



Virtual Group Dynamics and Social Networks

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Collective Intelligence

Theoretical Constructs and Models



Collective intelligence: Some recent examples

In the last few years we've seen some very interesting examples of new kinds of collective intelligence:

Google, for instance, takes the collective knowledge created by millions of people making websites for other purposes and harnesses that collective knowledge—using some very clever algorithms and sophisticated technology—to produce amazingly intelligent answers to the questions we type in.

Wikipedia, at another extreme, uses much less sophisticated technology, but some very clever organizational principles and motivational techniques, to get thousands of people all over the world to volunteer their time to create an amazing on-line collection of knowledge.

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WEB Based Collective intelligence

With advancing **information and communication technologies** (ICT) coupled with **synchronous conferencing applications** and **social network services**, various innovative team interaction and collaboration environments have emerged in recent years.

- In this era of digitally afforded multimodality and highly networked society, **people “integrate words with images, sound, music, and movement to create digital artifacts that do not necessarily privilege linguistic forms of signification but rather draw on a variety of modalities – speech, writing, image, gesture and sound – to create different forms of meaning”** (Hull and Nelson, 2005, pp. 224-225).
- In the context of multimodal interaction analyses, **these communicative intents are the building blocks of the individual’s intelligence, defined as “the aggregate or global capacity of the individual to act purposefully, to think rationally and to deal effectively with his environment”** (Wechsler, 1944, p. 3). (Kim, 2011)

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Inspired by the ideas of *Swarm Intelligence* and the “*global brain*”, a concept of “**community intelligence**” is suggested, reflecting that **some “intelligent” features may emerge in a Web-mediated online community from interactions and knowledge-transmissions between the community members.**

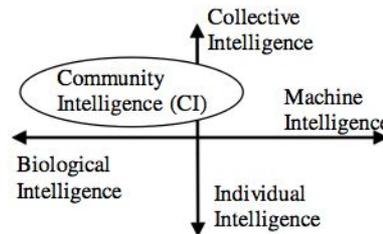


Figure 1 Community intelligence in the two-dimension-space of intelligence research

The collective intelligence of human groups is the idea that a human group may manifest higher capabilities of information-processing and problem-solving than any individual participant of that group does, especially when the participants densely interact with each other through the computerized communication channels such as the Internet and the World Wide Web. (Luo, 2009)

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Accompany with the explosion of the World Wide Web is the **rapid growth of the different categories of online communities or virtual communities** (Rheingold 2000), and the **collective activities of those virtual communities often manifest high problem-solving capabilities**.

For example,

- in the *Open Source Software movement*, a loosely-connected community of programmers who don't even know each other can collectively develop very complex software products like the Linux operating system. With the support of the information and communication technologies (ICT), the online communities may exhibit higher intelligent features than a traditional community does since ICT firstly provides an effective communication channel for massive exchange of data, information and knowledge and secondly the computation capabilities of the modern ICT may be of great help for the information processing tasks within the entire community. (Luo, 2009)

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“**Emergence**” aspect of intelligence - In a virtual community, the participants exchange their opinions and expertise during the collaborative learning and problem-solving processes.

The collective-level intelligence may then emerge from such knowledge exchange activities, analogous to the emergence of the collective intelligence of the biological swarms.

The rapid development of the Internet and the Web may greatly facilitate the inter-personal knowledge exchange within a community; consequently, the virtual and online communities are of particular importance.

(Luo, 2009)

Google. Wikipedia. Threadless. All are well-known examples of large, loosely organized groups of people working together electronically in surprisingly effective ways. These new modes of organizing work have been described with a variety of terms—radical decentralization, crowd-sourcing, wisdom of crowds, peer production, and wkinomics.ⁱ The phrase we find most useful is *collective intelligence*, defined very broadly as *groups of individuals doing things collectively that seem intelligent*. (Malone, 2009)

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WEB Based Collective intelligence

From genes to genomes

(Malone, 2009)

Using the individual genes, let's now consider how sequences of these genes can be combined into genomes of complete collective intelligence systems.

Linux

As described above and summarized below, the Linux community performs two key tasks. First, anyone who wants to can Create new software modules. Then a miniature Hierarchy, consisting of Linus Torvalds and a small group of colleagues, Decides which of the submitted modules to include in the next release. Most who contribute do so for enjoyment or peer recognition, though some are also paid to contribute by companies like IBM.

Example		What	Who	Why	How
Linux	Create	New software modules	Crowd	Money Love Glory	Collaboration
	Decide	Which modules warrant inclusion in next release	Torvalds and lieutenants	Love Glory	Hierarchy

Table 2: Mapping the collective intelligence genome for Linux

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WEB Based Collective intelligence

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(Malone, 2009)

Using the individual genes, let's now consider how sequences of these genes can be combined into genomes of complete collective intelligence systems.

Wikipedia

As described above and summarized in Table, editing individual Wikipedia articles is a form of Collaboration in which decisions are made by a rough consensus: anyone who wants to can make a change in almost any article, and articles remain unchanged only if everyone who cares is satisfied with the current version.

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Wikipedia

Example	What		Who	Why	How
Edit existing Wikipedia articles	Create	New version of article	Crowd	Love, Glory	Collaboration
	Decide	Whether to keep current version	Crowd	Love, Glory	Consensus
Decide what Wikipedia articles to include	Create	New article	Crowd	Love, Glory	Collection
	Decide	Whether to delete (preliminary)	Crowd	Love, Glory	Voting
	Decide	Whether to delete (final)	Wikipedia administrator	Love, Glory	Hierarchy

Table 3: Mapping the collective intelligence genome for Wikipedia

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Wikipedia

A different set of mechanisms is used to decide which articles should be included at all.

- Anyone who wants to can create a new article. For instance, no one would stop someone from creating an article about his or her own cat (What = Create article; Who = Crowd).
- But if someone else thinks the article isn't important enough, they can nominate it for deletion.
- Then anyone can give comments about why the article should or should not be deleted and cast a vote (What = Decide whether to delete article; Who = Crowd; How = Voting).
- Eventually, a Wikipedia administrator looks at the votes, reads the comments, and makes a final decision about whether to delete the article (What = Decide whether to delete article; Who = Wikipedia administrator; How = Hierarchy). (Malone, 2009)