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Sensing the public's reaction to crime news using the 'Links Correspondence Method'

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A B S T R A C T

Public media such as TV or newspapers, paired with crime statistics from the authority, raise awareness of crimes within society. However, in today's digital society, other sources rapidly gain importance as well. The Internet and social networks act heavily as information distribution platforms. Therefore, this paper aims at exploring the influence of the social Web service Twitter as an information distribution platform for crime news. In order to detect messages with crime-related contents, the Links Correspondence Method (LCM) is introduced, which gathers and investigates Twitter messages related to crime articles via associated Web links. Detected crime tweets are analysed in regard to the distance between the location of an incident and the location of associated tweets, as well as regards demographic aspects of the corresponding crime news. The results show that there exists a spatial dependency regarding the activity space of a user (and the crime-related tweets of this user) and the actual location of the crime incident. Furthermore, the demographic analysis indicates that the type of a crime as well as the gender of the victim has great influence on whether the crime incident is spread via Twitter or not.

Introduction

Media and the public's concern about crime

Media, and in particular TV and newspapers, affect people's feelings, impressions, judgments and viewpoints about crime. Many scholars have supported with their findings the positive association between media and crime perception; yet this is not a new research field. Interests on the Media's effects on crime perception have started since the beginning of the last century. Fenton (1910) argues that human habits are unconsciously and consciously acquired as we grow up and are influenced, among many other factors, by the newspapers as well. Based on this logical assumption, Fenton was interested to investigate whether newspaper publications had an agenda setting effect about anti-social activity or influenced and unwittingly promoted this type of behaviour.

Current research still acknowledges the positive association, but shifted its interest to the effects on crime perception in general. For instance, fear of crime is an essential and timeless area of research in criminology. Interestingly enough, the findings of previous studies disagree considerably in this scientific domain. Significant relationships between crime news and fear of crime (FOC) or fear of victimisation have been proved in many studies (Chiricos, Eschholz, & Gertz, 1997; Jaehnig, Weaver, & Fico, 1981; Smolej & Kivivuori, 2006; Williams & Dickinson, 1993).

Furthermore, it seems that crime type also plays important role in people's fear of crime and according to Jaehnig et al. (1981) this is more closely associated when newspapers emphasise on violent crimes. However, among the scholars there is considerable disagreement about the extent to which the media reflect or form opinions (Duffy & Rowden, 2005). Though, according to Williams and Dickinson (1993), Schlesinger, Tumber, and Murdock (1991), and Duffy and Rowden (2005), our study area (UK) seems to be affected.

Geographic information of crimes

Crime incidents feature geographic aspects. These aspects appear in form of a geographic location related to the crime scene. But not only the crime scene as such is georeferenced, the patterns of activities, routes and behaviour of victims and criminals feature

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geographical aspects as well. This observation manifested itself within the literature as the crime pattern theory (Brantingham & Brantingham, 1984, 1993). It is reasoned that crime incidents happen at predictable locations.

These locations are based on the geographical intersection of the criminals so-called awareness space and crime chances (Wortley & Mazerolle, 2013). As the development of technology advanced, Information and Communication Technology (ICT)-based systems found their ways to various application areas, in case of police work and crime analysis in form of geographic information systems (GIS). These systems support the police by proving the possibility to not only display temporal and spatial crime data, but also to develop models to identify crime hot spots and in further consequence to predict potential crime areas as well (Sherman, Gartin, & Buerger, 1989).

Not only the crime incidents as such generate geographic information, the public reactions to them do as well. Media and in particular the newspapers present a major public information source about crimes. In a survey related to the fear of crime produced by different cartographic practices, 58% of the respondents reported that newspapers are the primary source for crime information (Groff et al., 2005). Likewise, in the UK more than 60% of people are regular newspaper readers (Duffy & Rowden, 2005). As this information is spread among the community, people react to it via expressing their opinions and reactions to different topics, news, or events in social networks. As these reactions are usually in textual, verbatim description, as well as the profile information of the associated users, natural language processing (NLP)-based techniques and methods are crucial for retrieving and analysing these data. The use of NLP in GIS is an emerging research field. Current research projects cover heterogeneous topics from location-based services (Haav, Kaljuvee, Luts, & Vajakas, 2009), geoparsing and geocoding (Kounadi, Lampoltshammer, Leitner, & Heistracher, 2013) up to concepts in the field of human computer interaction (Thomas, Sripada, & Noordzij, 2012). A comprehensive overview of on-going research in this area can be found in Lampoltshammer (2012). This paper aims at exploring the influence of the social Web service Twitter as an information distribution platform for crime news.

Methodology

In this section the Links Correspondence Method (LCM) is introduced. LCM utilises online influential sources as well as sources of opinion expression in order to estimate the degree or variations of public's interest in particular topics. In this study, the investigated topic is crime articles, the selected influential sources are online versions of newspapers and the source of opinion expression is Twitter.

Since our topic is dealing with crime information, which generates negative emotions, we employ the LCM to estimate patterns, variations and the degree of concern related to specific crime articles.

The step-by-step outline of the Links Correspondence Method is shown in Fig. 1. It consists of two main phases: i) data extraction, and ii) the analysis of associations between the crime incidents and the crime-related tweets. In the first phase, we extract texts from sources of opinion expressions (in our case Twitter messages) that contain Web links pointing to influential sources. The texts provide information about the location and also the links' popularity which is expressed by the degree of occurrences of these links. In addition, the location of the topic that is discussed (in our case locations of crime incidents) and other characteristics of that topic are extracted from the links. The first phase results in four derivatives: a) the

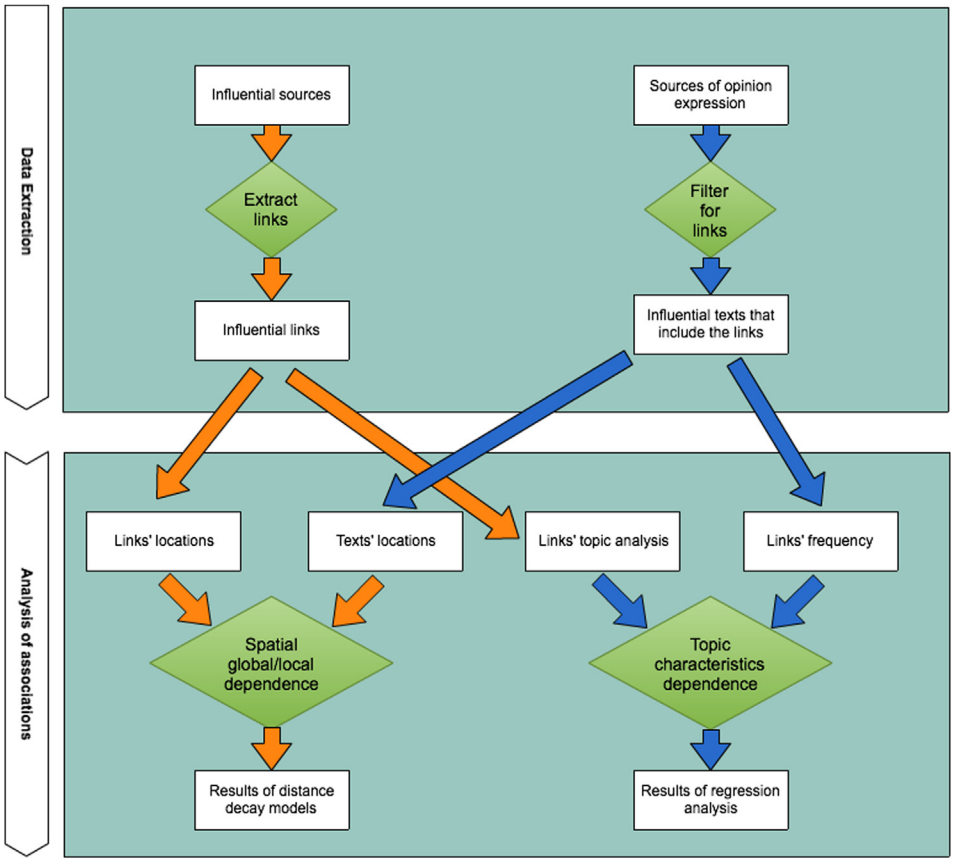

Fig. 1. Links Correspondence Method: Influential sources and sources of opinion expression are utilised to assess the interest in particular topics.