representing the connections between Daesh members. There is actually a considerable debate as to the definition of terrorism in general, and the process of drawing terrorist networks (Sageman 2011). In this case, I followed a strict computational procedure (see source code in references below for the calculation steps). Briefly, I constructed links between individuals on one of several grounds, including if they were involved in an attack on the same target. Links were also drawn from a suspect or attacker to another person if the other person provided assistance, shared a residence, or had a pre-existing relationship (familiar, friendship or other).

Results

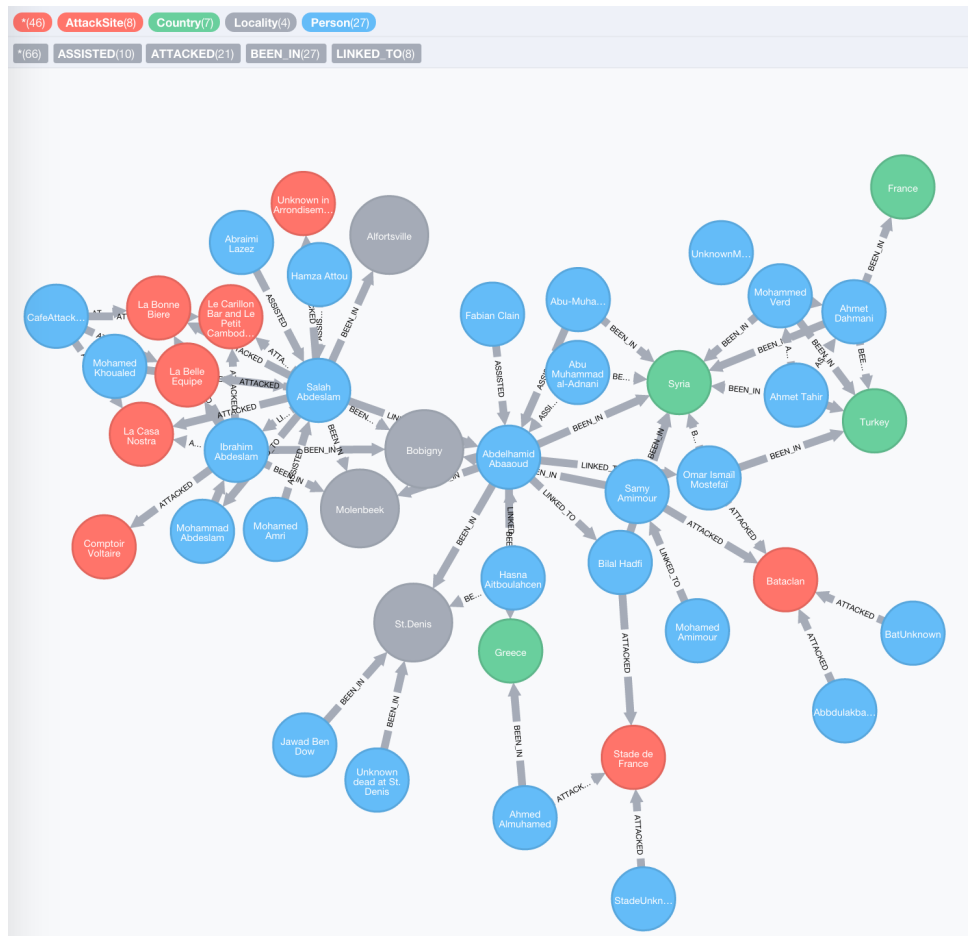The resulting event network has 46 nodes and 66 relationships (Fig. 1).

Fig.1: Plot of the event network. Targets (red), agents (blue), counties (green) and locations (gray) are shown. A. Abaaoud emerges as a key bridge all cells.

The agent network has 24 individuals and 34 undirected relationships (Fig.2).
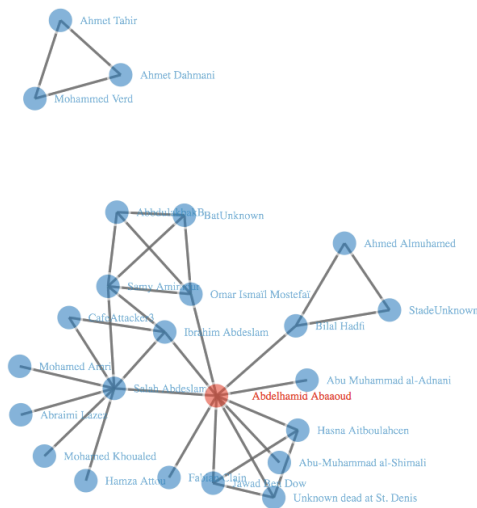
Fig.2: Plot of the agent network. A. Abaaoud and S. Abdeslam are clearly bridge nodes. Each of the attacks cells (Stade de France, Café and Bataclan) are clearly distinguished.

The network plot (Fig.2) reveals the cells involved in the attacks. It also highlights that we still don't know clearly about how the recently-arrested operatives in Turkey are linked to the rest of the network.

The degree of a node, i.e. the number of its connection in the network, can highlight its relative importance to the network. Indeed, it could be seen from Fig. 3 that A. Abaaoud, the suspected mastermind has the highest degree. People loosely linked to the plot, such as associates of the wanted S. Abdeslam have the lowest degree.
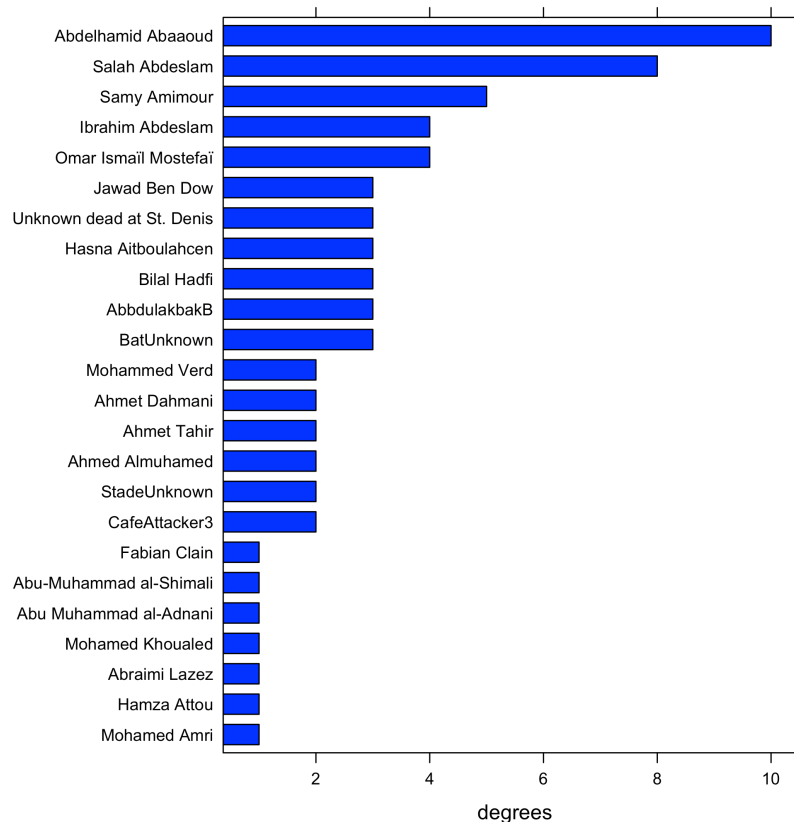
Fig.3: The degree distribution of the agent network.

The agents have a mean age of 27 [20, 36]. The gender distribution is 2 females and 20 males (91%). One person (the third café shooter) has unknown gender.

In conclusion, although data about the attacks is just beginning to emerge, it is possible to begin to identify structures among the events and agents involved in the recent tragic events.

Limitations

Because so little time has passed since the attacks, some of the information will undergo revision. At this point, many of the attackers have not been identified and persons are being sought by the authorities in connection with the attacks.

Even with more time and more data, there are basic limitations to the process of constructing network data about terror plots when relying on exclusively public media sources. It is likely that some ties between the individuals might not be revealed for security reasons until many years after the attack, but those ties that were reported in the media are likely to be real.

Linked to this report is the software used for building the network database and the agent network. The software code lists the original sources of the data in the media reports.

All of the individuals named in this report should be presumed innocent, unless proven otherwise.

This report will be updated as more information becomes available.

References

- Krebs, VE (2002) Mapping networks of terrorist cells. Connections 24: 43–52.

- Rodriguez, J (2004). The march 11th terrorist network: In its weakness lies its strength. Working Papers EPP-LEA, University of Barcelona.

- Gutfraind, A. (2010) Optimizing Topological Cascade Resilience Based on the Structure of Terrorist Networks. PLoS One. 10.1371/journal.pone.0013448

- Sageman, M. (2011) Understanding terrorist networks. U. Penn Press.

- For the network data, see https://github.com/sashagutfraind/Nov13/blob/master/create_network.R