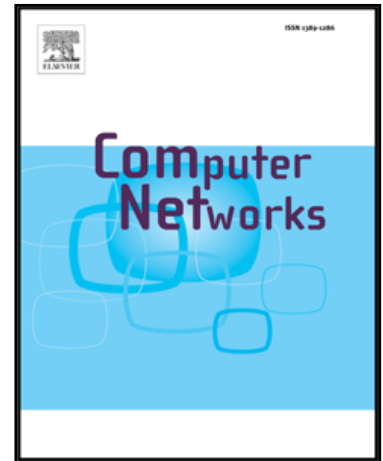


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# Towards Energy-efficient Task Scheduling on Smartphones in Mobile Crowd Sensing Systems

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## Abstract

In a mobile crowd sensing system, a smartphone undertakes many different sensing tasks that demand data from various sensors. In this paper<sup>1</sup>, 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 (QoS). 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-

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<sup>1</sup>This is an enhanced and extended version of a paper presented at IEEE Globecom'2015.

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