

Mobile CrowdSourcing - Gaining a High Popularity

Shivani Grover¹

Abstract

Crowdsourcing is gaining more and more popularity in the research community, regardless of the fact that it is a recent concept in information technology. Crowdsourcing is the generalized act of outsourcing tasks, traditionally performed by an employee or contractor, to a large group of Internet population through an open call. Mobile crowdsourcing aims to provide a mechanism to involve participants from the general public to efficiently and effectively contribute and utilize context-related sensing data from their mobile devices in solving specific problems in collaborations. The wide availability of sensing modules in mobile devices enables social networking services to be accessed and extended to incorporate location based services, media tag services, etc.

1. Assistant Professor (Computer Science), Swift Technical Campus, Ghaggar Sarai, Rajpura

Introduction

The WWW and the mobile phone have become an essential means for sharing implicitly and explicitly generated information and a communication platform for many people. With the increasing ubiquity of location sensing included in mobile devices we investigate the arising opportunities for mobile crowdsourcing making use of the real world context. Crowdsourcing is the generalized act of outsourcing tasks, traditionally performed by an employee or contractor, to a large group of Internet population through an open call. Crowdsourcing on the WWW has gained popularity over recent years. There are several websites available serving as a platform to distribute crowd sourcing tasks. The characteristic of crowd sourcing tasks is that they are typically difficult to solve by computers and easily accomplished by humans. Examples of such tasks are the tagging of images, e.g., images of garments for an online catalog. Here the aim is to get a representative set of keywords so that users can find what they are looking for. Other domains are natural language processing, summarization, and translation.

There are different types of crowdsourcing, including wisdom of the crowd, crowdfunding, microwork, macrowork, crowdvoting, creative crowdsourcing and inducement prize contests. Our findings provide designers with a better understanding of mobile crowdsourcing features and help guide successful designs.

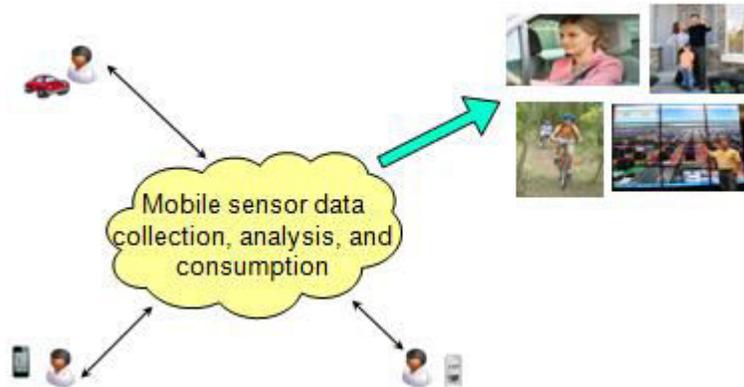


Figure 1: Mobile Crowdsourcing

Types of Crowdsourcing

Recently there are a number of crowdsourcing systems and applications which are developed for accomplishing a certain task or solving a given problem. Crowdsourcing applications and systems can be categorized based on two main factors. The first one is based on the type of platform used to develop the crowdsourcing application and the second category is based on the type of application the crowdsourcing system is to be used.

1. Crowdsourcing Based on the Platform

Crowdsourcing applications based on the platform on which they would be implemented can be grouped into two; web based and mobile based.

a. Web Based Crowdsourcing

Because of the popularity of Web 2.0 technology, crowdsourcing websites attract much attention at present. Currently there are several websites available that are based on the concept of crowdsourcing and they are more popular compared to their mobile based counterparts.

The Internet has become an essential platform for seeking and sharing information, communication, presentation, and collaborating for many users. This is facilitated by many applications, platforms, and services that are provided on the Internet. It is essential that Web users actively participate in generating content and providing services. This forces the creation and implementation of various crowdsourcing websites. A crowdsourcing site has two groups of users: requesters and workers.

b. Mobile Based Crowdsourcing

There are some tasks which should be performed in a certain context in the real world and away from the desktop. Such tasks are characterized by the need to be performed in a specific location only, or require the presence of a certain context to solve.

Mobile phones are not only empowering most humans on the planet to connect with each other in real-time communication, but also allow us to coordinately share and analyze

information, perform computational tasks and soon phones will enable anyone to conduct real-time, peer-to-peer financial transactions. Mobile devices now function as fundamental tools instrumental to billions of economic livelihoods

Models and Services that uses Crowdsourcing

Wikipedia: a platform that provides a collaborative document editing and knowledge sharing.

Ushahidi: a mapping tool for crowdsourcing crisis information. It enables the public to communicate crisis information via SMS, e-mail, or web entry. It has been used to manage relief efforts in Haiti during the earthquake crisis in 2010.

Threadless: a web-based t-shirt company that crowdsources the design process for its shirts through an ongoing online competition.

txteagle: a mobile based system enabling people to earn small amount of money by completing simple tasks (micro tasks) on their mobile phone for corporations. The tasks involve providing information for surveys and local language translation.

mCollect: a market information collection system is part of a broader initiative which also includes Market Prices and Market Alerts.

Yahoo's Flickr: a popular photo-sharing site and provides a mechanism for users to caption their photos. These captions are being used as alternative text for image searching.

CrowdForge: a general purpose framework for micro-task markets that provides support for more complex human computation tasks which require coordination among many individuals, such as writing an article.

InnoCentive: which allows companies with specific needs to share their challenges and specify awards among scientists dispersed all over the world.

Askus : a mobile platform for supporting networked actions that allows specifying tasks, which are then matched by the system to specific persons based on profiles.

Fashism : an online community that uses phones as bridges between the physical and digital world. It provides an easy way for customers to get comments on their fashion style while doing shopping by sending a dressing-room photo to the community and getting votes and comments back from the crowds in real time.

Google Maps: a crowdsourcing application developed by Google to accumulate users map usage and collaboratively builds maps, using a user's phone running it.

Some innovative start-ups or projects include:

1. **Cooperative traffic** – Google Maps and Waze are notable examples by crowd-sourcing traffic congestion information from drivers' GPS-enabled mobile phones.
2. **Geo-social networking** – Google Latitude and Loopt generate social networks supported by geo-location features, while Twitter exemplifies the best practice of real-time content streams.
3. **Product testing** – Companies such as uTest and Mob4Hire employ crowds to test newly developed mobile applications and provide feedback on functionality, load and performance, and usability.
4. **User-generated content** – Emerging mobile video sharing applications services such as Qik and Kyte tap on crowd sources to generate a large variety of content much similar to the role of YouTube on PC.
5. **User experience optimization** – A similar trend of passive or subconscious crowdsourcing is also occurring as information vendors such as Google increasingly integrate and analyze mobile usage data extracted from the “crowd” and use the information to help refine and optimize their user experience, such as personalized search.
6. **Leveraging mass reach** – Innovative services such as Google's SMS Channels and SMS Trader bridge the digital divide by creating a mobile platform for user-generated content and person-to-person trades in emerging markets such as India and East Africa, where these types of services are otherwise unavailable on PC.

Requirements

1. Crowd Participation (Content Generation)

Crowdsourcing applications are nothing without the participation of the crowd. The crowd is the one who is responsible for generating the content which can be information, data, or knowledge. The crowdsourcing applications rely on and make use of this crowd generated content to perform a task or solve a problem. The content that is generated by a crowd can be either an explicit content or implicit content.

Explicit content generation describes the process in which a number of web users individually produce content. The content production may be carried out independently or as a part of a coordinated effort. Such collections are sometimes seen as making use of the wisdom of the crowd.

In a crowdsourcing system, tasks are distributed to a population of anonymous Internet or mobile users for completion. Understanding the demographics of crowdsourcing workers and examining their behavior attracted significant attentions

Another area in which crowdsourcing can be seen as a means of creating content is flash mob. The idea of a flash mob is that, people use digital technologies and coordinate an action that conveys some sort of information or message.

2. Algorithms

An algorithm can help to formalize the design of a crowdsourcing system. An algorithm can model the performance of a crowdsourcing system.

Wang et al. Modeled the completion time as a stochastic process and built a statistical method for predicting the expected time for task completion on MTurk and showed how time-independent variables of posted tasks affect completion time.

Ipeirotiset al. presented an algorithm for quality management of the labeling process in a crowdsourcing system. The algorithm can generate a scalar score representing the inherent quality of each worker.

Carterette and Soboroff presented eight models of possible errors for relevance judgments from crowd and showed how each affects an estimate of average precision.

Jain and Parkes surveyed existing game-theoretic models for various human computation designs, and also outlined the research challenges by advancing the game theory to enable better design of human computation systems.

3. Quality

Quality is a key aspect in analyzing the output of an application. In crowdsourcing applications, the quality of the output greatly depends on the content generated by the crowd.

Having a high quality in crowdsourcing application is mostly challenging and this forces many researchers to concentrate on this issue.

4. Cheat Detection

In crowdsourcing applications, as the crowd is distributed, the requester of the task doesn't have the chance to know the capability of each individual that performs the task. So the input of incorrect or inaccurate content by a crowd cannot be avoided. Since the inaccurate contents have a negative impact on the output of the application, in developing a crowd application a great deal of concern must be given to the issue of cheating detection. Cheat-detection techniques are either based on control questions which are evaluated automatically or rely on manual checking by the requester.

Case Studies

Coca-Cola

Well-known for keeping secret the formula of its most famous beverage, Coke now uses a more open business model, assuming an increasingly prominent position in corporate crowdsourcing.

Its open-sourced "Shaping a Better Future" challenge asks entrepreneurs to create improvement-ventures for the project-hubs of youth employment, education, environment and health. In

addition, it's "Where Will Happiness Strike Next?" Series of short films and TV-commercials relies on the social media-input of Coke customers, contributing ideas about creating happiness. Coke also seeks crowdsourced online suggestions for marketing its products more effectively, once again tying social media to co-creation.

General Mills (GenMil)– This major food-processing firm has created the *General Mills Worldwide Innovation Network (G-WIN)* to vigorously generate innovative concepts from crowdsourced partners in a variety of merchandise, commodity, or service categories. Included are:

- (1) products fitting the GenMil-brand concept,
- (2) packaging of those products,
- (3) improvements to manufacturing, service or marketing processes,
- (4) ingredient-suggestions for food products,
- (5) technology-suggestions for GenMil's IT-processes, and
- (6) concepts for improving the firm's digital efficiencies and performance.

GenMil seeks ideas that help the firm deliver breakthrough innovation in any of these operational areas. The G-Win open call is sufficiently accommodating that anyone can go to the website, and clicks the "Submit a Novel Proposal" tab to suggest product or technology innovation useful to GenMil and its businesses.

Nokia

Like most crowdsourcing ventures, Nokia's Ideasproject defines itself as a global community devoted to open innovation. It focuses on consumer-derived collaboration across 210 nations to improve the viability of Nokia products in all markets. The Ideasproject is valuable because it draws on the consumer-experiences of participant-innovators to generate new ideas about the kind of products they seek from Nokia. Crowdsourcing participants are enabled, becoming their own agents of product-design. Current crowdsourced innovations can be examined, and new ideas offered. Nokia shares revenues generated from crowdsourced ideas with Ideasproject participants.

Unilever

Despite its globally-recognized and respected research staff and facilities, Unilever understands the value of collaboration with innovative partners from outside the firm. It seeks external contributions from anyone with useful input into such diverse project challenges as storing renewable energy, fighting viruses, reducing the quantity of sodium in food, creating cleaning-products that pollute less, and changing consumer behavior to encourage enhanced sustainability,

among many other projects. The firm invites crowdsourced, open innovation submissions at its “Challenges and Wants: Submit a technical solution to us via our Open Innovation” portal.

Calling for crowdsourced ideas, information, opinions and analyses has emerged as a viable and enriched resource of enterprise-data. It is rapidly becoming a procedure of choice for generating innovative solutions issues for a vast range of corporate and societal issues.

Conclusion

This paper provides an overview of the current research being conducted on Mobile Crowdsourcing. Case studies gives us real time data analysis on the human behavior, how tasks need to be allocated and verified, how humans are motivated and the types of incentive that should be adapted accordingly. A well designed mobile crowdsourcing application can solve many of the traditional problems being faced and could be a boon to humanity in future. Crowdsourcing is useful where tasks are difficult to automate and humans can perform these tasks easily. However, various security, privacy, reliability challenges exist due to human involvement. To attract more users we should provide some interesting benefits. To provide reliable results from users, we should build a reputation system for every crowdsourced task. In addition, there is a need to create a reliable platform or central authority between sharing users and service consumers so as to avoid security and privacy leakage problem.

References

1. Brabham, D.C., et al.: Crowdsourcing Public Participation in Transit Planning: Preliminary Results from Next Stop Design Case. In: TRB 89th Annual Meeting Compendium (2010)
2. Sorokin, A., Forsyth, D.: Utility data annotation with Amazon Mechanical Turk. In: Computer Vision and Pattern Recognition Workshops (2008)
3. Barkhuus L, Brown B, Bell M, Sherwood S, Hall M, Chalmers M(2008) From awareness to repartee: sharing location within social groups. In CHI’08, pp 497–506
4. Benisch M, Kelley P, Sadeh N, Cranor L (2010) Capturing location-privacy preferences: quantifying accuracy and userburden tradeoffs. Pers Ubiquit Comput 15(7):679–694