

Data Management Techniques for Smartphone Networks

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ABSTRACT

Smartphone devices have emerged as powerful computational platforms equipped with multitude of sensors that are capable of generating vast amounts of data (geo-location, audio, video, etc.) Collections of such devices connected to the Internet yield Smartphone Networks, which can be utilized for opportunistic and participatory sensing applications in intelligent transportation systems, social networking applications, city planning and others. The uptake of applications in this domain, is currently severely hampered by the fact that these devices have: i) a limited energy budget (i.e., smartphone devices still operate on batteries), ii) limited connectivity (i.e., not all regions offer unlimited Internet connectivity at the same cost); and iii) high privacy constraints (i.e., these devices might reveal the identity and habits of their custodians.)

In this talk, I will present a collection of data management techniques that deal with Smartphone Networks. In particular, I will start out with SmartTrace, a powerful framework for finding similar trajectories in a smartphone network without disclosing the traces of the participating users. SmartTrace relies on an in-situ data storage model, where geo-location data is recorded locally on smartphones for both performance and data-disclosure reasons. SmartTrace then deploys an efficient top-K query-processing algorithm that exploits distributed trajectory similarity measures, resilient to spatial and temporal noise, in order to derive the most relevant answers quickly and efficiently. I will then introduce SmartOpt, a multi-objective query optimizer that enables efficient content searches in smartphone networks. I will also introduce Proximity, a spatial neighborhood computation framework for smartphone networks. My talk will be succeeded by the presentation of SmartNet, our in-house programming cloud for smartphone networks.



Demetrios Zeinalipour (PhD, University of California, Riverside, 2005) is a Lecturer of Computer Science at the University of Cyprus. Before that he was a Lecturer at the Open University of Cyprus and a visiting researcher at the network intelligence lab of Akamai Technologies (MA, USA). Demetris has served as the PC Co-Chair of ACM MobiDE'09, IEEE MDM'10 and VLDB's DMSN'10, the General Chair for ACM MobiDE'10, the Contest Chair of IEEE ICDM'10 and the Organization Chair of HDMS'10. His primary research interests include Data Management in Systems and Networks, in particular Distributed Query Processing, Storage and Retrieval Methods for Sensor, Smartphone and Peer-to-Peer Systems, Mobile and Network Data Management. He is a member of ACM, IEEE and USENIX. For more information, please visit: <http://www.cs.ucy.ac.cy/dzeina/>

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