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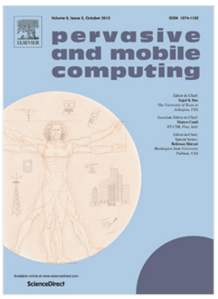

An online approach for joint task assignment and worker evaluation in crowd-sourcing

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ACCEPTED MANUSCRIPT

An online approach for joint task assignment and worker evaluation in crowd-sourcing [1]

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Abstract

The paper tackles the problem of finding the correct solution to a set of multiple choice questions or labeling tasks, by adaptively assigning them to workers in a crowdsourcing system. When we do *not* initially know anything (besides common a-priori statistics) about the workers and the questions involved, such problem becomes quite challenging and requires to *jointly* learn workers' abilities and questions' difficulties, *while* adaptively assigning questions to the most appropriate workers so as to maximize our chances to find which are the correct answers. To address such problem, we first cast it into a suitably constructed Bayesian framework which permits us to obtain an analytically tractable (closed form) single-question inference step, and then we address the more general framework via the Expectation Propagation algorithm, an approximated message-passing iterative technique. We then exploit the (time-varying) information gathered by the inference framework as adaptive weights for a maximum weight matching task assignment policy, proposing a computationally efficient algorithm which maximizes the entropy reduction for the questions assigned at each step. Experimental results both on

[1] This work is an extended version of the conference paper [1] Bianchi, G., Carusi, C., and Bracciale, L, "An online approach for joint task assignment and worker evaluation in crowd-sourcing", IEEE International Symposium on Networks, Computers and Communications (ISNCC) 2017 (pp. 1-8), May 2017.

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