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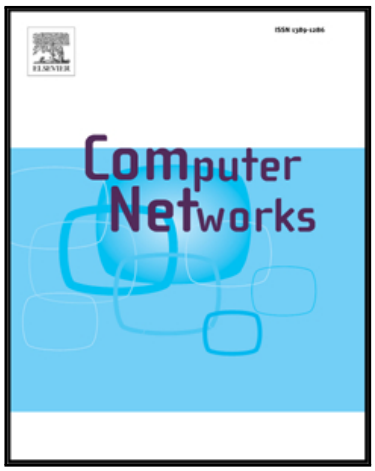

Real-time and energy aware opportunistic mobile crowdsensing framework based on people's connectivity habits

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Real-time and energy aware opportunistic mobile crowdsensing framework based on people's connectivity habits

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Abstract

Trade-off between energy-efficiency and real-time data delivery is seldom considered by the earlier research in mobile crowdsensing paradigm. This paper presents REOPSEK framework designed to satisfy this newly defined compromise while ensuring the required coverage quality. REOPSEK is based on the piggyback approach. In particular, it relies on users' connectivity sessions, named "Online Episode" (OE), to jointly perform sensing and uploading tasks. To differentiate between these presented opportunities, REOPSEK associates two new parameters to an OE. These parameters serve as condition attributes to determine the availability of a smartphone for immediate detection and upload tasks. Then, based on already experienced OEs, the framework builds a lightweight prediction model to drive tasks allocation process based on an improved Simulated Annealing (SA) metaheuristic method. Simulations on real connectivity contextual data collected from 100 users in Sfax, Tunisia, demonstrate the efficiency of REOPSEK in terms of energy saving, data timeliness and coverage quality.

Keywords: Sensor network, Mobile crowdsensing, Opportunistic, Real-time, Energy efficiency, Coverage quality, Connectivity behaviour, Online Episode

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