Discovering collection and analysis techniques for social media to improve public safety

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Abstract

The use of social media for contemporary knowledge management is growing. Success stories range from the fields of marketing to emergency disaster management. However its application to improve public safety remains elusive. This article outlines a case study of the presence of outlaw motorcycle clubs on Twitter and explores several collection and analysis techniques that can be applied to generate insights for social media intelligence.

Keywords: Social Media, Social Media Intelligence, SOCMINT, Open Source Information, Web 2.0, Contemporary Knowledge Management.

1. Introduction

Social media permeates and reflects nearly all aspects of today's society. The torrential flow of real-time digital information in the form of unstructured text, audio, images, videos and file attachments present a contemporary challenge in the field of technology management.

Information from social media holds the potential to generate insights. The emergency response to the earthquake in Haiti leveraged from social media technologies to initially establish the knowledge management infrastructure, and subsequently conduct live analysis of epidemic outbreaks.[1, 2] HealthMap is an example of real-time surveillance of social media platforms for emerging health threats.[3]

However, the use of this technology in protecting public safety remains embryonic. In a review of the policing response to the London riots in 2011, Her Majesty's Inspectorate of Constabulary (HMIC) summarized that British policing services are 'insufficiently equipped' to collect and analyze the unstructured and fast-moving social media information.[4] The Norwegian mass killer Anders Behring Breivik reportedly distributed a manifesto via social media some 90 minutes prior to the commencement of his attacks.[5]

Effective monitoring and analysis of social media remains a technological gap. Existing technologies and work practices of the relevant government agencies were primarily designed to collect, collate and analyze information in structured formats stored in databases and mainframes.[4] Intelligence agencies on both sides of the Atlantic, namely the United Kingdom Ministry of Defence (UK MOD) and the Federal Bureau of Investigation (FBI), both recently searched for tools to monitor and analyze social media information in enhancing their situational awareness.[6, 7] Australia's National Security Strategy focuses on a safe cyberspace as a critical future direction.[8]

This paper showcases several methods to collect and analyze social media information to improve public safety by using a case study of outlaw motorcycle clubs

(OMC). Section 2 introduces social media in terms of its foundational platforms, growth and driving factors. Section 3 shifts the attention to Social Media Intelligence as the discipline of applying social media information to improve public safety. Section 4 justifies the selection of OMCs as a case study to demonstrate the potential of social media. Section 5 outlines the data collection and analysis methodologies, closely followed by a discussion of the findings in Section 6. Section 7 highlights the research limitations and future areas for exploration, accompanied by Section 8 with concluding remarks.

2. Overview of Social Media

Social media is one of the most impactful applications of technology in everyone's lives. Its uses are both versatile and beneficial to the populace. For example, when wildfires plagued the Santa Barbara community in California, social media was used to circulate up-to-the minute information for the safety of residents.[9] More recently, political insurgency movements are facilitated by the anonymity afforded by social media sites, such as the protests after a disputed presidential election in Iran.[10]

Social media has uniquely provided all Internet users with their loudspeakers to the world. This trend has been captured by Time Magazine by nominating 'You' as the Person of the Year in 2006 and 'the Protester' in 2011, indicating the increasing significance of social media.[11, 12]

Social media is often thought to be interchangeable with Web 2.0 and user-generated content. It is important to distinguish between these interrelated concepts.

2.1. Defining Web 2.0

Various scholars agree that Web 2.0 represents a shift of focus in the Internet landscape; a focus that centers on the users to drive voluntary, participatory and collaborative contributions.[13-15] The distinctive characteristics of Web 2.0 are captured in the phrase 'participative Web', whereby the Internet is driven by the collective users' contribution, including encyclopedia entries in Wikipedia, videos shared in YouTube, and micro-blogs in Twitter.

Web 2.0 is not a new invention in and of itself, but rather a series of progressive improvements. Internet users cemented the demand to go beyond simply retrieving information from Web 1.0 platforms, to both

creating and consuming information. Web 2.0 facilitates interactive websites with richer context and user-friendly interfaces that encourage participation.[16] Web 2.0 represents a global collaboration directly facilitating democracy in the cyberspace.[17]

2.2. Defining User-Generated Content

User-generated content is the fuel and lifeblood of Web 2.0 provided by users, for users. User-generated content, or consumer-generated content, is a recently coined terminology which describes the information made available through Web 2.0 applications. There are three criteria to define user-generated content:[18]

- The information is published and publicly available on the Internet.
- The information incorporates a certain amount of creative effort to create the work, or adaptation of an existing work to create a new one. Thus original and adaptive works are included, but duplicated, copied or pirated materials are excluded.
- The information is created outside professional routines or practices.

2.3. Defining Social Media

If Web 2.0 is the platform and user-generated content is the content, then social media is the context in which both Web 2.0 and user-generated content are used in everyday lives. Social media can be defined as a group of Internet-based applications which build on the ideological and technological foundations of Web 2.0, and facilitate the creation and exchange of user-generated content.[13] Social media is usually seen at the application level and particularly emphasizes the meaning of input and content generated by users.[19]

The distinctive features of social media are its support for the democratization of knowledge and information, and transform individuals from mere content consumers into content producers.[16] This is a critical foundational principle of how social media changes the way knowledge is created and consumed in the virtual community.

The growth of these concepts is introducing concurrent paradigm shifts. On the one hand, Web 2.0 causes a shift in the locus of computing activities from desktop-based to be web-based, while user-generated content shifts the locus of knowledge creation from established sources to anonymous users.[16] The

happenstance of these two shifts effectively changes the locus of power from a few authoritative sources such as organizations and governments to the collective users of social media all over the world. The relationship between the three concepts can be best visualized by Figure 1.
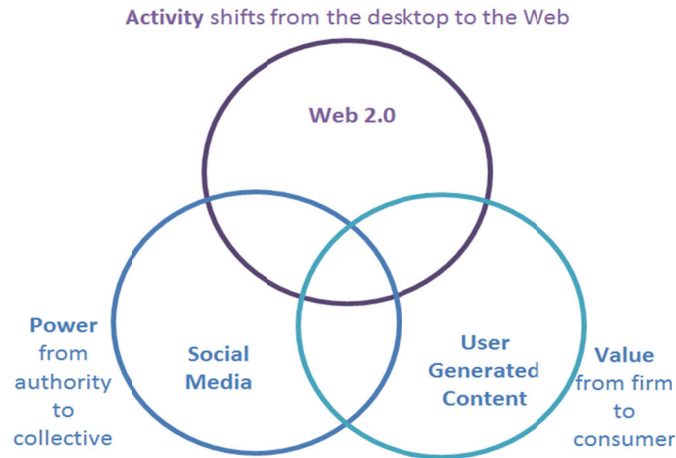
Activity shifts from the desktop to the Web

Web 2.0

Power from authority to collective

Social Media

User Generated Content

Value from firm to consumer

Fig. 1. Relationship between Web 2.0, User-Generated Content and Social Media [16]

In summary, Web 2.0 provides the technological infrastructure for user-generated content, which in turn represents ongoing knowledge creation, sharing and consumption, giving rise to what is termed social media.

2.4. *Drivers of Social Media*

The immense growth of social media can be attributed to five drivers, of which social driver is the most widely recognized. Social media is one of the few virtual ways people can manage others' impressions of their personality and competency through the quality of their contribution.[20] Societal interactions are increasingly being substituted through social media platforms, such as BlackBoard or WebCT to assist distance education.

Another facilitator is modern technological infrastructure such as increasingly accessible high-speed broadband and wireless connections.[13] Combining powerful mobile hardware and fast wireless Internet connection, the society is always connected to the Internet. The trend is unlikely to abate whereby broadband Internet connection is now a basic utility rather than a luxury through state-sponsored infrastructure such as United States' National Broadband Plan and Australia's National Broadband Network.[21, 22] Near-constant Internet connection means users have the freedom to contribute to social media whenever and wherever.[20]

Interestingly, a lesser number of scholars cite economic drivers of social media. Commercial entities are innovative in finding ways to monetize social media, for example YouTube financially rewards contributors who upload popular videos. As the trend continues, it is reasonable to expect increased variety of social media platforms which deliver financial incentives.[18]

Social media is also supported by open source and flexible copyright arrangements such as Creative Commons which is widely adopted by popular social media platforms including YouTube, Wikipedia and Twitter.[23-26] Open source copyright plans allow users to freely use, modify and distribute any user-generated content by simply citing the originating source and apply similar licensing plans themselves.[24] In fact, Twitter has gone so far as to open its platform to serve other applications that tap on Twitter's breadth of user-generated content.[26] TrendsMap is an example of such application where popular tweets all over the world are visualized over a geospatial map to represent most tweeted subject respective to that area.[27]

Apart from the above reasons, empirical research shows internal self-concept is a strong motivator for contributing to social media.[28] Internal self-concept refers to the motivation for individuals to meet their inherent standards.[29] Positive feedback received on behaviors driven by internal self-concept is likely to increase the actor's confidence in their competencies.[30] Empirical findings also confirm that contributors to

online travel reviews contribute to social media out of concerns for other travellers.[31] In summary, self-efficacy is the most important predictor of knowledge sharing intention and behavior.[32] The enjoyment gained from the process of knowledge sharing is driving increased use of social media.

3. Social Media Intelligence

While the use and growth of social media are clearly robust, its potential to improve public safety has only more recently surfaced. Social Media Intelligence (SOCMINT) is a newly introduced terminology so an agreed definition remains elusive.[33] The authors suggest SOCMINT is the collection, processing, analysis and reporting of social media information to satisfy intelligence requirements of law enforcement and security government agencies.

3.1. Social Media ⊄ Open Source

In comparison to SOCMINT, open source intelligence (OSINT) is a more established body of knowledge. OSINT is generally defined as intelligence derived from publicly available material that anyone can lawfully be obtained by request, purchase or observation.[34]

SOCMINT is considered by some to be a subset of OSINT. Some highlight the fact that SOCMINT derived from publicly available information, thus in essence it is a part and parcel of OSINT.[35] However, SOCMINT can also encompass information restricted from public view. Therefore SOCMINT is more appropriately treated as a mix between open and classified sources.[33]

Despite their close relations, it would be precarious to classify SOCMINT as a proper subset of OSINT. Social media has a distinct flavor of user-generated content that is commonly presented in conversation-like formats. OSINT on the other hand encompasses multitudes of information formats including websites, gray literature and presentations, which may or may not be distributed through Web 2.0 platforms. Therefore despite their neighboring heritage, SOCMINT has adequate distinction in format and flavor that warrants its recognition as a new stream of intelligence.

3.2. Open Source SOCMINT

This article focuses on open source SOCMINT, thus it is beneficial to briefly expand on the topic. An important distinction of open source SOCMINT is only using publicly available information, and categorically excludes classified (closed-source) information.[36]

In recent years, recognition for the importance of open source information has increased dramatically. At least three United States Federal Commissions criticized the lack of dedicated analysis and exploitation of open source information including the Aspin-Brown Commission in 1996, the 9/11 Commission in 2004 and the Weapons of Mass Destruction Commission in 2005.[37] Independent reviews of the intelligence community in Australia also produce similar findings. The Flood Review and the Cornall and Black Review both recommend new strategies for managing intelligence collection in the age of abundant information, including training and technologies to generate insights from open source information.[38, 39]

With its unclassified nature, commercial entities also seize on the opportunity to gain competitive advantage. Exploitation of open source SOCMINT is likely to gain greater prominence in the private sector as more competitive customer, supplier and market-related data becomes available.[40] Firms that can determine how and where to effectively gather and exploit open source SOCMINT stand to lessen their decision-making ambiguity and lower their risk.[41]

3.3. Perceptions of Open Source Information

Classified information remains the primary type of information used in intelligence assessments, but the advent of open source information brings debates within the intelligence community as to its relative value and credibility when compared with classified information.[37]

One recognized perception is that because classified information is normally derived from clandestine collection activities, it should be regarded as more valuable than freely available open source information. In other words, the perceived difficulty associated with the acquisition process is used as a barometer of information value.

A more considered view of open source accepts its strengths and benefits, but quotes the lack of reliability, credibility and proof as shortcomings. Proponents seem to indicate the need for further training and more precedence in exploiting open source information for mission critical issues. The Director of United States Open Source Centre recounted in 2009 when he reported on unrests in the Middle East fuelled by user-

generated content, but was received with skepticism by the wider intelligence community.[42]

3.4. *Challenges to SOCMINT*

As a new intelligence stream, SOCMINT poses some challenges for those seeking to manage and exploit it. Two of those challenges, technology and validation are explained in this section.

The first is to have specialized collection tools and analytical processes that allow the separation between the signal and noise, sorting the wheat from the chaff.[33] One argues that such has been the crux of intelligence efforts since its inception, but the flood of information available through social media, its unstructured nature, and real-time speeds present a unique challenge to existing technologies. This technology management challenge is described by an analyst who monitored social media during the London riots in 2011 as searching the British Library for a page in a book, but without an index to refer to.[4]

The second, and a more long-term, challenge is the difficulty of validation. Information obtained from social media is likely to be authored by anonymous individuals with little proven authority in the subject matter, which presents challenges in verifying the information presented. SOCMINT represents a shift from voices of authority to hubbubs of semi-anonymous conversations.[43] In the past era of print culture, information was presented with textual permanence, unity and identifiable authorship, and was therefore stable. Social media with its collaborative and mash-up philosophy transformed the landscape to flat and fluid information spaces.[44]

A token example is access to social media platforms by intelligence analysts. How many intelligence services provide access to social media platforms on the analysts' regular workstations? Security measures aside, SOCMINT will be the furthest from the analysts' minds if social media platforms are not at their fingertips.

A solution can be gleaned from the field of information literacy. Adaptive training in information literacy, based on non-linear approaches, is likely to facilitate analysts to make choices and negotiate between options.[45] The learning model is founded on the belief that analysts should avoid passively collecting information, but instead actively negotiate the task by forming their own perspectives and creating new insights throughout.[44] Table 1 summarizes

characteristics of the new learning model juxtaposed with existing approaches.

Table 1. Contrasting features of traditional and contemporary literacy models.[44]

Category	Existing Literacy Approach	Information Literacy 2.0
Accents in teaching	Teaching mechanics	Interpretations and negotiations
Content	Access and retrieval	Recognizing contexts, authority, reliability and accuracy issues
Characteristics of programs	Single correct solution	Non-exclusive solutions, multiple information paths
Perception of information systems	Systems-level: objective	Personal level: subjective
Perception of information spaces	Structured library world	Unorganized structures
Perception of users	Educating users	Educating information creators and users
Methodologies	One-time sessions, isolated instructions	Hybrid e-learning with Web 2.0 services

4. Case Study

SOCMINT has the potential to present unique strategic insights in addressing existing intelligence questions.[35] SOCMINT can illuminate the behavior of certain groups of interest, such as emerging topics within group-specific conversations and how the group reacts to a specific, perhaps volatile, event.[33]

For the purpose of this article, the authors selected a thematic issue such as OMCs which can be illuminated through open source SOCMINT.

4.1. *Background to Outlaw Motorcycle Clubs*

A cluster of motorcycle clubs refer to themselves as the 'one percenters' and often described as OMCs. They have expanded since their inception in the late 1940s and 1950s to become international franchises with memberships all over the world.[46, 47] Although their growth has previously concentrated in Anglophone countries, they have now globalized and successfully expanded to countries such as Japan, Russia, and

Germany. They have strong disciplined cultures and structures, commonly rotating around 'chapters', regional cells of these clubs. Each chapter holds relative autonomy although they also follow broader national and international club rules. Every chapter is led by a president, supported by sergeants-at-arms and a treasurer. Members graduate over the years from being a supporter, a 'hangaround', a prospect, and finally a 'fully-patched' member.[48]

OMCs are not considered to be criminal or illegal groups as a whole, but some of their members have consistently come to the attention of law enforcement for organized crime activities, typically in the illicit drug market.[46] Today's OMCs are sophisticated organizations who allegedly use their affiliation with a motorcycle club as a conduit for criminal activities. It has been observed that OMCs often employ violence and intimidation tactics to achieve their goals, thus generally considered to be a formidable threat to society.[47]

OMCs have grown significantly in the United States, numbering approximately 44,000 members nationwide, grouped in around 3,000 chapters, and reportedly collaborating with African, Asian, Eurasian and Italian organized crime syndicates.[49] In September 2011, two rival gangs were engaged in a public shootout at a Las Vegas casino, sending guests diving under the tables, and resulted in the death of an OMC president.[50]

OMC members in Australia number in excess of 4,000 persons in around 40 clubs.[46] Strings of violent acts have been associated with Australian-based OMCs over the years, most notably a brawl between two OMCs in Sydney Airport in March 2009 that resulted in one death.[51] As a result, an OMC president was found guilty of murder and sentenced with 28 years in jail.[52]

The airport-related fracas is reminiscent of a similar brawl in the United Kingdom between two opposing OMCs at Birmingham Airport in 2008. Twelve men were charged for violent disorder and weapons such as knuckledusters, hammers and a meat cleaver were retrieved from the scene.[53]

On the other hand, not all members of OMCs are involved in criminal activities. The OMC culture seems tolerant to its members being involved in criminal activities, but does not incorporate criminal acts in their charters.[54] Proponents of this argument view the violence commonly associated with OMCs to be

committed by overzealous members who wish to protect their clubs and fellow members.[55]

4.2. *Open Source SOCMINT on OMC*

The unique counter-culture proudly displayed by OMCs presents a rare opportunity to observe how open source SOCMINT can generate strategic insights into their behavior. The OMC ethos has been observed to be one that values interactions and loyalty among its members, while not generally shying away from public or law enforcement attention.[54] OMCs present a distinctive presence in the public eye through conventional media reporting and social media channels, unlike conventional criminal syndicates, therefore providing a rich environment for collection and analysis of open source SOCMINT.

5. Collection and Analysis

This research uses OMC presence on Twitter as a case study to demonstrate the relevant collection and analysis technologies to produce relevant SOCMINT.

The use of Twitter for academic research is growing. With more than 950,000 users, it provides a basis for research funded by the Australian Research Council Discovery Project as the first comprehensive study of Australian social media usage.[56] A search on popular academic databases for the term 'Twitter' returns over 8,000 scholarly articles since 2008.

5.1. *Data Collection*

Twitter is widely used by corporations and public figures to communicate with their constituents; the OMCs and their supporters are no different. It is apparent that a number of Twitter accounts bear the name of OMCs as their screen monikers.

While it is not possible to conclude whether the account owners are indeed OMC members, it would be reasonable to assume that they are ardent supporters of the respective OMCs.

The FBI National Gang Threat, published on the FBI website, provides a target population of 72 OMCs.[49] By iteratively searching for Twitter screen monikers that bear the names of the 72 OMCs, 23 Twitter accounts are identified which form the seed list for this research.

In order to obtain a comprehensive picture of their historical activities, the authors utilized Snap Bird, which in comparison to the standard Twitter interface,

can return tweets more than ten days old to a maximum of 3,200 tweets.[57] Snap Bird was used to collect all historical activities of the seed accounts, resulting in 6,601 public tweets. Table 2 summarizes the dataset.

Table 2. Dataset Summary.

Category	Number
Target Population of OMCs	72 clubs
Sampling Frame	14 clubs with Twitter accounts resembling their club names
Number of Twitter accounts identified	1,462
Number of public tweets collected	6,601
Date range	20 April 2009 to 20 January 2013

5.2. *Preliminary Analysis*

This section outlines some basic analyses of the sample population, including how Twitter accounts can be categorized, timeline of tweets, types of tweets and languages used. Discussions on the significance of these results will be expanded in a later section.

Categories of Twitter accounts

Traversing the 23 seed accounts through Snap Bird resulted in the collection of 6,601 public tweets. They in turn contain references to another 1,439 Twitter accounts by virtue of conversations and references. The Twitter accounts in the sample population can be categorized as follows:

- **OMC supporters** – 22 accounts associated with 14 distinct OMCs.
- **OMC news** – 1 account distributes OMC-related news, but is not associated to any specific clubs.
- **OMC associates** – 490 accounts 're-tweeted' (repeated or referenced) one or more tweets from the 22 OMC supporters.
- **Distant Relations** – 949 accounts are referenced in the collected tweets, but these users have neither replied nor conversed with OMC supporters.

Timeline of Tweets

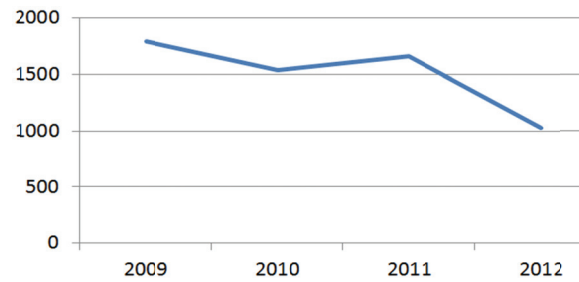The sample population of tweets span over 45 months as depicted in Figure 2.

Fig. 2. Timeline distribution of tweets

Figure 2 suggests the declining activities of the sample population since the highs of nearly 1,800 per year in 2009 to approximately 1,000 in 2012, a decrease of around 45 per cent.

The decreasing trend seems counter intuitive against the backdrop of greater social media usage described in previous sections. In investigating this matter further, the authors removed the one Twitter account described as OMC news. This one account alone is responsible for almost 3,200 tweets, nearly half of the sample population (48 per cent), thus it is likely to skew aggregate results.

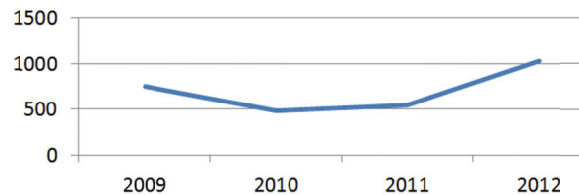The timeline distribution without the OMC news account is shown in Figure 3.

Fig. 3. Timeline distribution of tweets without OMC news

Figure 3 reveals a different pattern. By excluding this account, it is apparent that tweets from OMC supporters were at 757 in 2009, dipped slightly in 2010 and 2011, and jumped to over 1,000 tweets in 2012. The activities in 2012 represent an increase of over 35 per cent in comparison to that in 2009.

Types of Tweets

There are two types of tweets in the sample population; 'original tweets' authored by the user, and 're-tweets', which are tweets from other users that have been repeated or referenced by the author.

The OMC news account exclusively produces original tweets, thus the account is excluded from this analysis.

Out of the 2,862 tweets, 1,770 were original tweets and 1,092 were re-tweets. Figure 4 shows the division.
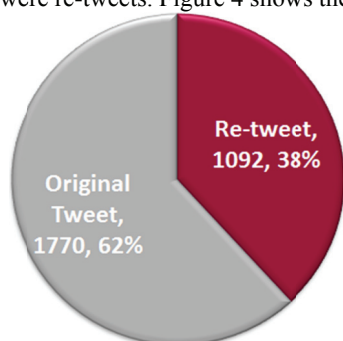

Fig. 4. Division between original tweets and re-tweets (excluding OMC news platform)

Languages of Tweets

Social media facilitates conversations all around the world and Twitter supports over 20 languages. At least 12 distinct languages can be detected from the sample population. Table 3 presents the breakdown.

Table 3. Languages used in tweets

Language	Tweets	Percentage
English	5,016	82.76%
Russian	748	12.34%
Portuguese	134	2.21%
Dutch	84	1.39%
Japanese	48	0.79%
Latin	20	0.33%
Hebrew	4	0.07%
French	3	0.05%
Other (Danish, German, Swedish, Korean)	4	0.06%
Total	6,601	100%

5.3. *Targeted Analysis*

Specialized analytical tools can be applied to generate deeper insights into the sample population. Similarly,

discussions on the significance of these results will be expanded in the next section.

Social Network Graph

Tweets can represent conversations between OMC supporters, thus they can be analyzed using social network analysis software such as Gephi.[58] Figure 5 visualizes accounts as nodes and tweets as edges.
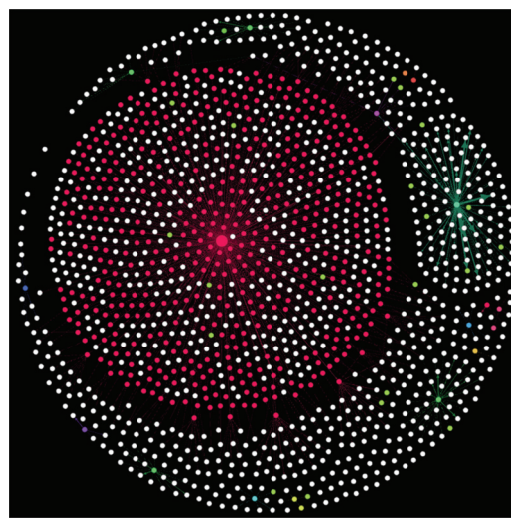

Fig. 5. Social network graph of the sample population

Behavioral Patterns

Tweets are rich with data that suggest a user's behavioral patterns. For example, aggregating the date and time stamps of tweets can reveal the user's daily routine. Some tweets, depending on the user's privacy settings, may hold geocoding information of where the tweet was generated from, and can be subsequently analyzed in a geospatial platform.

Previous analyses suggest that the OMC news account proved challenging to dissect because of the large number of tweets from one user. By placing the 3,199 tweets from this user on a scatterplot, Figure 6 displays the peaks and troughs of activities.
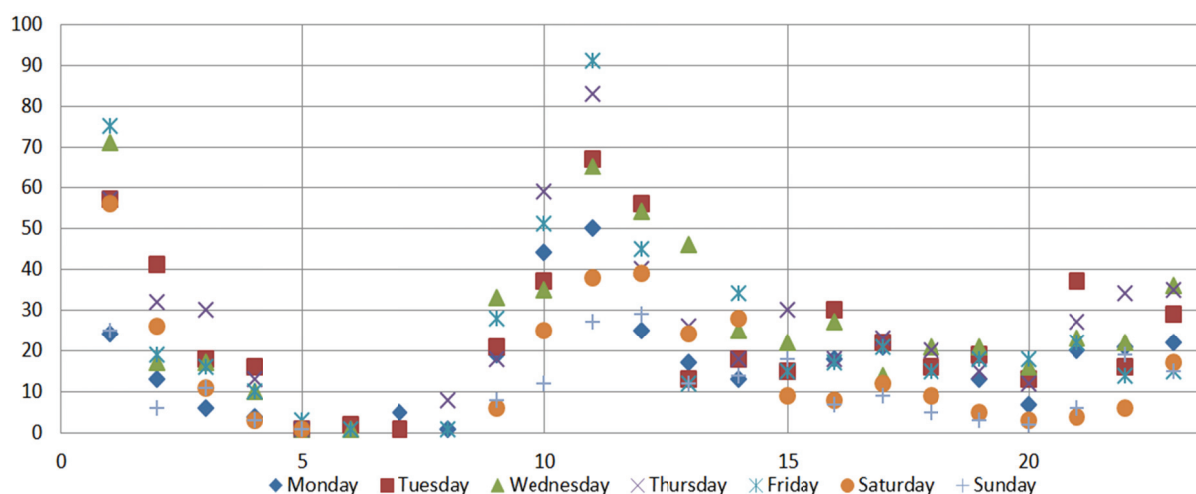
Fig. 6. Scatterplot of activities from the OMC news account

6. Discussion of Findings

It is clear that Twitter is a robust platform that is widely used by society and avails itself to various data collection and analysis tools to generate insights. This section examines the findings from the previous section to illustrate what can be gleaned from open source SOCMINT.

Firstly, timeline distribution corroborates the fact that social media usage continues to increase, including usage by OMC supporters and associates. Active monitoring of timeline distribution could be used as a barometer of the OMC community, especially in conjunction with significant events that impact on OMCs. For example, when several Australian states passed legislation that can declare certain OMCs to be illegal organizations,[59, 60] timeline analysis could potentially be used to monitor whether increased chatter are detected among OMC supporters around the same time. Sentiment analysis can then be used to detect attitude shifts.

Almost 40 per cent of the sample population consists of re-tweets. Re-tweets indicate stronger social interactions among members of this community as they generally foster a feeling of mutual support and collaboration. This reiterates the opportunity for open source SOCMINT to analyze the robust interactions in a complex social environment. Text-mining analysis can detect which tweets are more likely to be re-tweeted by OMC supporters.

The languages used in the tweets are equally fascinating. They confirm the presence of OMC supporters and associates in various countries, especially those considered to be new and emerging OMC frontiers, such as Russia, South America and Japan. It represents the continuing success OMCs have in expanding their networks around the world.

Targeted analyses on the other hand, generate insights that can assist operational activities. Social network graph visualizes the Twitter landscape and highlights the most active users. Figure 5 for example, depicts the presence of one major OMC in the middle hub, and a slightly smaller OMC to its right. They each display distinct social network structures that may represent different cultures of communications. Social network graphs can also identify emerging users with intriguing activities who were not previously known to associate with OMCs.

Lastly, the scatterplot presents an opportunity to examine the spread of user's activities. Figure 6 reveals that the OMC news account most frequently tweets during Friday mornings and afternoons, while evenings are most active on Tuesdays and Thursdays. The same approach can also be applied across more than one user to compare whether they have the same patterns of life.

7. Limitations and Opportunities

It was indicated earlier that one of the distinct limitation of open source SOCMINT is the inherent anonymity of cyberspace. For the same reason, it is timely to reiterate the research purpose is to demonstrate collection and

analysis techniques that can be used to generate open source SOCMINT, rather than specific findings per se.

This paper has only selected Twitter as a case study, but the approach can be suitably expanded to include other popular social media platforms such as Facebook, Instagram, LinkedIn and many others, to create a more comprehensive picture of OMC influence in the virtual world.

There are multitudes of other analyses that can be conducted on the sample population, including text and sentiment analysis, further exploration of the social network graph and comparison of scatterplots between rival OMC supporters, just to name a few. These would form areas for fertile research.

8. Conclusion

Open source SOCMINT represents a new arena for exploration in the application and management of technology for improving public safety. The ever-rising numbers of social media and its various types and platforms compounds the technology management challenge. The benefit of open source SOCMINT, like any other information sources, must be leveraged in conjunction with conventional methods and tools. Its greatest potential is to enhance existing approaches rather than replace them.

This research contributes to the growing academic research on social media, especially its applications in the fields of contemporary knowledge management, technology management, and SOCMINT to improve public safety.

This paper examined the presence of OMCs on Twitter to demonstrate how collection and analysis techniques can be applied to generate relevant open source SOCMINT. The discussion confirmed an increasing use of social media by OMC supporters as a networking platform, especially its expansion into countries which did not previously have strong OMC presence.

Targeted analyses showcased how data mining approaches can be applied on open source SOCMINT to support law enforcement and security endeavors in improving public safety. They can effectively identify key players in networks, as well as new and emerging areas for exploration.

Although several novel approaches were demonstrated in this article, an adaptive technology to solve the 'high noise, low signal' problem remains elusive. There are opportunities to be gained from applying established research methods to improving public safety, but it requires innovation, courage and persistence for such endeavors to bear fruit.

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