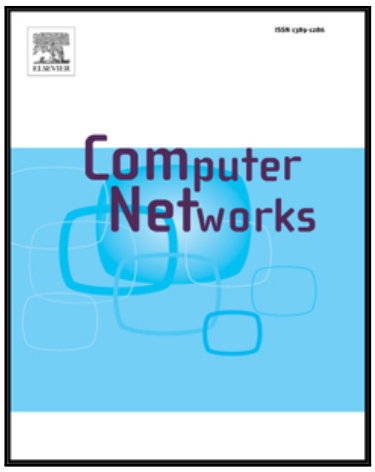

Towards Energy-efficient Task Scheduling on Smartphones in Mobile Crowd Sensing Systems

Jing Wang, Jian Tang, Guoliang Xue, Dejun Yang

PII: S1389-1286(16)30414-5
DOI: 10.1016/j.comnet.2016.11.020
Reference: COMPNW 6062

To appear in: *Computer Networks*

Received date: 8 July 2016
Revised date: 11 October 2016
Accepted date: 28 November 2016

Please cite this article as: Jing Wang, Jian Tang, Guoliang Xue, Dejun Yang, Towards Energy-efficient Task Scheduling on Smartphones in Mobile Crowd Sensing Systems, *Computer Networks* (2016), doi: 10.1016/j.comnet.2016.11.020

Towards Energy-efficient Task Scheduling on Smartphones in Mobile Crowd Sensing Systems

Jing Wang, Jian Tang

Department of Electrical Engineering and Computer Science
Syracuse University, Syracuse, NY 13244
Email: {jwang93, jtang02}@syr.edu.

Guoliang Xue

School of Computing, Informatics, and Decision Systems Engineering
Arizona State University, Tempe, Arizona 85287
Email: xue@asu.edu

Dejun Yang

Department of Electrical Engineering and Computer Science
Colorado School of Mines, Golden, CO 80401
Email: djyang@mines.edu

Abstract

In a mobile crowd sensing system, a smartphone undertakes many different sensing tasks that demand data from various sensors. In this paper[1], we consider the problem of scheduling different sensing tasks assigned to a smartphone with the objective of minimizing sensing energy consumption while ensuring Quality of SenSing (QoSS). First, we consider a simple case in which each sensing task only requests data from a single sensor. We formally define the corresponding problem as the Minimum Energy Single-sensor task Scheduling (MESS) problem and present a polynomial-time optimal algorithm to solve it. Furthermore, we address a more general case in which some sensing tasks request multiple sensors to report their measurements simultaneously. We present an Integer Linear Programming (ILP) formulation as well as two effective polynomial-time heuristic algorithms, for the corresponding Minimum Energy Multi-sensor task Scheduling (MEMS) problem. Extensive simulation results show that the pro-

[1]This is an enhanced and extended version of a paper presented at IEEE Globecom'2015.