

Accepted Manuscript

Community-Based Seeds Selection Algorithm for Location Aware Influence Maximization

Xiao Li, Xiang Cheng, Sen Su, Chenna Sun

PII: S0925-2312(17)31632-6
DOI: [10.1016/j.neucom.2017.10.007](https://doi.org/10.1016/j.neucom.2017.10.007)
Reference: NEUCOM 18986

To appear in: *Neurocomputing*

Received date: 4 May 2017
Revised date: 12 September 2017
Accepted date: 3 October 2017

Please cite this article as: Xiao Li, Xiang Cheng, Sen Su, Chenna Sun, Community-Based Seeds Selection Algorithm for Location Aware Influence Maximization, *Neurocomputing* (2017), doi: [10.1016/j.neucom.2017.10.007](https://doi.org/10.1016/j.neucom.2017.10.007)



This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Community-Based Seeds Selection Algorithm for Location Aware Influence Maximization

Xiao Li, Xiang Cheng, Sen Su*, Chenna Sun

State Key Laboratory of Networking and Switching Technology,
Beijing University of Posts and Telecommunications, Beijing, China

Abstract

In this paper, we study the location aware influence maximization problem, which finds a seed set to maximize the influence spread on targeted users for a given query. In particular, we consider users who have geographical preferences on queries as targeted users. One challenge of the problem is how to find the targeted users and compute their preferences efficiently for given queries. To address this challenge, based on the R-tree, we devise a PR-tree index structure, in which each tree node stores the location and information of users' geographical preferences. By traversing the PR-tree from the root in depth-first order, we can efficiently find the targeted users. **Another challenge of the problem is to devise an algorithm for efficient seeds selection.** To solve this challenge, we adopt the maximum influence arborescence (MIA) model to approximate the influence spread, and propose an efficient **community-based** seeds selection (CSS) algorithm. The proposed CSS algorithm finds seeds efficiently by constructing the PR-tree based indexes offline which precompute users' community based influences, and preferentially computing the marginal influences of those who would be selected as seeds with high probability online. In particular, we propose a community detection algorithm which first computes the social influence based similarities by the MIA model and then adopts the spectral clustering algorithm to find optimal communities of the social network. Experimental results on real-world datasets collected from DoubanEvent demonstrate our proposed algorithm has superiority as compared to several state-of-the-art algorithms in terms of efficiency, while keeping large influence spread.

Keywords: Social network, Influence maximization, Social influence, Community detection, Location awareness

1. Introduction

In recent years, social networks have become prevalent platforms for product promotion (e.g. viral marketing). Previous studies have proven that the viral marketing strategy is more effective than TV or newspaper advertising. With the development of new technology, artificial intelligence (AI) is now playing key role in social media marketing. Aiming to find a certain number of users (called seeds) to maximize the expected number of influenced users (called influence spread) through the word-of-mouth effect, in-

fluence maximization is the key problem behind viral marketing in social networks [1], which has been extensively studied recently [2, 3, 4, 5]. With the proliferation of geo-social networks (such as Foursquare¹, and Facebook²), location-based products promotion is becoming more necessary in real applications. For instances, a new opened restaurant in Chelsea, New York, wants to be promoted in a social network platform with viral marketing. The promoting strategy of this restaurant is to provide free meals for a limit k users, who can maximize the influence spread over the targeted users through the powerful word-of-mouth effect to attract them dining here. Obvious-

*Corresponding author: Sen Su

Email addresses: lixiao@bupt.edu.cn (Xiao Li),
susen@bupt.edu.cn (Sen Su)

¹www.foursquare.com

²www.facebook.com/about/location

متن کامل مقاله

دریافت فوری ←

ISIArticles

مرجع مقالات تخصصی ایران

- ✓ امکان دانلود نسخه تمام متن مقالات انگلیسی
- ✓ امکان دانلود نسخه ترجمه شده مقالات
- ✓ پذیرش سفارش ترجمه تخصصی
- ✓ امکان جستجو در آرشیو جامعی از صدها موضوع و هزاران مقاله
- ✓ امکان دانلود رایگان ۲ صفحه اول هر مقاله
- ✓ امکان پرداخت اینترنتی با کلیه کارت های عضو شتاب
- ✓ دانلود فوری مقاله پس از پرداخت آنلاین
- ✓ پشتیبانی کامل خرید با بهره مندی از سیستم هوشمند رهگیری سفارشات