Understanding and combatting terrorist networks: Coupling social media mining with social network analysis

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UNDERSTANDING AND COMBATTING TERRORIST NETWORKS: COUPLING SOCIAL MEDIA MINING WITH SOCIAL NETWORK ANALYSIS

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Abstract

Throughout the past decade the methods employed by terrorist organisations have changed drastically. One of these key changes has been associated with the rise of social media such as Facebook, Twitter, YouTube and blogging in general. Terrorist organisations appear to be using the wide reach and vast network capabilities created by social media to disseminate propaganda, radicalise susceptible individuals, recruit potential fighters and communicate strategic and operational objectives. However, this growing terrorist presence on Social Media can also offer invaluable insights into the social networks of terrorist organisations through the use of Social Media Mining and Social Network Analysis. By coupling these two techniques together, researchers can gain a greater understanding of how to combat and possibly destabilise complex terrorist social networks and aid in the fight against radicalisation and terrorism.

Keywords

Terrorism, National Security, Social Network Services, Social Groups, Social Network Analysis, Social Media

INTRODUCTION

Throughout the past decade the nature of terrorism has changed enormously. Through the changing global economy, to the universal issues facing all nations today such as climate change, the face of terrorism is a very different, and as many would observe, a more frightening one. While the core of terrorism may be tenacious in its changeability, with political, religious and ideological violence still the most common claims to terrorist action, arguably the biggest change has come from Social Media. Social Media has opened up new ways for radical thinkers to communicate, network, plan and operate. Social media sites such as Facebook, Twitter, YouTube, Myspace, and Blogging sites in general, have fundamentally and irrevocably changed the platform for terrorist networking in the 21st century. While social media has opened up extraordinary avenues for socialising, sharing information, rallying for political and social causes, and identity formation, it has also made combatting terrorism exponentially more difficult due to the sheer magnitude of data exchanged and retained   .   With   a change in the medium of terrorist networking and organisation, so too must there be a change in the way we investigate, understand and counter terrorist networks – and Social Network Analysis (SNA) coupled with Social Media itself, may have the answer. This paper will explore how SNA can be used to analyse data collected through Social Media Mining to help map out and analyse terrorist networks. This coupling can be immensely helpful for future researchers studying terrorist networks, as well as law enforcement and intelligence agencies.

Social network analysis and terrorism

Social Network Analysis was developed in the 1950's as a methodology for investigating relations between actors. Where traditional social science methods focused predominantly on the individual as the primary source of social data, SNA re-directed the focus on the relations *between* the actors rather than on the actors themselves (Knoke & Yang, 2008). By doing this, SNA practitioners could observe the nuanced dynamics between individuals, groups, corporations, nation-states, etc. often providing a rich source of meaningful information not obtainable through traditional social science research methods. SNA was then quickly adopted in many different disciplines including: criminology, where it was/is used to map criminal organisation structure and analyse the power dynamics, distribution and crime patterns of its key players. Anthropology, where tribal, urban and informal groups are mapped to aid in understanding the formal and informal social structures. And the health sciences, where diseases such as Avian flu and HIV/AIDS can be geographically mapped and better prevented through the focus on interactions between infected individuals. With the many benefits of SNA presenting themselves in various disciplines, recently, scholars have begun unleashing SNA's unique analytic capabilities on the study of terrorism, and more specifically, terrorist networks (these scholars' works will be explored later).

As Perliger and Pedahuzer (2011) note students appear to be reluctant in using SNA as "the majority of political violence students have very limited acquaintance with the rationale, main concepts, and methodological tools of SNA… and consequently tend to express doubt in regard to its efficiency and relevance for the study of complex social phenomena" (Perliger and Pedahuzer, 2011, pp:45). This unfortunate point leads to an oversight in the important, rich and meaningful results, that can be obtained in terrorism studies through the use of SNA. SNA is a research tool that is rarely included as part of the curriculum in social science departments at universities, with most students not even hearing about it well into their post-graduate studies. With the advances in technology, specifically the personal computer, there was a sharp ascent in SNA popularity which was the direct result of the development of SNA software, most notably UCINET, Pajek, NetMiner, STRUCTURE and MultiNet (Knoke & Yang, 2008). However, SNA remained a relatively nuanced research methodology within Terrorism and Security Studies, not often practiced by scholars. Having said this, there has been a small group of academics who have completed research in terrorism studies using SNA methodologies.

Scholar Karl Van Meter, following the 9/11 terrorist attacks in New York City used SNA, specifically Link Analysis to describe various forms of network research including adversary networks and traffic analysis in relation to phone surveillance. Van Meter's study examined this topic by focusing on the US Army from World War II to the late 1960s, against the IRA in Northern Ireland in the 1970s and well into the modern era (Van-Meter, 2001). By using SNA in the study of terrorism, Van Meter was able to identify weaknesses in certain terrorist networks which would otherwise not have been uncovered through traditional social science approaches. Going one step further, Kathleen Carley specifically targeted her research at destabilising covert networks. Through SNA networks she was able to identify weaknesses in the social networks and accurately develop strategies to combat and destabilise them (Carley, 2006). Similar to Carley (2006), Krebs (2002) points out the difficulty in mapping covert terrorist cells and offers insights into how SNA can be used in future research for this purpose (Krebs, 2002). However, as Perliger and Pedahuzer note, "even though their [post September 11 SNA scholars] studies showed strong potential in providing significant insights into the structures and internal processes of terrorist groups, the use of SNA in the study of political violence has remained quite limited and still amounts to only a small fraction of the research in the field" (Perliger & Pedahzur, 2011). One of the reasons scholars of Terrorism and Security studies have not been inclined to use SNA techniques is due to the assumption that Social Network Analysis is often hindered by difficulties in data collection. However, the rise of social media may be a solution to this problem.

Social Media as a Data Source for SNA

The use of Social Media as a data source in SNA has been growing over the last decade, since the rise of Social Media in general. The data is often gathered through data mining, using software specifically designed to pinpoint keywords, to more laborious methods, such as manually scouring hashtags, as in the case of twitter. However, with the large number of individuals participating in social media, creating, engaging with and disseminating networks, social media makes an excellent source for SNA data collection.

Data collection methods vary from site to site; however common approaches can be identified. Sites such as Twitter and Instagram allow data to be collected directly from the application programming interface (API), such as the method used by Community Studies scholars Wayne Williamson and Kristian Ruming (Williamson & Ruming, 2016). Data collection through the API is also possible for the social network site Facebook, however recent important changes to the privacy permissions of the application have barred access to specific data such as the sharing of 'Friend's' information. However, core data sets are still accessible within the Facebook API, allowing the researcher access to useful network data Networks can also be traced and linked through hashtags, a type of metadata label which works similarly to a hyperlink but with a broader focus on social interaction (Chang & Iyer, 2012). Blogging works similarly in that social interaction and 'sharing' are key to the function of the site, allowing a data collector or researcher access to already established digital networks. Scholars have taken advantage of these large amounts of accessible data for research in varying disciplines such as Community Studies, Political Science, Psychology and Pedagogy. See (Norman, Nordin, Din, Ally, & Dogan, 2015), (Fu, Cheng, Wong, & Yip, 2013), (Williamson & Ruming, 2016) and (Lucente & Wilson, 2013). Having said this there has been little use of Social Media data combined with SNA techniques in the study of terrorism.

While data collected through social media has been used in terrorism studies, it has rarely been integrated and analysed through SNA. It is well documented that terrorist propaganda, social networks and recruitment processes are disseminated through social media. However, the overwhelming majority of literature featuring the key words "Social Media" and "Terrorism" is concerned with the use of social media by terrorist organisations, rather than using social media as a data gathering tool to aid in the understanding and combat of terrorism. See (Dean, Bell, & Newman, 2012), (Marhu & Balteanu, 2014) and (Markon, 2016). Many academics, including the

above authors have documented the use of social media by terrorist organisations and how this creates a risk of online radicalisation to susceptible individuals. They also address the international network potential of terrorist groups and organisational prowess made possible by social media. However, as mentioned above there appears to be very little research that takes advantage of the relatively large radical and terrorist presence on social media as a data source for combatting terrorism and extremism.

This paper identifies 3 key advantages of using Social Media data with SNA in terrorism studies
1. International terrorist networks are easier to link together: While other methods of research into terrorist networks may be somewhat effective at identifying primitive links between key actors, they are rarely useful in mapping international connectedness.
2. The majority of Social Media data is open-source: Due to the covert and confidential nature of terrorism, data collection is often limited to news reports and declassified government documents, which are often outdated and no longer relevant. Social Media data, for the most part, is open to any individual with the abilities to mine it. This coupled with the large use of Social Media by terrorist organisations exposes a gold-mine of terrorist network data
3. Social Media Mining circumvents the risks of field research: Due to the violent nature of terrorist groups, ethnographic field research often comes with great risks to the researcher's well-being. While this method of research offers extensive and important ethnographic data, it is often very dangerous and thus rarely undertaken. Social Network data mining and SNA can be completed externally, with extra protection possibilities provided through secure servers and networks. This method of research eliminates the dangers experienced by the field researcher and allows for more varied and automated data gathering techniques.

With this in mind, it is also important to outline the disadvantages of using Social Media data with SNA in terrorism studies. SNA being a quantitative research methodology misses out on the detailed subject centred approach that qualitative studies offer. Ethnographic studies for example while limited in their scope, offer a much more detailed analysis of the human experience involved in terrorism. The other key disadvantage evident is the fact that not all terrorist organisations use social media. This can lead to a gap in data, which can cause misleading analyses. Having said this, specific research methods should not be used in isolation. SNA and Social Media Mining should be used as a complimentary research approach. Combining qualitative and quantitative research methods can lead to a more rounded approach to studying terrorism, therefore the disadvantages of SNA and Social Media Mining should not be seen as a problem when appropriately complimented.
These above mentioned three key advantages of coupling Social Media Mining with SNA as a research methodology position the researcher at a key advantage to others in the field of terrorism studies.

IMPLICATIONS

Data gathered from social media sites and applications can be integrated in SNA to produce insightful analyses into various aspects of extremism and terrorism. This coupling can provide invaluable insights into the network, power relations, distribution patterns and radicalisation trends of terrorist networks. Additionally, the advantages are not limited to analysis and understanding, they also offer integral practical applications. Through understanding the structure and most importantly, the key relations within terrorist social networks, researchers and security agencies will be able to effectively identify vulnerabilities in the network, which could ultimately expose opportunities to destabilise networks as a counter-offensive tactic. Thus, the use of Social Media data in SNA can be employed in counter-terrorism as well. Several variables must be addressed during the planning and operational stage of such research; therefore, this paper will not publish such results here. However, this paper hopefully exposes important and useful techniques in understanding terrorist networks for future research to explore, allowing for a more in depth discussion on the analytical capabilities of the coupling of SNA with social media mining.

CONCLUSION

The analytic capabilities of SNA in Terrorism Studies are invaluable, however there is a peculiar lack of research done using SNA techniques. This appears to come down to a lack of in-depth conceptual understanding of the methodology. However, by combining the data mining resources of Social Media, a domain which is populated by many terrorist organisations, with the relation focused analytic capabilities of Social Network Analysis, we may be able to better understand and ultimately combat terrorist networks which threaten national and global security. This article offers only a brief outline of the capabilities of the proposed research method, but hopefully illuminates possible approaches to terrorism that may be adopted by future researchers as well as law enforcement and intelligence agencies.

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