Journal Pre-proofs

Social Media Sentiment Analysis and Opinion Mining in Public Security: Taxonomy, Trend Analysis, Issues and Future Directions

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Abstract

The interest in social media sentiment analysis and opinion mining for public security events has increased over the years. The availability of social media platforms for communication provides a valuable source of information for sentiment analysis and opinion mining research. The content shared across the media gives potential input to the physical environment and social phenomena related to public security threats. The input has been used to: monitor public security threats or emergency events, analyzing sentiment and opinionated data for threat management and the detection of public security threat events using geographic location-based sentiment analysis. However, a systematic survey that describes the trends and latest developments in this domain is unavailable. This paper presents a survey of social media sentiment analysis and opinion mining for public security. This paper aims to: understand the progress of the current state-of-the-art, identify the research gaps, and propose potential future directions. In total, 200 articles published from 2016 to 2023 were considered in this survey. The taxonomy shows the key attributes and limitations of the work presented in the surveyed articles. Subsequently, the potential future direction of work on sentiment analysis in the public security domain is suggested for interested researchers.

Keywords: Sentiment analysis; Opinion mining; Public security; Public threat; Taxonomy

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1. Introduction

Ensuring public security has long been a core factor of a stable country. Over time, the definition of security has broadened to encompass a range of sectors and domains, including environmental, societal, economic, and political. Additionally, the concept of security has deepened to include individual safety and well-being, not just national or state-level security (Stevens & Vaughan-Williams, 2016). According to the Oxford dictionary, security encompasses the activities involved in protecting a country, building, or person against attack and danger, as well as the state of feeling happy and safe from danger or worry (Hornby & Cowie, 1995). In general, public security consists of: maintaining social privacy, eliminating risks, and the optimal use of opportunities to ensure sustainable development and well-being (Dehdezi & Sardi, 2016). The common definition of public security is the protection and safety of persons or property against the threat of attack and danger (Manunta, 1999; Ortmeier, 1998). The threat concerns can be criminal or non-criminal. Criminal threats typically arise from non-natural causes such as terrorism, riots, protests, crises, conflicts, accidents and crime. Non-criminal threats, on the other hand, are caused by natural events such as natural disasters, disease outbreaks and pandemics. Ensuring public security is vital for protecting the general public: from significant threats, danger, injury, harm, damage and/or loss of life; whether caused by natural or non-natural events (Bansal, Grover, Saini, & Saha, 2021; Chung & Zeng, 2018; Ortmeier, 1998). These events have seriously threatened human life and safety for a considerable time, causing significant economic and cultural loss.

Opinion mining, also known as sentiment analysis, is the field of study that analyzes people's opinions, sentiments, appraisals, attitudes, and emotions toward entities and their attributes expressed in written text. Although the terms "opinion" and "sentiment" are related, there is a subtle difference between them. Opinion mining primarily deals with a person's concrete view of something, while sentiment refers to an attitude or thought prompted by a feeling. Opinion mining involves two levels of abstraction: a single opinion and a set of opinions, whereas sentiment