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# Seeing what they are saying:

## Diagrams for socio-technical controversies

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### Abstract

The opening of enormous databases and the possibility offered by new tools to access the heterogeneous flows of data and information emerging from the Internet could be seen as an innovative mode also to observe and represent social complex systems. The *cartography of controversies*, the applied version of the Actor-Network Theory (ANT), is one of the examples of this new way of exploring and understanding these new information and knowledge domains. The cartography of controversies also aims at overcoming some of the limits of the traditional description of social issues by exploiting the potentialities of the *information visualization* and of the *information design*. In this framework visual models and diagrammatic devices are assumed as useful tools to describe the different position assumed by the actors of controversy. A distinctive feature of these, heterogeneous and non-isotopic, spaces is the absence of *unique metrics* to deal with them. The absence of reference points requires endowing with technical and conceptual tools for understanding and grasping the dynamics and the processes, which characterize them. Diagrams are here considered as operating devices able to describe and unveil the nested and latent connections of a system.

A real case has been chosen to develop and test the capability of diagrammatic models to observe and describe controversies and to show the point of view of the actors involved in it: the remote control of dangerous materials transportation in road.

The research is strongly related to the development of the *Turtle Project*: a series of visual tools and diagrammatic devices able to explore controversies. It could be defined as an observation environment of the discursive knowledge flowing through the Internet, offering the possibility to make profit both from quantitative and qualitative research methods.

Some results about the chosen controversy are discussed as well as the limit of the tools.

### Keywords

*Social Complexity, diagrams, controversies, Actor-Network Theory, cartography of controversy, content analysis, discourse analysis.*

### New domains to visualize

It seems that the traditional modes of accessing, observing and representing social complexity are changing thanks to the opening of enormous databases and new tools to access heterogeneous flows of information (Latour, 2007). This hypothesis, supported also by Lev Manovich (2001, 2006), redefines a new emerging cultural form to capture, explain and discuss the complexity of reality, but it should be reshaped and extended. A more accurate analysis should be carried on two aspects strictly related to design discipline and more specifically to communication design practice. Communication design tools could be used as strategic devices able to read and narrate the dynamics that shape the current space of information and knowledge (Bonsiepe, 2000). On one side, theoretical remarks should concern the access to data, which, gathered from different fields of study, produce a new relationship between qualitative and quantitative methods; on the other side, empirical experimentations should be deployed on the modes through which these spaces are synthesized and translated into narrative devices<sup>1</sup>. These two aspects, only apparently

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<sup>1</sup>The key concepts about the capabilities of visual tools refer to some theories born in the cognitive sciences with Johnson-Laird and particularly on the effectiveness of images, graphs, maps and more generally the class of diagrams, not only in mnemonic tasks (Yates, 1974), but also in those of complex reasoning and orientation between

sequential, can be merged into a new dimension that overcomes epistemological borders: beside a strongly codified knowledge are associated new relational and dynamic ones. This new domain requires also new modes of observation and representation. Indeed, it is emerging an area study labeled as *knowledge visualization* (Okada, Shum, & Sherborne, 2008; Shum & Okada, 2008), quite similar to the *information visualization* and to the *information design*, that aims to depict spatially knowledge domains (Shiffrin & Börner, 2004).

## From visualization to controversies

The *cartography of controversies*<sup>2</sup>, developed by Bruno Latour as an applied version of the Actor-Network Theory (ANT) (Latour, 1999, 2005), is one of the examples of this new way of exploring and understanding these new information and knowledge domains. The ANT approach tries to comprehend social and knowledge issues as complex network made up by relationship between heterogeneous actors, objects and discourses.

One of the most innovative elements of cartography of controversies is how the description of the analyzed complex social system is performed. The limits of a pure analytical approach, based on textual forms, are also shown by the increasing achievement of system theories and of complexity science. Alongside to text and discourse, visual models should be a mode of representation that does not divide or analyzes the elements separately but studies them in an interconnected and indivisible manner. *Images* thus could assume a role of primary importance: able to describe elements as a whole without dividing them, it becomes an irreplaceable instrument for depicting qualities of systems otherwise difficult to interpret. The aim is to explore, to integrate and depict the enormous informative richness produced by the actors through communication devices able to assemble information and practices even apparently unrelated, in a single *optically coherent space* (Venturini, 2008). The cartography of controversies aims at overcoming some of the limits of the traditional textual narrative description by exploiting the potentialities of the *information visualization* and of the *information design* to observe social phenomena.

## Smooth spaces and points of view

Under certain aspects ANT shares with Complexity theories, and particularly with social complexity, not only the interest in complex networks<sup>3</sup>. Indeed, some features of the complex systems<sup>4</sup> show resemblances with the controversies, as the dynamicity due to a high number of agents and actors and the non-compressibility due to non-linear interactions. Furthermore, the very same definition of controversy makes reference to open dimensions, with a priori non-definable boundaries. They are indefinable as the Complex systems are, bringing to an impossible exhaustive, stable and complete knowledge<sup>5</sup>. The possibility of understanding these systems depends also on the production of *dialogical* models able to compare different data, information and knowledge. The dialogical models configure themselves as a representation of *smooth spaces* (Deleuze & Guattari, 2006) animated by different tensions which do not appear as unique and compact realities, but composed by fragments and heterogeneous pieces (Marzocca, 1994). A distinctive feature of these, heterogeneous and non-isotopic, spaces is the absence of *unique metrics* to deal with them. The absence of reference points requires endowing with technical and

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a high number of data and information (Berthoz, 2006).

<sup>2</sup>The *cartography of controversies* can be defined as a set of techniques for observing and describing, as well as to explore and visualize social issues, especially but not exclusively, *socio-technical systems*. The word controversy refers as a neutral term, to a shared uncertainty or to «*a debate surrounding a technique or scientific fact that has not yet been determined*». Its aim is to open the *black boxes* of techno-scientific truth and observe empirically how they are constructed through a widened and non-linear process of negotiation. At a conceptual level all the controversies, even though each one is essentially unique, have some common characteristics (Law, 2004):

- A high number and high diversity of actors and agents involved;
- A high dynamics of relations between actors and agents;
- A marked non-reducibility and compressibility;
- A dialectic but conflicting form.

<sup>3</sup>In the *latourian* cartography every social event is described as a heterogeneous network of connections where actors are constantly working to bind or dissolve their mutual links.

<sup>4</sup>See also (Cilliers, 1998).

<sup>5</sup>Even if it is assumed to be able to obtain all the data about a Complex system it would be impossible use them, coming to a situation of *information overload*. See in this regard (Ricci, Ciuccarelli, & Valsecchi, 2008; Scagnetti, Ricci, Baule, & Ciuccarelli, 2007).

conceptual tools for understanding and grasping the dynamics and the processes, which characterize them. Also according to the cartography of controversies, each approach to the knowledge spaces can exist only from subjective and partial point of views. The only objectivity accepted by the social epistemology is a second order objectivity, which is the attempt of understanding a system as a unique object through the highest number of possible point of views, even those in opposition. This position, often accused of radical relativism, is interested more in the “*truth of the relationships*” rather than in “*the relativity of the truth*”<sup>6</sup>. In this way the Latourian relativism is the opposite of the point of view absolutism, i.e. the evident willingness of not comparing or of not linking one of the vision of the world with the possible others, of not establishing a dialogue with them. It is a *dialogue* able to disclose a deeper knowledge of the analyzed controversy.

## The bridging artefacts of communication design

The capability of the communication design of building languages and tools, first of all visual ones, should be oriented also to the construction of bridging artifacts, in order to connect different point of views, social contingencies and manifold interests, structural features of a Complex social system. One of the raising challenges is the representation of smooth and complex spaces (Scagnetti et al., 2007), which are also spaces of knowledge and controversies. Visual models could help in describing, in a tangible manner, the different position assumed by the actors of a complex system and their point of view, developing mutable explanations of the reasoning processes as well as the data cognition processes paths, which underpin their assertions. It is a very process of translating the actors’ mental models (Laird, 1988; Norman, 1996; Preece et al., 1994) into a shareable form. It is a focus, which moves from identifying the possible controversies solutions to assisting the actors of the social transformation in underlining the social, economic and organizational dynamics through the constructions of artifacts:

- *open* to the possibility of recombining data and heterogeneous information;
- *inclusive* in the possibility of telling plausible visions regarding the system perception, offering an optically correct device, maintaining and preserving the multiple interpretations, produced by a space of controversies.

## Diagrammatic devices

The challenge is that of showing the multiplicity of viewpoints and stressing the different narration typologies which underpin them. Besides, it has to point out where the different interpretations overlap and where they diverge. At the same time it has to be shown how the information characterizes the very nature of the system. It is, then, necessary a notation system, which explains the controversies dynamics. Diagrammatic modes of visualization (Scagnetti et al., 2007; Ricci et al., 2008; Ricci, 2009) seem to be particularly adapted to achieve the above mentioned goals. In this context diagram are considered as operating devices able to describe and unveil also the nested and latent connections of a system. When design is addressing complexity, diagrams could become generative tools that can be used to generate *metadata* relevant to the design process. Diagrams effectiveness lays in the ability to act as go-between with explicative functions of the different correlated quantities (Abrams & Hall, 2006; van Berkel & Bos, 1998; Corbellini, 2007), as a sort of *graphic short-cut* for the representation of complex phenomena. Indeed diagrams and maps are media between what is known about a system and what the system is; they could display not only quantitative data but also ideas, concepts, frames, schemes, viewpoints, perspectives and values of the system observer. The aim is not that of representing fixed positions in space and time, but rather of rendering in a visual language the actors’ mutable tensions and the strengths fields produced during a controversy.

In this research field have been conceived, first conceptually and then in an empirical form<sup>7</sup>, two diagrammatic tools to manage the three main dimension of a social complex system: time, actors

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<sup>6</sup>See also (Deleuze, 1990).

<sup>7</sup>This research is related to a wider field in the framework of the DensityDesign Lab. The aim of this line of research is to verify the power of communication artifacts in helping decision making processes and their ability to facilitate dialogue within participatory design actions. For more information see [densitydesign.org](http://densitydesign.org)

and interactions. Each of them has the objective of transforming and formatting in a common form data and knowledge produced by each actor belonging to the system. The proposed approach discussed in this paper is different from others in which the main effort is to develop formal model and algorithms for computer simulations, and where visual codes are strongly codified. Here, the objective is to set up a visual language mixing up digital information to depict, through the observer interactions, how agreement areas and disagree ones are generated. The real goal is to build narrative models (Bruner, 2005) preserving the informative richness but bearing in mind that every analysis reduce and compress.

## Choosing a real controversy

This research has seen, since the very beginning, a profitable collaboration with the Mobility and Transportation Laboratory (LMT) of the Politecnico di Milano, in order to test on a real case both the theoretical concepts and the diagrammatic tools of this work.

From a series of interviews and collective discussions with the LTM research group, it has been found the most interesting case to be tested: the remote control of dangerous materials transportation in road. The selected social-technical system is constituted by many actors, very different each other and facing a deep transformation. On one side the legislative modifications are causing a deep transformation of the entire industry; on the other the whole transportation industry has changed its dynamics, which are still facing a redefinition process. This industry is characterized by a hyper-fragmentation of the transporters, which are action as single firms. Another featuring phenomenon is the evolution of the shipment management technique, producing enormous data to be analyzed. If on side this could be interpreted as a raising efficiency but on the other as privacy and independence loss of the myriad of involved transporters. This is causing a lot of frictions both on the experimentations of the info-mobility technologies and to the implementation of clear and sustainable laws. The research effort is also to set-up tools useful for a profitable discussion among transporters, legislative and technological actors.

## Setting up the research method and strategy

Once the observation field has been defined, an approach to generate the dataset and a method to elaborate them in order to observe the controversy has been chosen. Many are the difficulties linked to the direct observation of a controversy (Venturini, 2009) and in general to observe all the social complex system since expanding themselves in space and time. The observation of social and technical system is like a constant collection of materials produced by the actions of the several actors, present in different time and places. It is an integration work, which finds in the digital dynamics of the Internet an affinity almost elective (R. Rogers, 2002, 2004, 2009). Differently from many digital research methods, which by the automation of some mathematical algorithms build networks and rebuild connections, among the different actors of a controversy, in this research the aim is to try developing and testing semi-automated tools focused on the semantic content and structure of information. During a controversy every actors constantly leave some traces, which could be seen a potential heterogeneous database: made up by the interview transcriptions, official reports, statistical data, operating and normative procedures, and industry analyses and media news. All these traces share, regarding the research hypothesis, the shape in which they are generated. They belong to a social structure, reflecting also the point of view of each actor. They are part of different discourses by which each actor tries to further and enhance its position within the network and in the controversy developing path. Among the various qualitative research methodologies, through the use of discourse analysis<sup>8</sup>, it is possible to try to

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<sup>8</sup>The text, language and discourse are seen within the methodologies of *discourse analysis* as *objects* able to provide representations on how things are, how they were, and how they could be or should be. Discourse creates three types of interdependent social and cultural meanings that define a mental model. In our field of research:

- It creates representations of activities and events – it is the discourse “semantic function” through which we define the concepts, ranks them, they are enumerated and assigned attributes ;
- It constructs the viewpoint of each actor and social relations – it is “the pragmatic function” building social and emotional ties to some issues brought forward by other stakeholders, whether real or not, and to other points of view;
- It creates the relationship with the environment – it is the function that organizes the contents of the texts and discourses, that create the sense and narrative structures, it also related to other forms texts such as the data

understand, unveil and construct how the positions in the networks are related to this traces and discourses. The discourse analysis, in fact, examines how the social word is constituted by the meaning of discursive practices: it interprets them.

This work, from a technological point of view posits itself above information and discursive flows, related to a controversy developed in the Internet. With adequate tools, such as crawlers and ad hoc research engines the traces of a controversy emerge and they can be observed. The data gathering finds in the Internet not only a precious *box*, which contains the elements to reassemble the network and the dynamics of a controversy. Stemming from the previous statements, the *Turtle Project* has been conceived. It is made up by a series of tools and devices able to explore controversies and could be defined as an observation environment of the discursive knowledge flowing through the Internet.

*Turtle* is able to grasp significant discursive data exploiting the potentialities implicit in RSS feed system. For this project an RSS is a constant source of information related to specific actor. Each RSS feed is associated to an actor, vice versa each actor could be related to a more than one RSS feed. *Turtle* is periodically monitoring the feed list for each actor, and it finds relevant news and traces for the analyzed controversy thanks to a keyword matrix. In order to build an extensive list of RSS feeds related to each actor, some tools have been borrowed from the Digital Methods Initiative. They are complementary to the *Turtle* project: in particular the *Lippmannian Device* also knew as Google Scraper, which has been used to attain a series of valid URLs, from which extracts the RSS in relation to the dangerous goods transportations. This process has been carried on in the following way:

1. The first two hundred results of a traditional Google research with the query "Trasporti" have been selected;
2. The multiple hosts, the links from Wikipedia, images and videos have been deleted;
3. The remaining results have been processed by the *Lippmannian Device*, with the query "merci pericolose";
4. With another tools have been extracted the RSS;
5. A weighted list of one hundred and sixteen results related to the controversy has been build;
6. The list has been enlarged by adding the most important Italian journalistic headlines;
7. Exploring this website list, have been generated twelve clusters of actors.

At this time *Turtle* is able to automatically perceive the information produced in real time by the actors. Since an RSS can produce information not strictly related to the observed controversy, a semantic correspondence between the information content and a list of keyword related to the dangerous goods transportation is performed. Furthermore, if an information is considered relevant, from it are extracted the most important words. To sum up, to each actor are associated some RSS feed from which are extracted the relevant information. The main contents come by the latter. Furthermore, performing a Content Analysis process *Turtle* is also able to give some quantitative insights about the observed controversy<sup>9</sup>.

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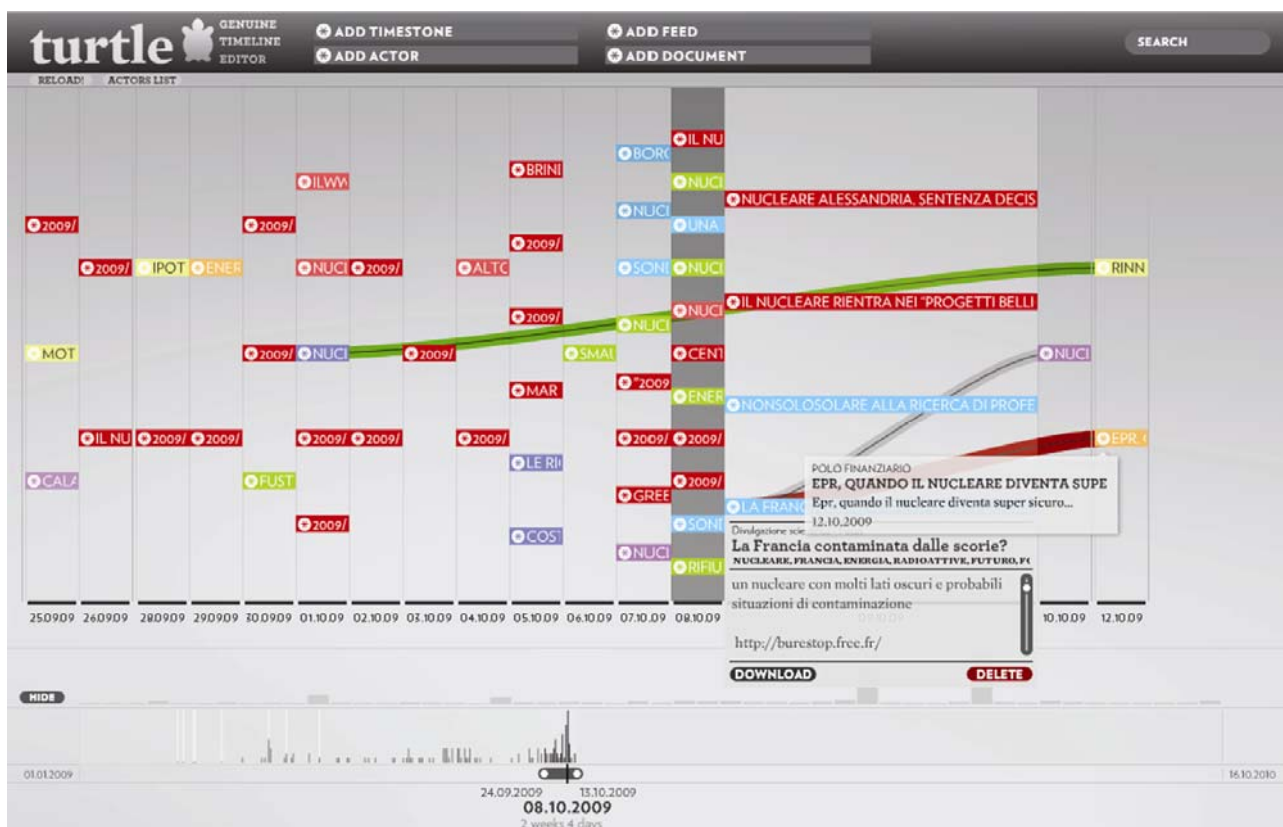
or images.

The concept is often vague, or used with different meanings depending on context. A useful description is given by Marike Finlay (1987): «[...]discourse analysis is the study of the way in which an object or idea [...] is taken up by various institutions and epistemological positions, and of the way in which those institutions and positions treat it. [it] studies the way in which objects or ideas are spoken about [...]».

<sup>9</sup>Content analysis is a method used to transform non-numeric and symbolic information for the purposes of statistical analysis. It follows explicit rules of coding and allows classifying large amounts of data. Because of its relative conceptual simplicity can be used to support other, more detailed textual information and discursive fragments. Are distinguished two main approaches in the use of this class of research tools (Shapiro, 1997) the instrumental analysis and the representational analysis: «At issue in this distinction is whether it is the source's or the researcher's perspective that is used to interpret the texts under analysis. When a researcher understands texts representationally, they are used to identify their sources' intended meanings. When a researcher understands texts instrumentally, they are interpreted in terms of the researcher's theory» (Smelser & Baltes, 2001).

## Observe and visualize

After having described the technical and conceptual features of the research, it has to be pointed out that the *Turtle* characteristics are not exclusive linked to the RSS feed aggregator. Indeed, *Turtle* offers some useful tools to explore a controversy. To the traditional and digital filing documental functions are added explorative and narrative functionalities of visualization. From a graphic interface point of view *Turtle* is made by two explorative tools: *Turtle Timeline* useful to analyze data and observe the controversy, depicting the results of the automatic Internet information gathering; *Turtle dynamics* synthesizes information showing the position of the various actors, their relations and the most important content of their discourses. The potentialities of the visual models have been tested in the empirical study in a real controversy on a twofold floor: firstly, *Turtle* should clarify the specific contribution to the overall discursive structure of each single discursive fragment; secondly, it should underline the latent structure by synthesizing every single discursive fragment. Even if it *Turtle* seems to act in an automatized manner, each action is controlled by the controversy observer.



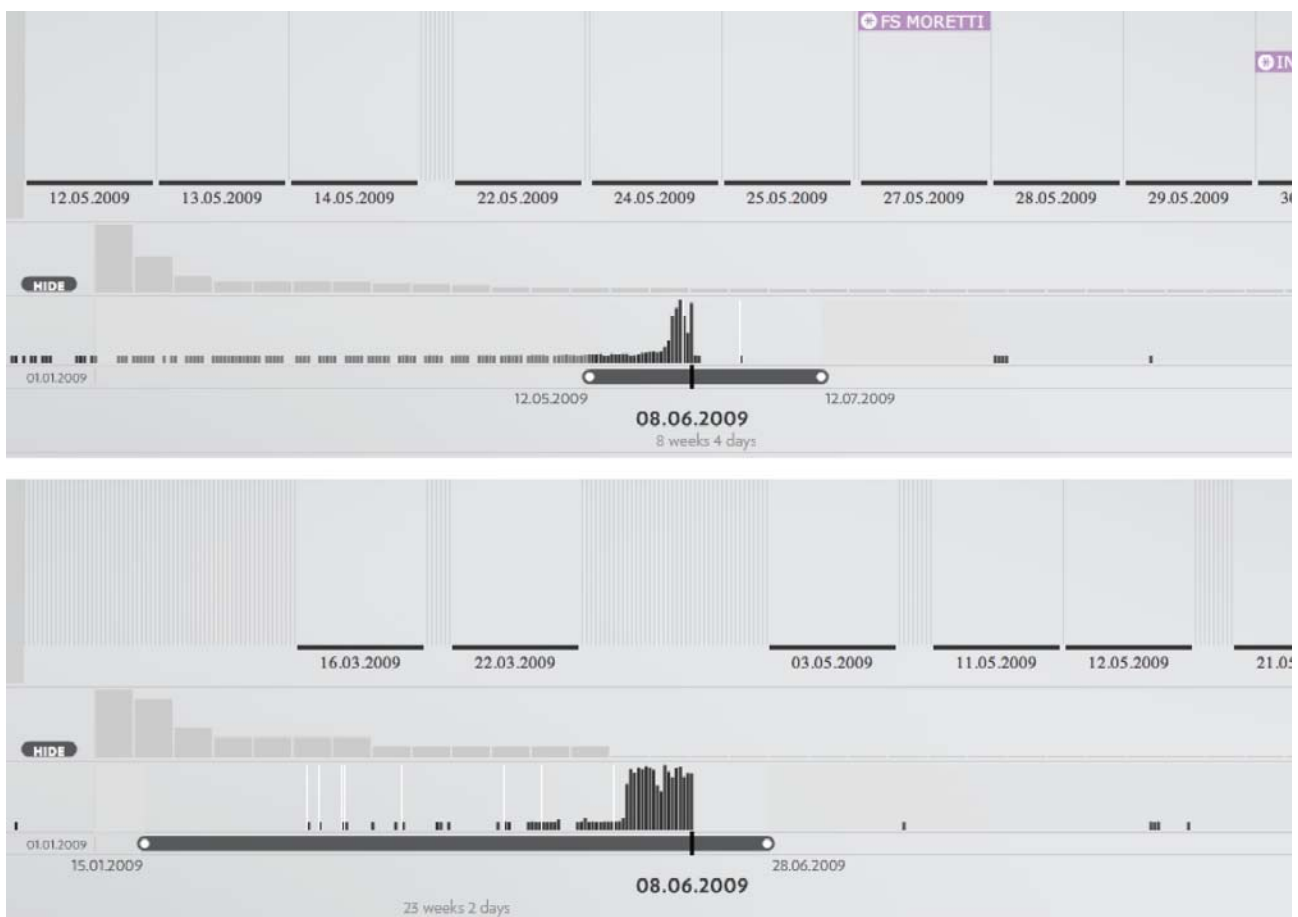
Turtle Timeline: Creating the relationship between discursive fragments

For example, illustrating the interface characteristics and its features in visualizing information, it is possible to start from the actors identification procedure, which is a step by step process and it is able to guarantee a great flexibility. To each actor it is possible to associate a color, different shades indicate different groups of actors (e.g. the observer can choose the purple for the governmental headlines; blue for right news headlines; green for environmental associations). Different color graduation can indicate different actors, which tend to share their idea. To each actor the observer can associate some metadata. The specific aim of this software is to visualize the discursive fragments and stress their relationships, also with respect to time. The observer can link two or more fragments assigning to their relationships in terms of similitude or contrast. Three are the possible links: a generic one, depicted as a grey line; the second, an agreement link, assigned by the observer when he considers the content of two fragments as converging; the third one, a disagreement one when the observer states that the content of two fragments are in conflict or show two different opinions or point of views. Furthermore, the observer can assign a weight to the last two links, indicating the strength of the concordance and discordance.

*Turtle dynamics* is the complementary device of *Turtle Timeline*. It gathers the fragments actor by actor and the relationships among them, proposed by the observer to visualize a synthesis of the controversy. It shows cluster of actors for a specific momentum as a graph; letting emerge the relationships among clusters of actors. The latter are visualized as circles, with a directly proportional to number of fragments produced by them. Each position on the graph is a function of the relationship built by the observer in *Turtle Timeline*. The distance among the circles decreases as the agreement links between actors increases. On the contrary the distance increases if two actors have lots of fragments in opposition.

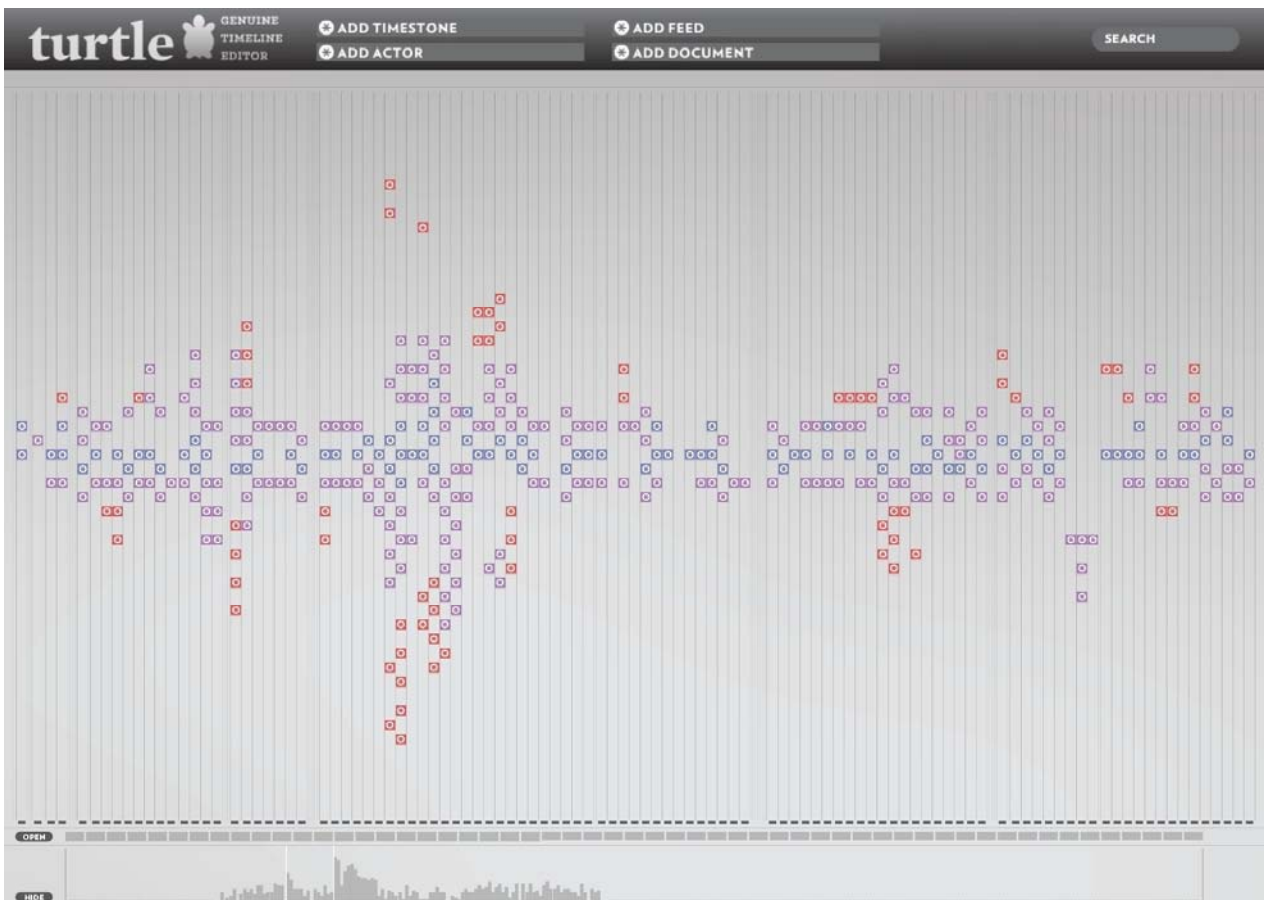
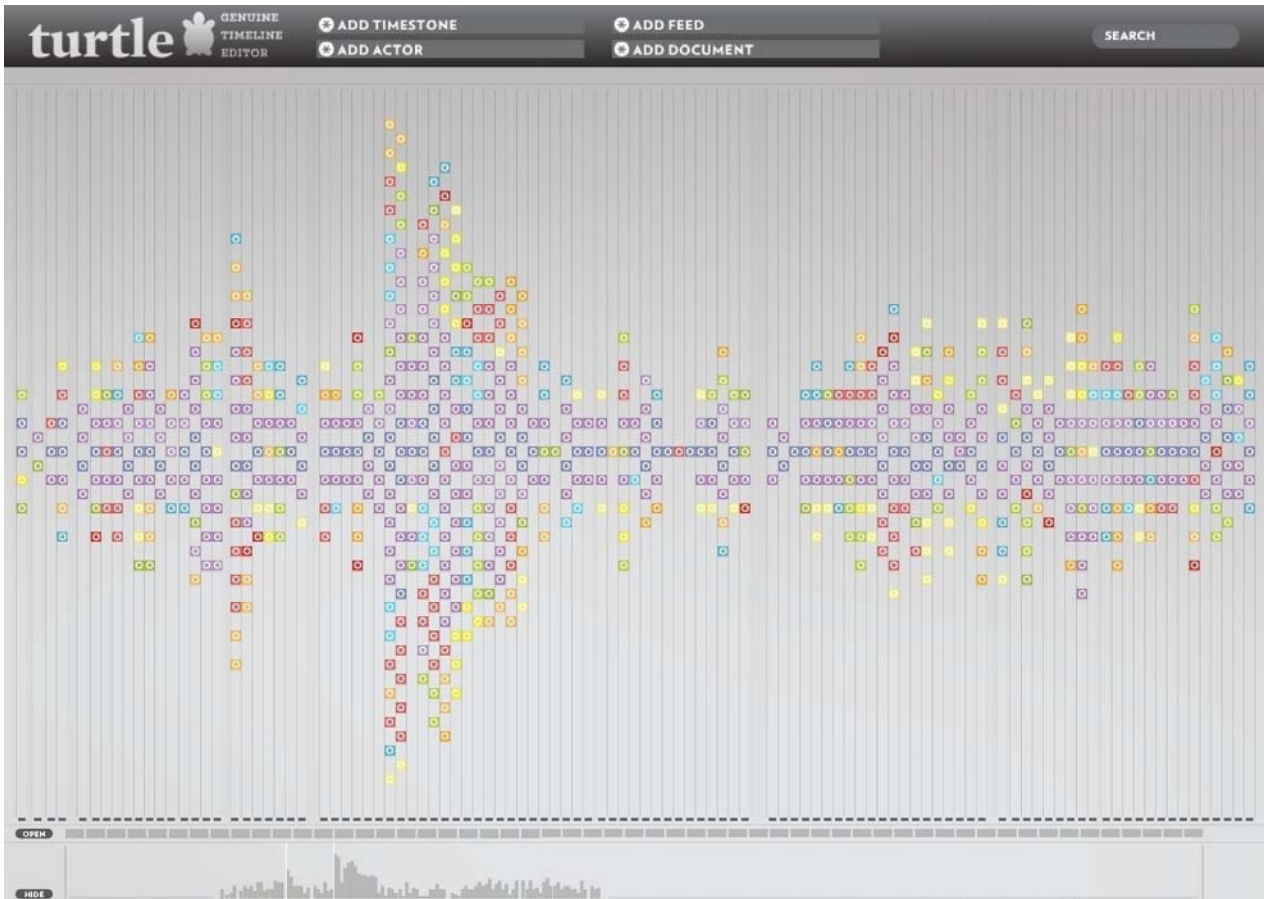
## Some results about the controversy

In observing the controversy about the dangerous goods transportations *Turtle* has made it possible to enlighten some interesting dynamics. First of all, the dynamicity of the considered case has emerged thanks to its content analysis capability and from a comparative analysis with another controversy, i.e. the nuclear energy implementation in Italy. By observing the dimension of the flow through the time, it has been possible how the external events can affect the controversy. In this sense, the comparative analysis shows the *discursive flow volatility*: the increase or decrease of the discursive production in relationship with an external event. For instance, considering the last European poll, the two controversies showed a different behavior. The dangerous goods transportation one, as the elections were approaching, saw a rapid raise of the flow, which has been constant through all the poll period for plummeting at the end. On the contrary, the nuclear controversy the flow rose even before of the elections, and then stayed stable in the long run.



Turtle Timeline: Above the "dangerous good" information flow. Below the "nuclear" information flow. The considered period is related to the 2009 European poll

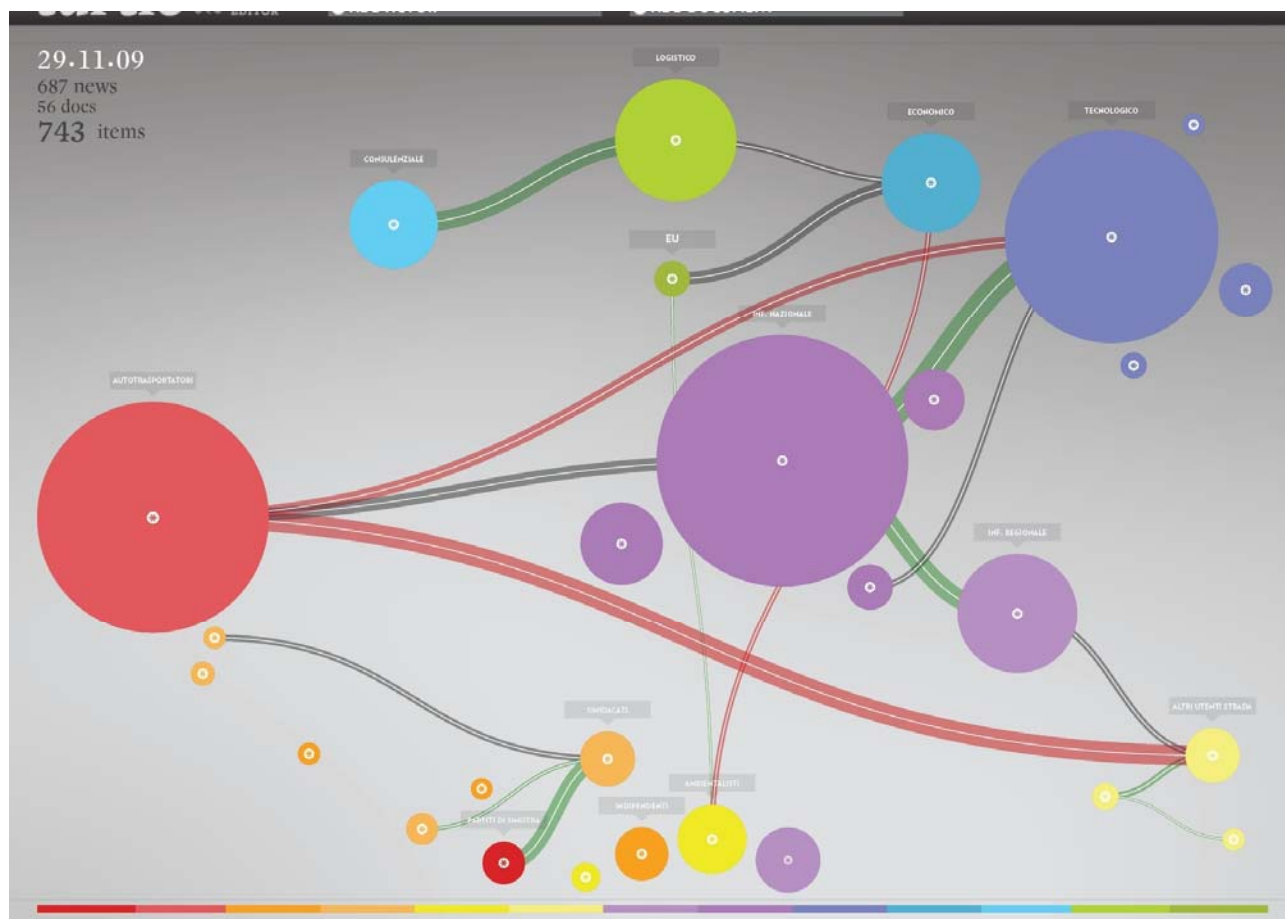




Turtle Timeline: Above the diagram after six months of observation. Below the diagram where the *discourse axis* is enlighten

Other observations have been performed in relation with events more germane to the specific controversy of the dangerous goods. On 29 June 2009, in Italy a tragic event took place in Viareggio, where a train transporting dangerous goods was involved into an accident. Although it was referring to a differing transportation system, this event led to a significant increase of the discursive flow, strictly related to the remote control of the transportation of dangerous materials in road. After this event, the flow remained stable. *Turtle* shows its capability of revealing the interdependence of controversies with other systems. By observing the lay out of the fragments into the interface, other patterns emerged, both communicative and relational ones. *Turtle Timeline*, in fact, positions on the median area the fragments belonging to the actors, which in the observation time frame has the highest ratio between the number of fragments vs. number of days, so to identify the more active actors in the controversy, which constitute the *discussion axis*. In our case, it is represented by the technological actors cluster.

The most important qualitative and discursive results can be abduced by observing the diagram produced with *Turtle dynamics*. It shows in the upper part, really near among them, clusters concerned with the economic aspects of the controversy: the technological cluster, the logistic and the economic information one. Within this area, of great interest is the consultancy cluster, which represents those actors involved in the trucks and drivers certification. It is at the end of a chain starting from to the EU cluster, producing the laws and directive for the entire transportation industry. In other words it is evident a link between directives and their economic impact, the logistic and the bureaucratic issue, all of them are polarized by the technological aspect of the controversy. A weak link joins the EU cluster with the environmental one, even if the link is an agreement one.



Turtle Dynamics: the graph after six months of observation.

On the contrary, the environmental cluster has a disagreement weak link, with the economic cluster. In the middle of the graph, the national news headline cluster has a huge weight, strongly linked to the tech one. The regional news headline cluster, closed to the national one, has a generic link with the cluster pertaining to the car and motorcycle drivers. This relationship could

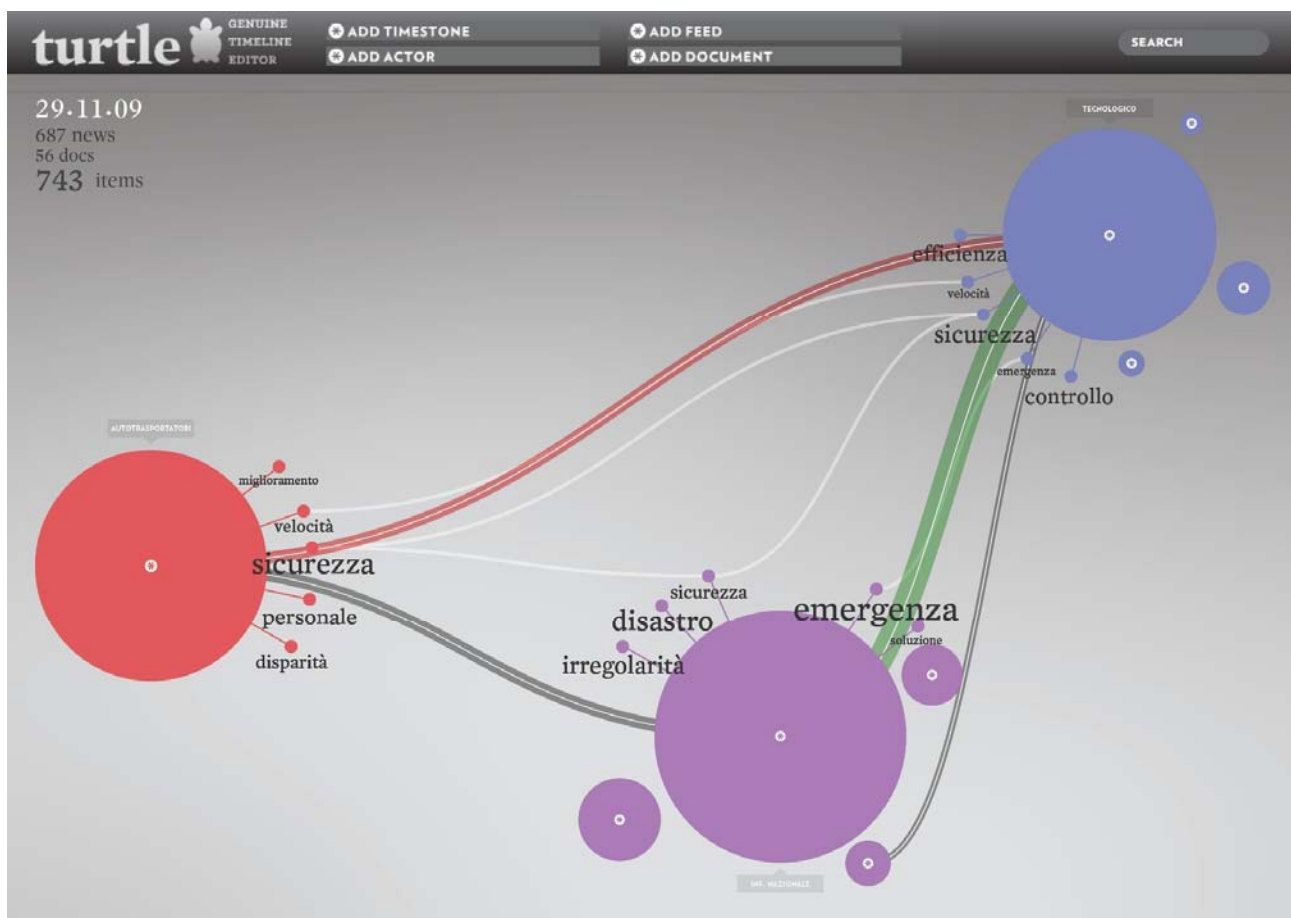
mean that there is a mutual influence between the regional news sources and personal blogs and forums, which constitute the vast majority of the car and motorcycle drivers cluster.

The latter are clearly and strongly in opposition to truck drivers, which occupy the left part of the diagram. They are in opposition with the tech cluster as well.

At the diagram bottom are situated the labor unions cluster and the left party cluster.

This diagram lay out reflects some hypotheses emerged from the first and quick analysis of the controversy as well as the interview session with the researchers of the LMT. Expanding the *Turtle dynamics* diagram and letting appear the key issues concerning the three main clusters, even though they are in contrast, it is possible to point out where their point of views converge. Recalling the remote control of dangerous materials transportation in roads, jointly with the privacy issue, the diagram shows the tech cluster interest in safety, efficiency and dangerous goods transportation control. The national news headline is concerning with the need of finding solutions to prevent emergencies and accidents. Even the truck driver cluster is supporting the safety issue, but it is concerned also with the improvement of their working conditions. Safety is by far the major linking strength, even if it could be declined in various facets from the economic to the social one.

Taking into account what it can be observed through the diagram and triggering a *designerly* way of thinking, the clash between the need for a greater safety, achieved through the control and the tracing of the truck drivers, and the need for independence and privacy can be balanced considering the other drivers interests. The role of the remote control devices should be considered twofold: on one side it is perceived as invasive by the truck driver, on the other they can be used to increase their working condition. An issue, the latter, which is one their main concern.



Turtle Dinamics: The three main actors, and their issue relationship.

### **Some limits about the tools**

The research results presents obviously some limits, which basically reflect all the three levels on which the empirical tests have been carried out: the technical one, the definition of observation area and the visualization one. Here will be discussed only the first, which has shown the more significant impact on the results achieved. The main limit has been represented by the *noise* of the information flow. It is an issue related to the automatic part of the gathering data process but it requires some reflections about the research methods. The researcher has to constantly monitor the results of the filtering process in order to overcome this limit. If one side it can be enhance by optimizing the algorithms, on the other it implies not to fully rely on the automatic procedure; therefore, it implies the need for exploiting the researcher cognitive capabilities to reassemble the puzzling fragments of a controversy.

### **Multiple perspectives**

In developing the research, from a more abstract point of view three steps in *formatting* information and discursive fragments have been carried out:

1. From the textual fragment to a visual object. It has been sought the qualitative and quantitative data salience in order to convert them into nodes and elements referable to an optical space;
2. From the phenomenon implicit structure to an explicit and visual one. Analyzing one by one the visual objects, it has been tried to highlight their mutual significance as well as their overall sense, visually showing their relationships.
3. From a unique perspective to a multiple one. The possibility of not univocally linking the different fragments opens to more than one possibility. Moreover, it brings to further reconfigurations and multiple interpretations of the same phenomenon.

The possibility of another observer to build its own links would bring him to configure a different network and a diverse interpretation of the observed phenomenon.

The diagrams, presented in this paper, have not to be considered as devices able to provide the reader with definitive answers, but instead as tools to be used in drafting better questions to be asked to the system. Their novelty relies more on their capability of *formatting* data, rather than their visual aspects. On the wake of Bonsiepe (2000), it could be stated that diagrams are like *finding engines*, rather than searching engines. Rephrasing, they are able to provide entry points to better examine the faced issues. Diagrams are interfaces providing patterns where the observer is responsible of the assembly operations and of the meaning making operations. At the same time the reader is responsible for the sense making activity of the diagram. The logical path linking the observer-writer with the reader is featured by three questions: what do I see? What does mean what I see? What it might mean with respect to my issue?

In such a context *to see* acquires a key importance: it highlights the structural features, it describes distributions, directions, dynamics helping the observer in understanding a complex discursive space. In this researcher these possibilities are pursued differently from a pure algorithmic approach. The most important actions, as for instance that of building links among fragments, result from active actions of the observer. The observer is called to read and interpret every single information and data acquired about the controversy, producing a personal and non-linear discursive order. Through these actions, he increases his consciousness with respect to what it observes. This chance of arranging, linking and manipulating objects and discursive elements has not to be disconnected from the ethical stances. It is to be accepted the responsibility of the modeling operations and be aware of their imperfection. The overall process, in fact, identifies only what it is relevant to one observer. In this way diagrams incorporate also its point of view. This, which could mean a great limit, in the light of the Complexity, in which there is never an absolute point of view, could mean taking advantage the multiple interpretations and models, which can be built for the very same phenomenon. Every attempt to homogenize observations and, thus, interpretations would imply *violence* to the complexity in which we are immersed.

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## Author Biography

### Donato Ricci

Donato Ricci is a researcher and senior designer at DensityDesignLab ([www.densitydesign.org](http://www.densitydesign.org)), where he carries out scientific researches, design project and teaching activities in the field of visual languages for complex decision making processes. In 2005 he graduated in Communication and Industrial Design at Politecnico di Milano. In 2010 he obtained a PhD degree cum laude in Industrial Design and Multimedia Communication at Politecnico di Milano with the dissertation *Seeing what they are saying: Diagrams for social complexity and controversies*. During the doctoral research he developed Turtle, an advanced prototype of a web-based platform for the visual exploration of socio-technical controversies.

His works have been featured in several conferences and exhibition (the MediaLAB Prado – Visualizar08, the SIGGRAPH09 Conference, the VirginiaTech Educate09 Conference, the MIT Humanities + Digital Conference) and publication and showcases (Data Flow 2, Visual Complexity.com).