Geospatial System of Collective Intelligence: A technological application for the interdisciplinary study of the geographical space complexity

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INTRODUCTION

Geographical space is where practicaly every event happen and it affects activities in many ways; therefore, it is essential that when planning, organizing and undertaking any activity the spatiotemporal component be considered from an interdisciplinary perspective.

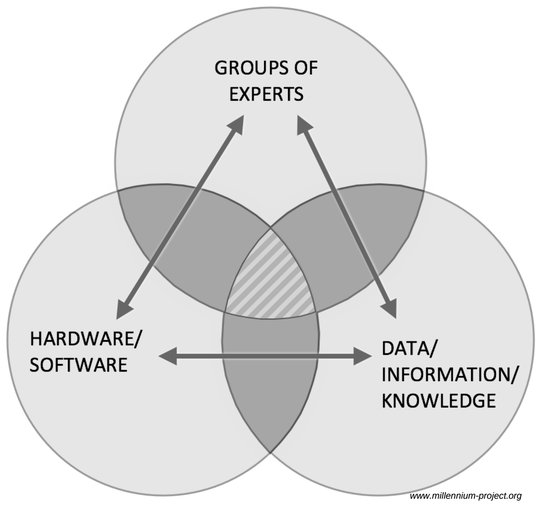
The SDSS are designed to help decision-makers to solve complex problems related to geographical space, and are mainly based on the technology of GIS, which together with other components can create robust systems for group collaboration.

ARCHETYPE MODEL OPERATION

The **Geospatial System of Collective Intelligence** has been conceived on the basis of the contributions of:

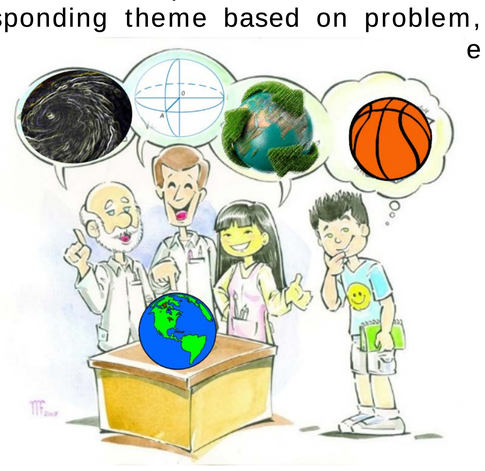
- **Spatial version of the Delphi Method**[1]
- **Vector Consensus Model**[2].

The tool developed consists of a Group-Spatial Decision Support System (G-SDSS) application in which a multidisciplinary group of experts, suitably selected for the issue to be addressed, can asynchronously give an opinion and **anonymously** complete a survey (spatial), which seeks to locate on a map the most suitable sites (or less suitable, depending on the context) with regard to goods, services or events. To do this, the system can store and display regulatory and communicative elements such as documents, pictures, videos, reports, laws, maps and other qualitative and quantitative information to help understand and study the corresponding theme based on problem, needs, available resources, delimitation i e study, objectives to be achieved, etc.

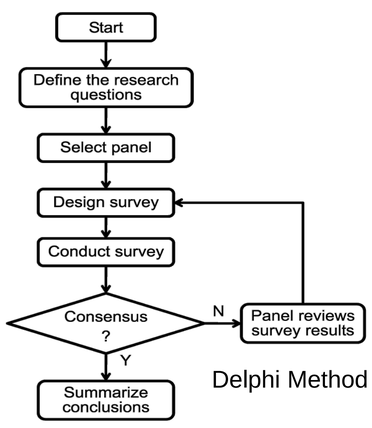


COLLECTIVE INTELLIGENCE

The capacity of human collectives to engage in intellectual cooperation in order to create, innovate, and invent (Pierre Lévy).



The same problem may be approached differently according to the reasoning of each user.



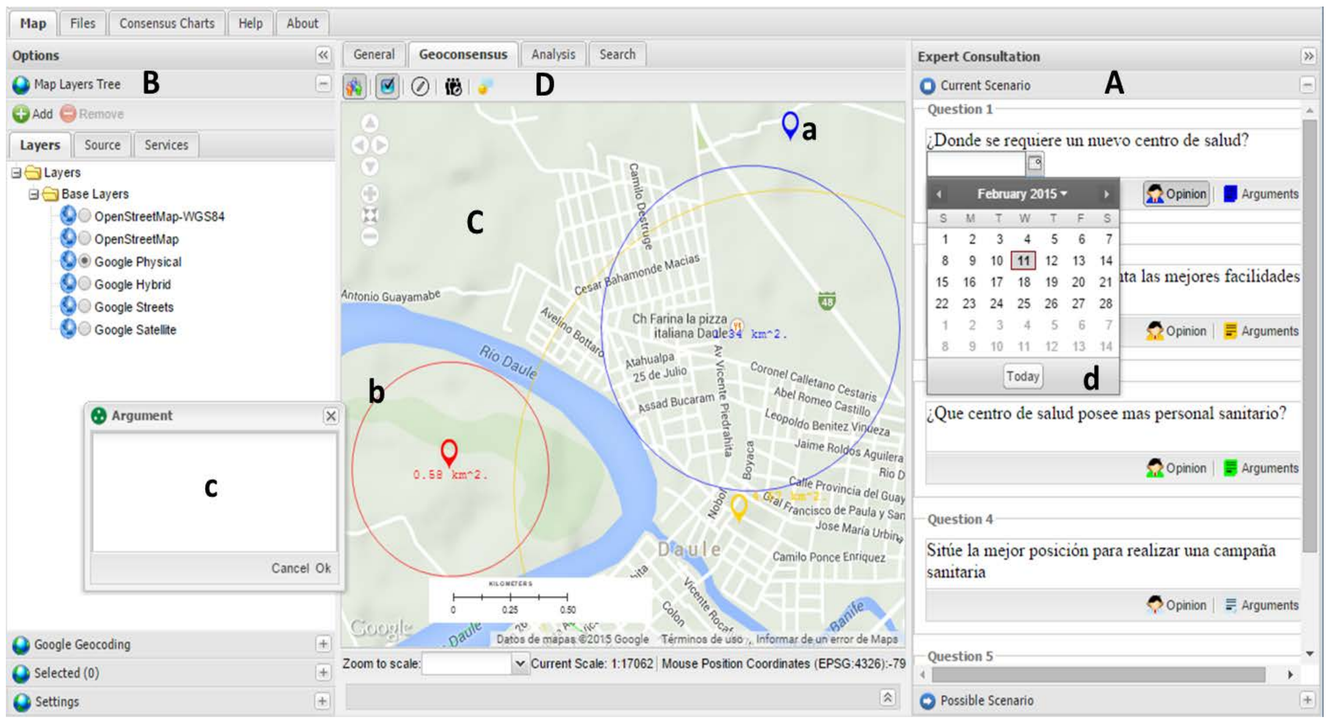
Delphi Method

In this proposal, Each expert can actually visualize in real time if his or her opinion is within or outside the geoconsensus area[5]. Furthermore, each participant can see the arguments presented by other experts, putting forward own arguments with the aim of defending his/her opinion; whereby immediate feedback is provided, in order to strengthen, and where is deemed appropriate, to reconsider those decisions regarding the chosen locations.

Unlike the spatial version of Delphi method in which the geo-consensus is obtained after different sequential rounds of feedback, in this case it is intended to obtain the agreement of the group in a given period of time, in which participants have access the application as frequently as is necessary, and as many times as desired either; as well as changing their minds as often as considered required[3]

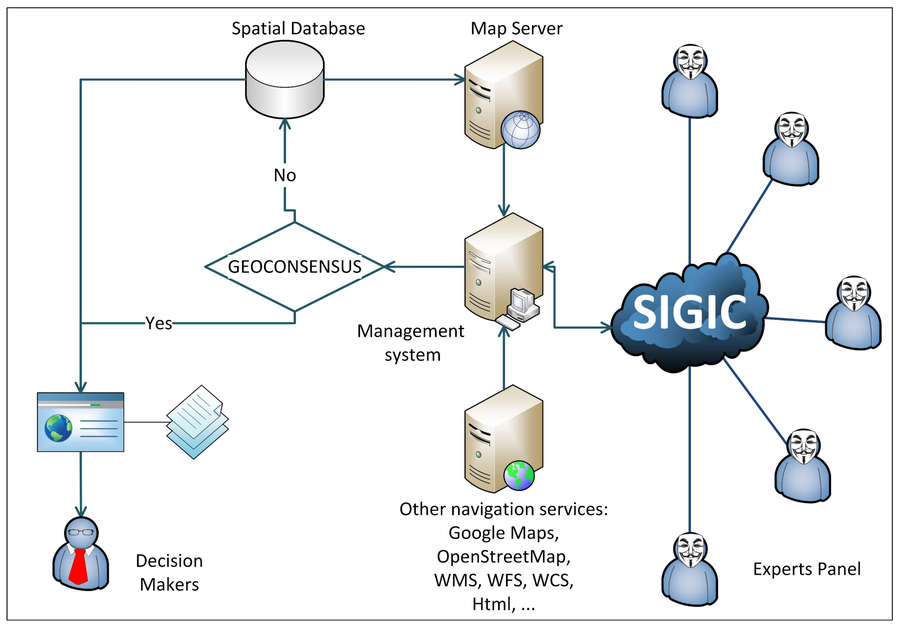
OBJECTIVE

Present the research progress in the conception, development and validation of a **Group-Spatial Decision Support System** application (G-SDSS) named Geospatial System of Collective Intelligence (SIGIC for its acronym in Catalan and Spanish), aimed to support the decision making process in geographic complex scenarios, mainly regarding the planning, organization and/or use of resources in the territory, through modelling of spatio-temporal locations of goods, services and/or events derived from interdisciplinary consensus of a **group of experts**.



SIGIC user Interface. Based on GetSDI Geoportal Open-Source Software. It is possible to locate the following components: **A**. Questions Panel; **B**. Options Panel; **C**. Review Panel; **D**. Tools of geo-consensus, **a**. Opinion expert, **b**. Geoconsensus area, **c**. Argument of opinion expert, **d**. Calendar selection.

Context diagram



This application can be used with appropriate adaptation in various relevant areas related to the complexity of geographical space.

NEXT PLANNED APPLICATIONS

- **Ecuador Health Planning Model**. Support to the Public Health System for the optimal situation of health centers and resources. Collaboration with the Ecuadorian Spatial Institute.
- **Air Quality Monitoring Stations.** City of Pescara (Italy), in coordination with Gabriel D' Annunzio University of Chieti- Pescara.
- **Location of Infrastructure**. Optimal situation of essential buildings and infrastructures in the region of Tremp (Catalonia), with the support of the Cartographic and Geological Institute.

SOME REFERENCES:

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