

Crowd Computing

Matthew N. O. Sadiku, Sarhan M. Musa and Osama M. Musa

Abstract— *Developments in recent years have created new opportunities for crowd-centric computing. Crowd computing may be perceived as a means of distributing human interaction tasks to mobile devices. The key characteristics of crowd computing are participation by a crowd of humans utilizing human capabilities and interaction with computing technology. This paper provides a brief introduction to crowd computing.*

Key Words: *crowd-centric computing, crowd technologies, crowd computer interaction, computational crowd sourcing,*

I. INTRODUCTION

Emerging technologies, such as networked personal technologies carried by members of crowds, such as phones and music players, have created new exciting opportunities for members of a crowd to interact. Crowds are usually formed as audiences in groups such as sporting events, concerts, political rallies, or demonstrations [1]. The conventional definition of crowds may have to be reconsidered in the light of newly emerging communication technologies such as smart phones and cloud based infrastructures.

By nature, humans are community-based species. We associate clubs, churches, mosques, nations, societies, and organizations. Crowds present a unique problem for deploying technology because the large number of people involved leads to a collection of many different cultures and identities. The cloud computing paradigm provides an infrastructure that can support the virtual crowd [2]. Basically, crowd computing is achieving large-scale distributed computation using mobile devices. The success of this method largely depends on users' social interactions and their willingness to share resources and collaborate.

II. CHARACTERISTICS

Crowd computing is related to crowd sourcing, human computation, social computing, pervasive computing, cloud computing, and mobile computing.

The term "crowd computing" is recent in the literature, appearing only in 2009 and thereafter. As shown in Figure 1, crowd computing can be regarded as a means of distributing human interaction tasks to individuals or crowd with mobile devices. It can be used to spread computation and collect results. It is a human analog to cloud computing. Some describe crowd computing as crowd sourcing, a technology for crowd management, where human wisdom and

intelligence are used for problem solving. It is viewed as emerging from social computing [3].

Crowd computing claims that work can be most effectively managed by combining crowd sourcing, automation, and machine learning (which has been gamified). It is being used today in a number of industries, including healthcare, social media, financial services, and drug recovery [4].

III. APPLICATIONS

Crowd computing has been gaining more and more attention from researchers, scientists, and practitioners and the number of application areas have been increasing. Some common applications of crowd computing include social computing, crowdsourcing, human computation, and crowd-computer interaction.

Social Computing: Social networking services such as Facebook, LinkedIn, and Twitter have been associated with crowd computing. These services enable activities such as photo sharing, bookmarking, tagging, and profiling. From the crowd computing viewpoint, these websites can be regarded as search tools that use the crowd's wisdom to filter the vast content of the Internet. Social computing naturally supports social behaviors such as communication, and collaboration, and for sharing of information among individuals and communities [3].

Crowdsourcing: Crowd sourcing is the process of getting work done by online community or crowd of people in the form of an open call, the voluntary undertaking of a task. It allows businesses and organizations to use multiple sources to develop solutions for their problems. Crowd sourcing is a new culture of open innovation, typically supported by crowdfunding. This innovation employs human capabilities and talents to solve problems through collective intelligent and idea collaboration for the greater good. Crowdsourcing platforms, such as Galaxy Zoo, Eyewire, and Phylo attempt to harness the processing power generated by crowds of online video gamers [5].

Human computation: Human capabilities that are drawn on in crowd computing include human understanding, feeling, intuition, intelligence, cognition, visual processing, and common sense. Different crowd computing applications may utilize one or more these specific human skills. By working together, people can achieve favorable outcomes and superior outcomes can be achieved with the inputs from the crowd. Human computation utilizes human processing power to address problems that computers alone are unable to solve. We have built automated factories, interactive voice response systems, and devised all kinds of ways to put machines to work for us.

Crowd-computer Interaction: The main objective of this is to enhance public engagement around events such as sport or music. This may involve interactive displays to show information and create interaction with the public and increase commitment. The crowd may interact and provide input using smart phones. Today's smart phone should be regarded as a powerful computer.

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Crowd computing has the potential for applications in various commercially and socially beneficial purposes. All crowd computing applications have some basic requirements, mainly: (1) the need for nearby devices discovery, (2) the need for evaluating the goodness of collaborating peers [6].

CONCLUSION

Crowd computing is emerging as a popular new research area. It combines mobile devices and social interactions to achieve large-scale distributed computation. It is focused on performing an activity to achieve a predetermined purpose that is defined by the initiator. The choice of the initiator largely determines the amount of useful computation. One purpose of crowd computing activity may be to promote engagement and interaction among members of the crowd. The crowd may participate in human computation as a machine or engage in performing tasks that computers alone cannot process.

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THAT'S WHAT CROWD COMPUTING DOES.

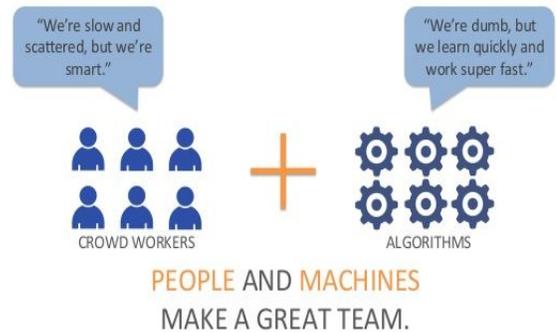


Figure 1 An image on crowd computing.