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Analysis of Student Online Interaction Behavior: A Social Relationship Perspective

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Abstract

Mobile opportunistic networks (MONs) have been attracting increasing amounts of attention in recent years. Characterizing user contact behavior provides a baseline to evaluate the performance of these networks. However, because the contact distribution of nodes in MONs is conventionally modeled from a large-scale perspective, i.e., by aggregating all node pairs, the contact features of nodes with multiple social relationships are not reflected. Thus, it is not clear whether friends and strangers have similar or different contact behaviors. In this study, we aggregated the contact information of users from the real world, and discovered that two phenomena exist: (1) Most friends or strangers make contact at public hotspots, rather than private hotspots; (2) The distribution of intra-contact time (ICT) exhibits different decay factors---the ICT distribution of strangers is predominantly faster than that of friends.

Keywords: Mobile opportunistic networks; User contact behavior; Social relationship; Hotspots.

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1. Introduction

Concomitant with the significant advancements in microelectronic and communication technologies, numerous sensors and wireless interfaces are now integrated into portable devices such as smart-phones and personal digital assistants (PDAs). This has resulted in the emergence of a new communication paradigm called Mobile Opportunity Networks (MONs). In contrast to traditional mobile cell networks and ad hoc networks, MONs do not have a connected path between sources and destinations. Instead, messages are transmitted with a store-carry-and-forward style. This new feature in MONs creates various exciting opportunities and many interesting applications, ranging from mobile offloading [1] to urban computing [2], are being envisioned.

Characterizing user contact behaviour provides a foundation to evaluate the performance of MONs, because the mobility of people plays a significant role in the applications being envisioned [3] [4] [5]. For example, before supplementary municipal planning facilities can be deployed in Beijing, a key issue would be determination of the potential. Collecting user's trajectories and detecting their activities in order to ascertain the primary gathering places may be a good choice [6].

Over the past years, several user mobility analysis studies have been conducted [7] [8] [9], where two primary contact features are considered, inter-contact time and intra-contact time [1] [10] [11] [12] [13]. Numerous experiments have revealed that both features follow a power-law [3] [14] or an exponential distribution [5] [9] [15] [16]. However, because most studies model the contact distribution of nodes from a large-scale perspective, i.e., by aggregating all node pairs, the contact features of nodes with multiple social relationships is not reflected [14]. For example, their models cannot determine whether friends and strangers have similar or different contact behaviors.