

Chapter 106

Progressive Scrambling for Social Media

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ABSTRACT

Despite research work achieving progress in preserving the privacy of user profiles and visual surveillance, correcting problems in social media have not taken a great step. The reason is the lack of effective modelling, computational algorithms, and resultant evaluations in quantitative research. In this article, the authors take social media into consideration and link users together under the umbrella of social networks so as to exploit a way that the potential problems related to media privacy could be solved. The author's contributions are to propose tensor product-based progressive scrambling approaches for privacy preservation of social media and apply our approaches to the given social media which may encapsulate privacy before being viewed so as to achieve the goal of privacy preservation in anonymity, diverse and closeness. These approaches fully preserve the media information of the scrambled image and make sure it is able to be restored. The results show the proposed privacy persevering approaches are effective and have outstanding performance in media privacy preservation.

1. INTRODUCTION

Social networks have never been so broadly influenced our daily life (Montjoye et al., 2014; Fung et al., 2010). In this era, social media networks provide such a public place for sharing information and shorten the distance of communications between users. While a media is being shared on a social network, the network (Liu et al., 2012) assists in sharing media information such as photos, music, audio and video footages between various registered users. Previous Facebook users only shared text information, currently most of them are enjoying picture sharing, it is said video sharing times will come soon in the near future.

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Social media was uploaded by a registered user of a social network system, the system archives the media data which may be shared to different viewers across different accounts, the users who have relationships with the media owner and view this media will have the opportunity to poster their comments on this public network. Therefore, online social media is different from traditional one. Our understanding of a social media network is shown in Figure 1. Figure 1(a) shows how a media will be shared from Alice (a sender) to Bob (a receiver) locally as well as how a media will be shared along a path in a social network globally in Figure 1 (b).

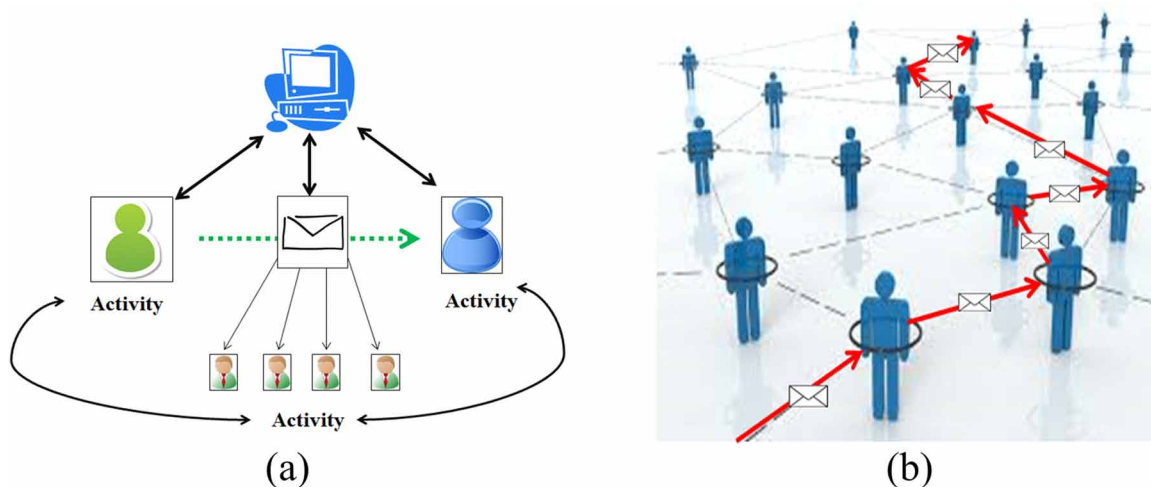
The media on social network may carry confidential or privacy information which is related to personal secrets, children, siblings and relatives, location and time privacy, appearance and wearing, emotions and intentions, etc. Therefore, media privacy on social networks does exist. Within a social network, users are connected mutually by the networks within the society. Hence media privacy of social networks is derivative from user profiles and activities of registered users under the architecture of social networks.

However prevalent social networks could not hold media privacy appropriately. For instances, the settings of Facebook and Twitter typically did not deal with media privacy issues properly. Figure 2 shows the settings of users and their profiles for privacy protection in Facebook and Twitter.

Social media privacy preservation is different from censorship systems of a state. In censorship, a rating system usually classifies movies or TV dramas, computer games and literature into several classifications: General Audiences (G), Parental Guidance Suggested (PG), Restricted (R), etc. The media contained objectionable, harmful, and sensitive etc., politically incorrect or inconvenient media will be banned by a government or an organization. However, social media privacy may not explicitly embrace this kind of content, it's normal from ordinary life but it does make viewers embarrassment and cause further disputations.

In publishing data privacy over World Wide Web, preserving data privacy usually refers to release more anonymous records, such as k-anonymity, meanwhile we could keep the k records have l-diverse. The difference of these l-diverse records could have t-closeness in probability or entropy (Zou, Chen and

Figure 1. Understanding of social networks. (a) Local media sharing on social network, and (b) Global media sharing on social network



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