Field:
Social Sciences

Session Topic:
Collective Intelligence

Chair:
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Collective intelligence is a relatively new research area that studies how to build intelligent systems that actively involve massive number of humans over the Web. The contribution of humans can be either passive, as part of their everyday lives, or explicit and active where each human performs some explicit computation (e.g., image classification, translation, protein folding) that leverage human intelligence. Understanding how to best harness collective intelligence is a challenge for even the most sophisticated learning algorithms that exist today.

When designing such systems, many questions arise: How can we design mechanisms for querying humans such that their responses are truthful? What are the techniques for aggregating noisy outputs from multiple human computers when the ground truth is unknown? How do we effectively assign (implicitly or explicitly) tasks to humans to match their particular expertise and interests? What policies might we derive if we assign the tasks under deadline or budget constraints? What if it is not possible to assign tasks but we also need to predict what tasks humans will perform next? What complex computation (e.g., solving NP complete problems) can we tackle by human computation? What are some programming paradigms for designing algorithms that effectively leverage the humans in the loop? How do we build human computation systems that involve the joint efforts of both machines and humans, trading off each of their particular strengths and weaknesses?

The questions are many, and likely need to be tackled using research from many disciplines, including machine learning, mechanism and market design, information retrieval, decision-theoretic planning, optimization, behavioral economics, psychology, human computer interaction and many others.

We discuss issues that go beyond simple data collection and examine the challenges in building systems where humans perform a major part of the computation, provide feedback through their actions, or are an integral part of the overall computational system.