

## Accepted Manuscript

Mobile local search with noisy locations

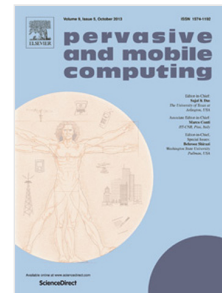
Rinku Dewri, Ramakrishna Thurimella

PII: S1574-1192(16)30048-7

DOI: <http://dx.doi.org/10.1016/j.pmcj.2016.04.014>

Reference: PMCJ 703

To appear in: *Pervasive and Mobile Computing*



Please cite this article as: R. Dewri, R. Thurimella, Mobile local search with noisy locations, *Pervasive and Mobile Computing* (2016), <http://dx.doi.org/10.1016/j.pmcj.2016.04.014>

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.

# Mobile Local Search with Noisy Locations

Rinku Dewri and Ramakrishna Thurimella  
Colorado Research Institute for Security and Privacy  
Department of Computer Science  
2280 S Vine St., University of Denver, CO 80210, USA  
{rdewri,ramki}@cs.du.edu  
Ph: +1-303-871-4189

## Abstract

The deep penetration of mobile devices have led to the emergence of multiple mobile applications that seek to harness the positioning capabilities embedded in such devices. One of the most functional of these applications is local search. Local search is similar to a regular web search, yet is more powerful in a mobile setting since results are ranked both by prominence and locality. Undoubtedly popular, the current design of local search applications fails to cater equally to a privacy-aware user who desires finer controls in her location disclosure. Towards this end, we propose the design for a private local search (PriLS) application that enables a user to first learn the geographic variation in local search results and then use it to determine a noisy location that has little or no affect on the search results. Parametric studies and real-world evaluations show that PriLS can help identify geographic locations that would produce similar search results (compared to when the user's location is used) with no noticeable delays in user experience. They also reveal that large areas typically exist where there is no change in the result of a local search query, and can be exploited to provide spatial privacy guarantees to a user.

**Keywords:** location privacy, local search, mobile device

## 1 Introduction

Wide adoption of GPS-enabled mobile devices and advances in cellular telecommunication networks now allow content providers to deliver search results to a mobile user such that they are relevant semantically, as well as, geographically. Local search applications such as Google Places, Yelp, Loopt, Where, AroundMe, and many others, have spawned in the past decade to cater to this user base, and at the same time, tap into the revenue potential of the market. Despite the excellent functionality and growth potential, the collection of user location information raises multiple privacy concerns. Since the legal restrictions remain to be clearly defined, it is difficult to know if the collected information can later be used to encroach on user privacy. Large fraction of users indeed demand protection of their location privacy, yet still consider local search applications to be an invaluable tool in their devices [4]. Unfortunately, existing applications take a permission-based approach to resolve this problem, which either prevents a user from harnessing the power of local search, or requires the user to forgo any privacy expectation.

Download English Version:

<https://daneshyari.com/en/article/4957506>

Download Persian Version:

<https://daneshyari.com/article/4957506>

[Daneshyari.com](https://daneshyari.com)