Social Network Analysis to Counter Terrorism

Today, perhaps the biggest threat to national security in the United States of America is terrorist groups and extremist organizations. Largely due to the fact that these organizations are comprised of loosely connected individuals, the traditional intelligence methods used during typical warfare are not directly applicable. Thus, new measures must be used in countering these terrorist organizations [1].

Along comes social network analysis (SNA). The underlying assumption behind such an approach is we have nodes which represent criminals/ terrorists and edges which represent underlying relationships/ties between these terrorists. Because terrorist groups typically consist of individuals that span multiple countries and are of different backgrounds and socioeconomic statuses, SNA can be used to understand how radical ideas spread, how recruitment works, and how the network is evolving to develop more effective countermeasures [2].

In this blog post, we look at a network analysis of the 9/11 hijackers. Soon after 9/11, the media quickly became flooded with how the 19 hijackers were interconnected which is shown here. Using these ties, we can get an initial picture of the network. Note that the edges are weighted based on how long pairs of individuals have known each other (those that went to school together or living together have the heaviest weights, those that traveled or had frequent meetings together have the medium weights, and those that infrequently met up or only had financial transactions had the lightest weights) [3].

[HijackerMatrix] [Initial]

From above, the feature that stands out is the sparseness of the network. Most hijackers are connected to just two or three others. This clearly plays into Al-Queda’s strategy; they are willing to sacrifice efficiency for secrecy. Keeping each member as isolated from others prevents damage caused if one of the individuals are captured or choose to defect. This is in line with what Osama Bin Laden said in a released transcript, “Those who were trained to fly didn’t know the others. One group of people did not know the other group” [4].

Now, obviously for this plot to have been successful, there must have been more to the network than just the 19 perpetrators. Through analysis of bank account transactions, phone records, email, and other sources of communication, we can get an idea of others who were indirectly involved, whether it be that they were messengers, financiers, or some other peripheral yet vital role for the operation. This gives us to a better picture of the overall network [3].

[FullNetwork]

Now, with everybody in place, we see that there appear to be a select few pilots that have most of the connections with these peripheral assistants, notably Mohamed Atta, Ziad Jarrah, and Marwan Al-Sheshi, and Hani Hanjour. Now, we look at some quantitative centrality measures to support our qualitative observations.

[Centrality]

Looking at the top individuals for each of these centrality measures, we see indeed that the same names are repeated, suggesting that although most of the network is pretty sparse, we have a few key terrorists that served as the bridge and line of communication between the direct pilots/perpetrators and outside facilitators. Such individuals can be considered to be the masterminds of the plot. It turns out that Mohamed Atta, one of the most important nodes in our network, was one of the main ringleaders for the 9/11 attacks. Furthermore, the concentration of importance of the entire conspirator network on just a few people have led some to believe that the entire 9/11 network could have been broken up with the removal of just three nodes.

As we now seem to live in a society where the government seems to keep track of everything we do, privacy concerns have led to outcry (NSA collecting phone records in 2013). However, such data could prove essential in analyzing criminal and terrorist networks on a large scale so that we can stay protected by being proactive as opposed to reactive. That is not to say that SNA is the be all, end all. It is just an additional tool that can be added to our arsenal in combating extremist behavior [2].

How the NSA Uses Social Network Analysis to Map Terrorist Networks: <https://www.digitaltonto.com/2013/how-the-nsa-uses-social-network-analysis-to-map-terrorist-networks/>

Social Network Analysis as an Approach to Combat Terrorism: Past, Present, and Future Research: <https://www.hsaj.org/articles/171>

Mapping Networks of Terrorist Cells: <http://insna.org/PDF/Connections/v24/2001_I-3-7.pdf>

Transcript of Osama bin Laden videotape: <http://edition.cnn.com/2001/US/12/13/tape.transcript/>