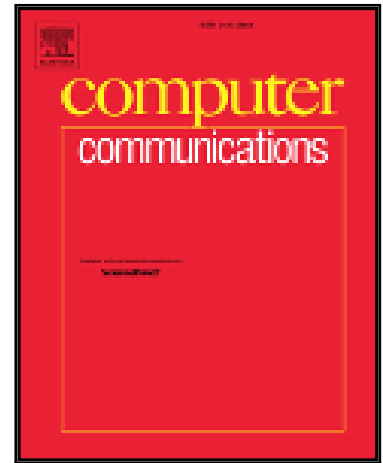


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# A Deep Dive into Location-based Communities in Social Discovery Networks

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## Abstract

Location-based social discovery networks (LBSD) is an emerging category of location-based social networks (LBSN) that are specifically designed to enable users to discover and communicate with nearby people. In this paper, we present the first measurement study of the characteristics and evolution of location-based communities which are based on a social discovery network and geographic proximity. We measure and analyse more than 176K location-based communities with over 1.4 million distinct members of a popular social discovery network and more than 46 million locations. We characterise the evolution of the communities and study the user behaviour in LBSD by analysing the mobility features of users belonging to communities in comparison to non-community members. Using observed spatio-temporal similarity features, we build and evaluate a classifier to predict location-based community membership solely based on user mobility information.

*Keywords:* Human Mobility, Link Prediction, Social Discovery Networks

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## 1. Introduction

Location-acquisition technologies like GPS on smartphones have rapidly promoted the use of location-based services. Foursquare<sup>1</sup> is a traditional Location-Based Social Networks (LBSN) which enables users to share their real-time locations, by checking into a set of venues in the proximity of their geographic location. The popularity of LBSNs has attracted substantial research interest as data collected from LBSNs enable studies of individuals' online and offline behaviours, ranging from human mobility modelling [1, 2] to user behavioural analysis [3, 1], user re-identification [4], user anonymity analysis [5, 6] and social relationship recommendations [7, 8].

A new category of LBSNs are Location-Based Social Discovery (LBSD) networks that are specifically designed to enable users to discover and communicate with nearby people such as Sweetr [9], WhosHere<sup>2</sup>, WeChat<sup>3</sup>, Yik Yak [10] and Momo<sup>4</sup>. Recently in April 2014, Facebook launched a new opt-in service called "Nearby Friends", which enables users to share real time location and discover nearby friends [11]. As an emerging new type of services, LBSDs are yet to be thoroughly studied compared to number of measurement studies of LBSNs such as *Twitter*. This is primarily due to the inability to capture data and unavailability of real-world datasets.

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<sup>1</sup><https://foursquare.com>

<sup>2</sup><https://web.whoshere.net>

<sup>3</sup><http://www.wechat.com/en/>

<sup>4</sup><http://www.immomo.com>

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