Demo Abstract: mCrowd - A Platform for Mobile Crowdsourcing

Tingxin Yan, Matt Marzilli, Ryan Holmes, Deepak Ganesan, Mark Corner
Department of Computer Science
University of Massachusetts, Amherst, MA 01003
{yan, mmarzill, rholmes, dganesan, mcorner}@cs.umass.edu

Abstract

Crowdsourcing is a new paradigm for utilizing the power of "crowds" of people to facilitate large scale tasks that are costly or time consuming with traditional methods. Crowdsourcing has enormous potential that can be truly unleashed when extended to sensor-rich mobile devices, such as smart phones. In this paper, we demonstrate mCrowd, an iPhone based mobile crowdsourcing platform that enables mobile users to post and work on sensor-related crowdsourcing tasks. mCrowd enables mobile users to fully utilize the rich sensors equipped with iPhone to participate and accomplish crowdsourcing tasks at fingertips, including geolocation-aware image collection, image tagging, road traffic monitoring, and others.

Categories and Subject Descriptors

H.4.m [**Information Systems Applications**]: Miscellaneous

General Terms

Design, Human Factors, Experimentation

Keywords

Crowdsourcing, Mobile Sensing, Mechanical Turk

1 Introduction

Our society has undergone two concurrent revolutions in the past decade. The first revolution is the emergence of a new model of computation named crowdsourcing, where the power of crowds of people is utilized on tasks that are costly or time consuming with traditional methods. A number of successful applications, such as wikipedia[9], iReport[2], reCAPTCHA[8], Amazon Mechanical Turk (MTurk)[5], and others, have promoted sophisticated and organized crowdsourcing systems. A closely related revolution has been the emergence of distributed sensing using mobile phones, where the sophisticated sensing, processing and communication capabilities of millions of smart phone users can be harnessed towards a common sensing goal. Such examples include Urban Sensing[7], MetroSense[4], Nokia Sensor Planet[6], and others.

In this demonstration, we show the confluence of crowdsourcing and distributed mobile sensing, enabling a new paradigm for ubiquitous sensing and data processing. This
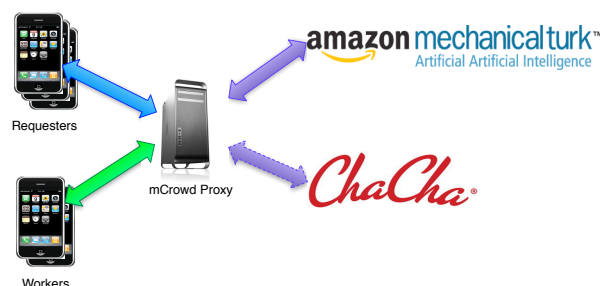
Figure 1. mCrowd System Overview

new paradigm is enabled using mCrowd [3], a mobile crowdsourcing platform that enables mobile users to post and work on crowdsourcing tasks with the most popular crowdsourcing services. mCrowd has three major contributions. First, it fully utilizes the rich sensors equipped with iPhone, including GPS, camera and audio, to enable novel mobile sensing applications that would not be possible using traditional methods. Second, it exploits the popularity of existing crowdsourcing services, such as Amazon Mechanical Turk, to promote crowdsourced mobile sensing with a large workforce. Third, it encapsulates multiple crowdsourcing services and provides mobile users a unique interface, thus simplifies the participation in crowdsourcing.

2 Design

mCrowd is a mobile crowdsourcing client for ubiquitous sensing tasks. It enables two models of crowdsourcing. First, users can post sensing tasks and exploit mobile workers who can answer these tasks using their mobile phones; second, users can exploit existing crowdsourcing services, such as MTurk[5] or ChaCha[1], by posting text or image tagging queries.

The mCrowd system overview is shown in Figure 1. mCrowd currently supports four types of tasks: (i) image tagging tasks, for example, tagging objects in a query image; (ii) image data collection tasks, for instance, obtaining images of a landmark such as the Amherst Townhall; (iii) textual queries from users, for example, "what is the best restaurant in Amherst?"; and (iv) GPS location-based queries, such as what is the nearest book store of certain location. We are in the process of extending the mCrowd client to post jobs using other sensing modalities such as accelerometer and microphone, which will enable a wider range of applications.
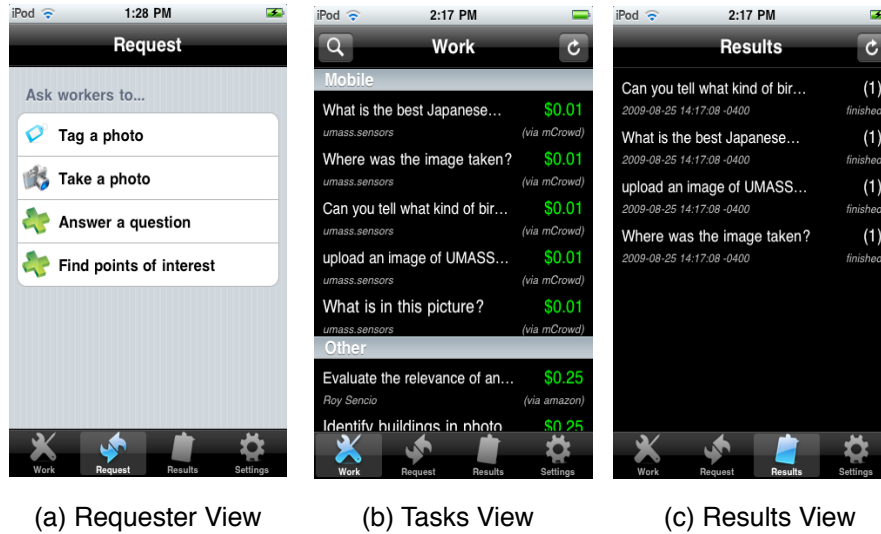
| (a) Requester View | (b) Tasks View | (c) Results View |

Figure 2. mCrowd iPhone client. Requesters start posting task from (a)requester view, the posted tasks are shown in (b) task view, and the results submitted by workers are shown in (c) results view.

3 Demonstration

The goal of our demonstration is to show how mCrowd can facilitate crowdsourcing and discuss the potential applications that are feasible using mCrowd. All SenSys attendees will be able to use our mCrowd system to post sensor-related jobs and obtain results as well as work on jobs posted by other mCrowd users in return for monetary rewards, through an easy-to-use iPhone client.

The user interface of mCrowd is shown in figure 2. On the requester view, a requester can choose one of the category of tasks and post it to MTurk through our mCrowd proxy. The figure shows the four types of tasks that we currently support. Once a user posts a task, it will be shown as an entry in the task list with an associated reward. Currently, we provide a "free" mode to users, wherein users can post jobs for free but we offer a worker a small reward for providing an answer for the task.

Tasks posted by users are immediately posted on MTurk using mCrowd as special "mobile jobs" so that mCrowd users can easily access and work on these jobs. Note that in the figure, all the tasked posted through mCrowd are shown as the "Mobile" tasks that reside on top of "Other" tasks that are ordinary MTurk tasks. Workers explore the task list and tab to choose a task to work on. In this case, the monetary reward offered is 1 cent. Once the working results are submitted to MTurk successfully, they will appear in the results view.

We will demonstrate the use of mCrowd for several applications involving the camera sensor including 1) answering queries about images, for example, tagging an image of a bird, flower, or building, and 2) posting queries to obtain specific types of images, for example of a certain type of bird or flower, from a large number of mobile users. These applications will showcase the use of our mCrowd system as an efficient tool for crowdsourcing using mobile phones. Our demo will also show how the system can be used for a wider range of tasks such as traffic sensing using mobile phones.

4 References

[1] chacha: Your mobile bff. http://www.chacha.com.

[2] The ireport. http://www.ireport.com/about.jspa.

[3] mcrowd: The world's workforce at your fingertips. http://crowd.cs.umass.edu.

[4] E. Miluzzo, N. D. Lane, K. Fodor, R. Peterson, H. Lu, M. Musolesi, S. B. Eisenman, X. Zheng, and A. T. Campbell. Sensing meets mobile social networks: the design, implementation and evaluation of the cenceme application. In *SenSys'08*, pages 337–350, New York, NY, USA, 2008. ACM.

[5] Amazon mechanical turk. https://www.mturk.com/mturk/welcome.

[6] Nokia sensor planet. http://research.nokia.com/research/projects/sensorplanet/index.html.

[7] Urban sensing. http://urban.cens.ucla.edu/projects/peir/.

[8] L. von Ahn, B. Maurer, C. Mcmillen, D. Abraham, and M. Blum. recaptcha: Human-based character recognition via web security measures. *Science*, August 2008.

[9] The wikipedia. http://en.wikipedia.org/.