MaGA – Collective "Knowledge Maps"

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Introduction

MaGA (*MAppe Globali di Apprendimento* – "Global Maps of Learning") is a Web-based software designed for a collective construction of "knowledge maps". The founding working hypothesis of the software is the idea that it is possible to represent a collective "knowledge" on a particular topic through a network of *concepts*, each containing definitions and references of various types.

The network thus obtained is a sort of a labyrinth, paths capable to nullify any encyclopaedic three that tries to represent it. A multitude of users are invited to enter and to actively participate in the construction of such a labyrinth, by discovering and by proposing "secret" connections, sudden crossroads and mutual dependencies the network is made of.

The grounding idea is that at the basis of the definition of every single *lemma* there is not a "substitutive semiotics" where a concept corresponds to a term to be defined: rather, the former is just a limit area of a single term, beyond of which we find the activity of a multitude of users that has concurred to the construction of that particular local knowledge. References to other terms and to external objects (bibliographies, web-biographies, etc.) constitute hence a Thesaurus that one can navigated through: it allows us to leave a single concept and to start with a "hyper-textual" navigation within a "library". The exploration of possible "pathways" of reading are assigned to users, but are nevertheless suggested by a collectively constructed structure.

Objectives

The network of concepts – the founding structure of the system – represents the relationships, links and affinities among different key concepts. The links (arcs) between concepts (nodes) can have variable "intensity" and "strength", allowing in this manner a construction of "maps" with variable geometry where it is possible to analytically determine a series of characteristics (e.g. see below fig. 2.)

Each concept is associated to a series of elements that define and illustrate it. In particular, each concept can contain:

- textual definitions;
- representations (multimedial content);
- bibliographical references;
- web-biographical references (links);
- discussion forum;
- list of concepts that particular concept is linked with.

To summarise, what we have called a "knowledge map" is in reality a network of concepts/key words – mutually connected after their reciprocal affinity in terms of semantico-logical vicinity - where the arcs contain information about the intensity of

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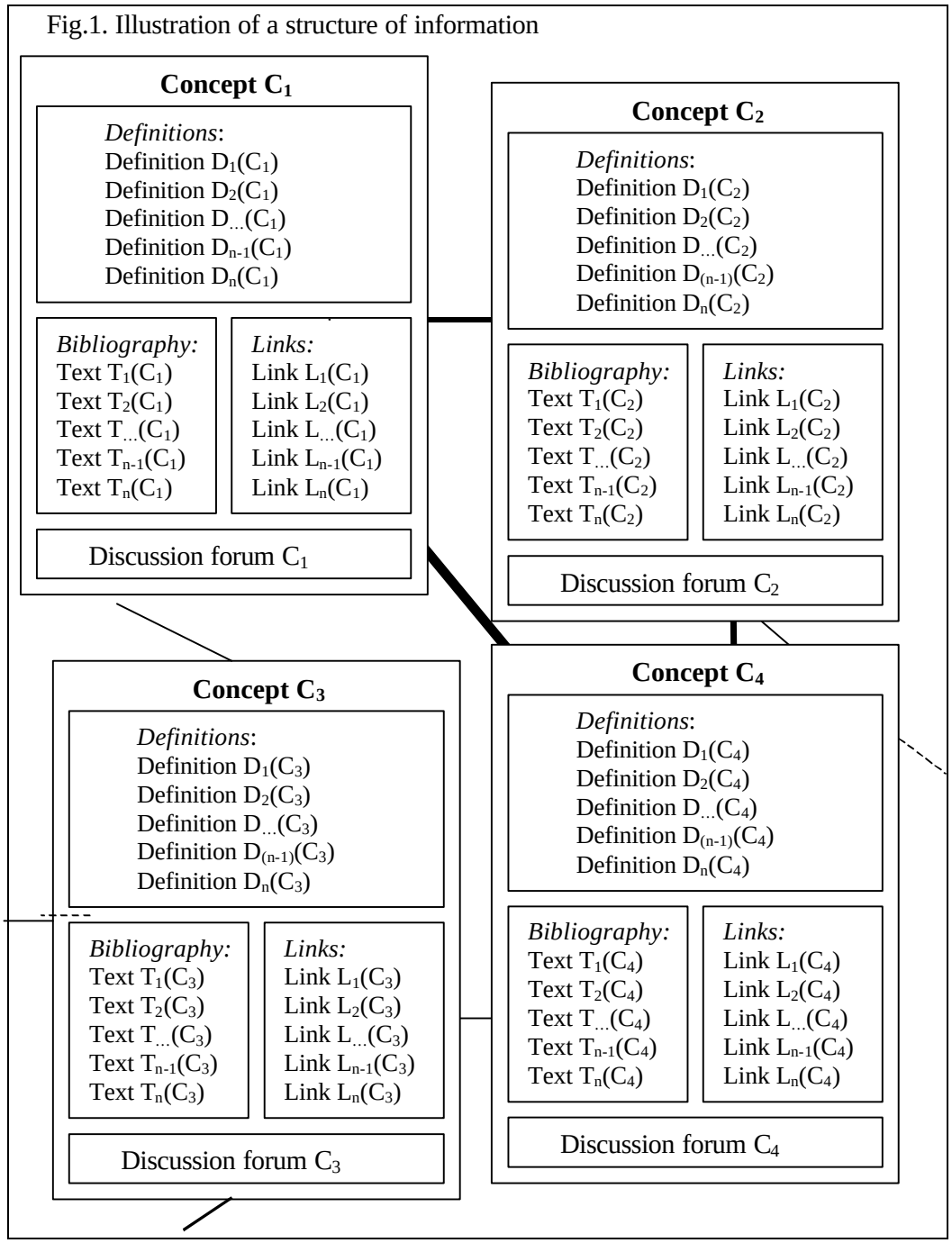
connections and where nodes (representing concepts/key words) are “containers” where these concepts get defined and a discussion place is offered to users.

Structure

Figure 1 illustrates this general scheme of information organisation.

Fig.1. Illustration of a structure of information



The collective construction ("bottom-up") of "knowledge maps"

Until now we have only described what can be called the data structure of "knowledge maps", but what – on our opinion – makes this software an useful and interesting tool is the accent put on a *collective* construction of such maps.

In fact, one of the objectives was to propose an "enabling-tool" for a "bottom-up" construction where every authorised user can intervene, freely contribute and extend "knowledge mapps"

Subsequently we enlist main functionalities at users' disposal:

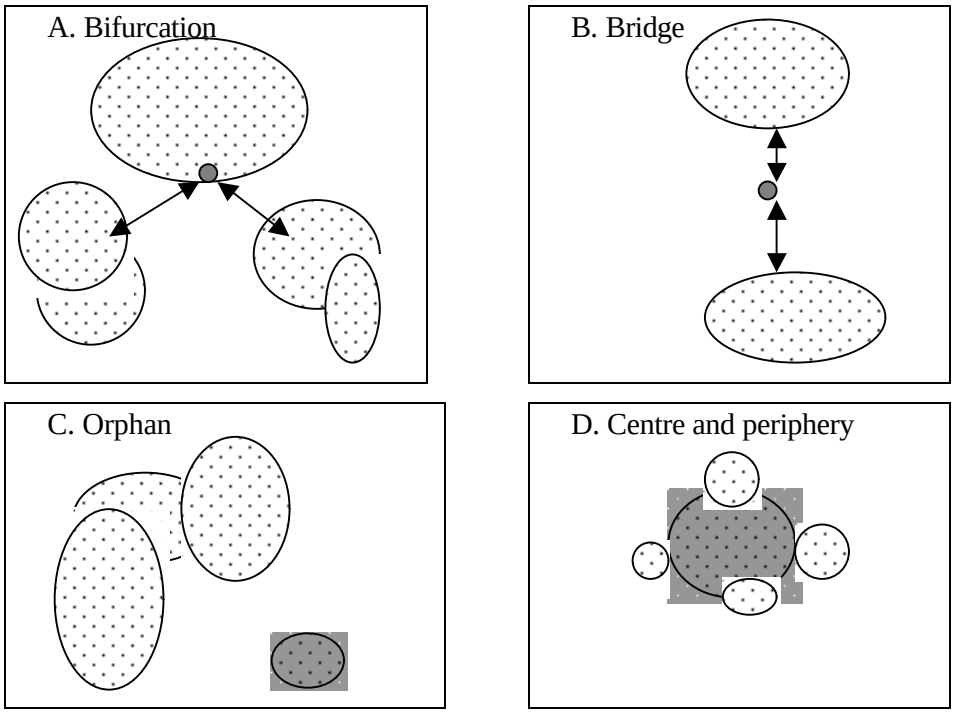
- *insert new concept*;
- *add a definition to a concept*: a user can insert a textual definition for each concept in the database; furthermore, he or she can vote definitions previously inserted by other users by assigning to them a vote from the following scale of votes: –2 (absolutely inadequate, totally incorrect), -1 (partially inadequate, partially incorrect), 0 (neutral opinion), 1 (partially adequate, partially correct) and 2 (completely adequate, completely correct); thus, per each concept there is a ranking list of all inserted definitions;
- *bibliography and web-biography*: furthermore, it is possible to insert bibliographical and web-biographical references; analogously as with the definitions, users can express their vote relative to the pertinence and usefulness of every single reference proposed;
- *connection between concepts*: users can "move" freely from one concept to the other; once moved to another concept, they can vote the connection between the origin concept and destination concept (using still the same scale of votes from –2 to 2); Alternatively, it is possible to navigate through a graphical representation of the network's graph and assign votes to single connections;
- *discussion forum* is activated automatically for every concept inserted in the database.

Analytical tools and graphical representation

The software offers a series of tools for analysis and graphical representation of knowledge maps. Hence, it is possible to visualise the map as a bi-dimensional or tri-dimensional network that can be used as a mean of navigation from concept to concept. Furthermore, several types of filters can be activated on maps thus visualised, for example:

- visualise the connections between concepts where the "strength" of connection exceeds a particular value defined by user;
- activate – starting from a series of "concept of aggregation" defined by user – a cluster analysis;
- visualise "hierarchies" between concepts, where the importance of a concept depends on the number and strength of connections with other concepts;
- search for particular "geometries" that might be of particular interest within our "encyclopaedia" (e.g. see fig. 2.).

Figure 2. – Examples of "geometries" of particular analytical interest



Possible Uses and Potentials of the Software

The software offers a series of functions and procedures, but does not preclude in any sense the type and the nature of themes and topics that can be treated. The use of the system can – in the line of principle – cover a wide range of purposes, from a careful theoretical discussion to a support for collective *brain-stormings.*

Furthermore, it is of a particular interest the collective and "horizontal" nature of constructs obtained via the system. Thought and designed as intrinsically democratic and egalitarian, it can reveal its usefulness as an instrument of activation of citizens' participation to public decision.

We would also like to mention its use as a starting point for construction of games. Just for example, players/nodes can have a systems of preferences on scenarios inserted in she system: if the strength of connections between players and scenarios are considered as an indicator of results of the game together with a measure of distance among players, the mechanism of the game could conduct – after the intervention of "supporters" of different actors – to a situation that efficaciously describe the system of social preferences.

On the other side, the system can be a formidable instrument of collective learning. Learning that does not happens only through a consultation of a "hyper-textual encyclopædia", but also through an active participation, through interaction between different holders of particular and local knowledge. Finally, learning of a knowledge that gets cultivated and constructed – quite as in the real world – via relationships of power, which – the power – nevertheless within our system can be exercised only as capacity to convince and as an expression of will and motivation.

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