Crowdsourcing vs. Wisdom of the Crowd: The Implementation in the Geo-Science Domain

Prof. Dr. Yerach Doytsher

**Mapping and Geo-Information Engineering,
Technion, Israel**

Within the context of com3's booklet on:

**New Trends in Geospatial Information -
The Land Surveyors Role in the Era of Crowdsourcing and VGI**

- A development of online publishing tools, and particularly of the World Wide Web (WWW) simplified:

  1. interaction between users.

  2. 'navigation' through enormous amounts of data and information.

- Users all over the world are involved with data processing.

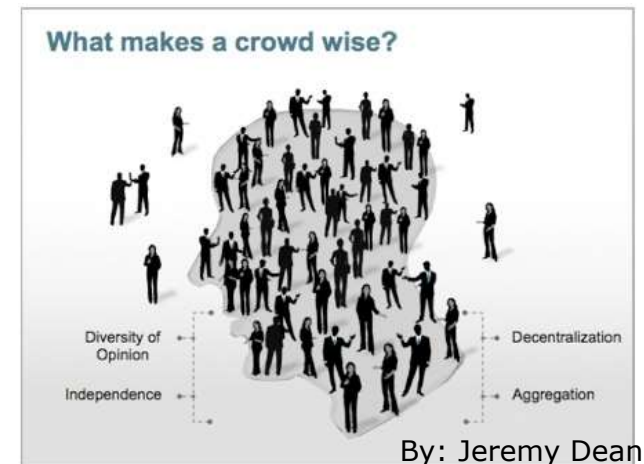- This revolution has brought the development of two important working methodologies:

  Crowdsourcing   and   **Wisdom of the Crowd**.

Wisdom of the Crowd

- Described by Surowiecki (2004):

   "***Large groups of people are smarter than an elite few***".

- The crowd can be any group of people that "*can act collectively to make decisions and solve problems*".

- 'Wise' crowd has to exist of four main attributes:

   o Diversity;

   o Decentralization;

   o Independence;

   o Aggregation.

What makes a crowd wise?

Diversity of Opinion — Decentralization
Independence — Aggregation

By: Jeremy Dean

Main definitions of the term are:

1) *"Taking a job traditionally performed by a designated agent and <u>outsourcing it to an undefined, generally large group of people</u>"* (Howe, 2006).

2) *"The practice of obtaining needed services, ideas, or content by soliciting contributions from <u>a large group of people</u> and especially from the <u>online community</u> rather than from traditional employees or suppliers"* (Merriam-Webster online dictionary, 2014).

3) *"Can be explained through a <u>theory of crowd wisdom</u>, an exercise of collective intelligence… It is a model capable of aggregating talent, leveraging ingenuity… <u>crowdsourcing is enabled only through the technology of the web</u>"* (Brabham, 2008).

4) *"A type of participative online activity in which an individual, an institution, a non-profit organization, or company proposes to <u>a group of individuals of varying knowledge</u>…"* (Estelles-Arolas and Gonzalez-Ladron-de-Guevara, 2012).

Problem Definition and Objective

- **Crowdsourcing** and **wisdom of the crowd** are often terminologically intertwined and indefinite.

- There is no <u>clear distinction</u> between these two terms specifically in respect to the geospatial scientific discipline and geo-services and processes.

⬇
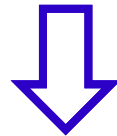
- We can find the differences between the two terms by comparing two main location based services.

  1) OpenStreetMap (OSM)

  2) Waze (© 2009-2014 Waze Mobile)

OpenStreetMap

- A <u>collaborative</u> online project

- An <u>open-source</u> editable vector map of the world

- Users can:

  1) view and <u>edit</u> the underlying data

  2) <u>upload</u> GPX files (GPS traces) from hand-held GPS units

  3) <u>correct</u> errors in local areas according to satellite imagery and out-of-copyright maps

  4) download desirable data freely and <u>use</u> it to their own purposes

Waze

- A <u>community</u> real-time GPS-based traffic and geographical navigation service

- Drivers can:

  1) <u>share</u> real-time traffic and road info. (with just opening the Waze app)

  2) <u>actively report</u> traffic jams, accidents, road dangers, etc.

  3) from the online map editor users can <u>add</u> new roads, <u>update</u> existing roads, add landmarks, house numbers, etc.

- The collected data are <u>aggregated</u> and provided to the user/ community as alerts, traffic flow updates – and more

The Four Main Attributes

Diversity

- **<u>What?</u>** – each individual contributes <u>different</u> pieces of information, and in mapping it helps in covering wide topographic areas – <u>crucial for both terms</u>

- **<u>How?</u>** **OSM**: every volunteer can add topographic data, such as buildings, roads, and in different areas.
  Waze: every user can add new roads, place of accidents, road dangers, etc.

Decentralization

- **<u>What?</u>** – answers are not influenced from the hierarchy e.g., boss, founder or a small group of people

- **<u>How?</u>** **OSM**: not relevant in terms of data, but relevant in terms of coverage (some priorities exist)
  Waze: some information might influence on users' decision

The Four Main Attributes (cont.)

Independency

- **What?** – person's opinion is not affected by people in his close vicinity but from his own judgment – <u>crucial in wisdom of the crowd, less crucial in crowdsourcing</u>

- **How?** **OSM**: if a volunteer sees a good mapped area, possibly he/she will search for another less mapped area to map.
  Waze: users supply their own route and alerts, but the route is influenced from all other users

Aggregation

- **What?** – a mechanism that unifies all individual opinions into a collective decision or conclusion – <u>crucial in wisdom of the crowd, unessential in crowdsourcing</u>

- **How?** **OSM**: the most current update is added to the map
  Waze: place and time info of a traffic jam is received by an aggregation of all drivers' 'reports'

Crowdsourcing vs. Wisdom of the Crowd

A weighted system on the scale of 1-10 to each index in respect to the two terms:

Index\Term	Crowdsourcing	Wisdom of the crowd
1. diversity	10	10
2. decentralization	10	10
3. independency	8	10
4. aggregation	1	10

A system of score on the scale of 1-10 to the two services:

Index\Term	OSM	Waze
1. diversity	7	9
2. decentralization	8	10
3. independency	6	9
4. aggregation	1	10

A normalized scores to each of the projects, where two scores represent two terms: crowdsourcing (left), and wisdom of the crowd (right)

Index\Term	OSM		Waze	
1. diversity	0.70	0.70	0.90	0.90
2. decentralization	0.80	0.80	1.00	1.00
3. independency	0.75	0.60	1.12	0.90
4. aggregation	1.00	0.10	10.00	1.00
Average		0.55	3.26	
S.D		0.31	4.5	

In conclusion:

- **OSM** - is a typical crowdsourcing project.
- **Waze** - is more wisdom of the crowd projects, mostly because an aggregation process is crucial.

Thank You for Your Attention

Prof. Dr. Yerach Doytsher

Mapping and Geo-Information Engineering, Technion, Israel

doytsher@technion.ac.il