A.N.D.I. - A NEW DIGITAL INSTRUMENT: For Networked Creative Collaboration in Architecture and Net.art_

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Abstract. A.N.D.I. (A New Digital Instrument), an open source software project, has objective to develop a run-time environment with the focus on the applications for the networked international and cross-disciplinary production in the creative sphere of architecture, urban planning, design and net.art. It is a digital environment which opens up possibilities to generate advanced projects in a networked society. This new working tool will increase the creativity, productivity and competitiveness of the involved actors by drawing upon and developing technologies for virtual, augmented and mixed realities.

A.N.D.I. has two basic aspects. On the one hand it is a database-driven collaborative environment and on the other hand it will enable the development of future software and tools for **networked creative collaboration**.

1. Project Objective

In order to think and even practise new type of architecture, new instruments are needed. The existing software is insufficient and in most cases not even programmed for a new vision of architectural space. Secondly, the **code of architecture, its alphabet, needs to be changed!** In order to be able to change it, we will have to liberate it first and then make it accessible publicly. *Open source architecture*, the development and use of A.N.D.I., is definitely the most immanent innovative future scenario and will change the situation significantly. This working method will make possible a new generation of projects. It is an operating system based on the Internet which works interdisciplinary and internationally during each architectural or art project to solve complex urban, sociological and architectural problems, to increase the creative dimension of projects, and to improve communication during the process of conception, designing, planning, production and realization of projects.

Again, the only way to define new architectural strategies and thus bring about decisive changes in architectural practice is to change the “architectural code”. In order to enable a discourse that is all-embracing, comprehensive and sufficiently complex, this source code needs to be open and free. Then it will be possible to win

over a large community for actively discussing relevant topics in forums and to motivate them to be highly involved in the creative processes.

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Initially, "A.N.D.I." will address a group of people and partners who are highly motivated and looking for individual ways of participating and intervening in their local and global urban situations. The main actors will be architects, urban planners, net artists, sociologists, media theorists, technology partners and developers, economy experts, production firms, service companies, and last but not least—clients.

The ultimate objective and our vision will be to bring all those users together and create the virtual working space for the projects in their first creative conceptual phase.

The first steps in this direction are as follows: improved communication between the user and the developer, as well as the generation of complex systems of parametrical procedural decisions.

The changes of architectural production are linked to changes in thinking about architecture and architectural practice. A work will no longer be an expression of a single individual; it is an expression of the collective. More—it is an expression of a platform—one of a network of influences which are continuously being reorganized by all the participants involved.

2. Theoretical background

The focus is on visualization of the **hyper surface matrix**, which defines new paradigms for architecture, video art, electronic music, and networked collaboration. The meaning lies in this state of flux, in the topological flow of data based on action design.

"Action Design®" is inspired by the Action Painting—a style of abstract painting that uses techniques such as the dribbling or splashing of paint to achieve a spontaneous effect. In Action Painting the canvas is the arena in which the artist acts. The action of painting becomes a moment in the biography of the artist-- the canvas becomes the record of the event.

The arena for the ***networked action design*** is the Hypersurface. A collaborative input over network is described by the design diagram and is manipulated just-in-time (live/synchronic). The input can be: images/stills, video clips (footage), audio sequences, MIDI signals which are synthesized together.

2.1. DIFFUSE DENSITY THEORY

The traditional coordinate system has X-, Y- and Z-axis. The diffuse coordinate system is based on the single node, which represents the centre of the specific "node cloud". Apart from the Euclidian space that is 3-dimensionsional, this INFOSPACE is endlessly n-dimensional and therefore non-dimensional. It is not defined by the coordinates but by the density of the information.

The node is the smallest part of the **Networked Sequencer**, and it can be seen as one neuron—a basic element of the neural network. Its properties also include the functions for the relationships of the information. Every node is actually at the centre of the system all the time and its axis are building endless spatial construct.

The diffuse density system is based on the single node, as the centre of it, **information vector** and the **relative distance**. Since the vector can have any possible angle absolute to the certain reference coordinates and therefore we can assume endless numbers of directions, we can speak of *diffuse information source*. The relative distance is connected to the fuzzy logic of the information relationships: between clear and blurry condition.

The **node cloud** is the high density information condition for more nodes around one node. The node clouds are not stable and they are changing all the time, as the representation of the actual Point-of-View, since the dependencies of the node's relationships are permanently changing with the project's progress. For every creative process, the directions will be separately defined.

2.2. SYSTEM HEIRARCHY

The matrix of the hypersurface can be also seen as an *endless plateau*, with the primary function of representation of knowledge links. This is a network of the **connected events**. One event is a certain condition of the connected nodes and the state of their relationship. Selected events and its content (data) are defining INFOSPACE and its result can be transferred through the specific interface from AWSP (Active Work Server Pages) to the Project Development (Virtual Office) part.

The organization of the design framework, as a support for the **"active design®"**, is based on hierarchy of 3 categories (top to bottom):

2.2.1. Event

Events are the temporary system conditions, which are happening through the modifications done by the user through its various synthesized processes. The relationships of the nodes and their interaction define an event. The conditions of the events are based on the various outputs from the sequence synthesizer. These outputs are event results. An event is the result of the creative process through one collaborative session. The event conditions are the highest organizational level.

2.2.2. Synthesizer

The synthesizer is a processor for the sequences. Sequences brought together and filtered are defining one synthesizer's input. They are application modules created or customized by the user, and can be defined by the system's supplied visual tools for modelling synthesizer behaviour. One sequence is a group of nodes, no matter if those are connected in any form (e.g. node cloud). The node grouping is necessary before the nodes can be used by the synthesizer (filter for grouping and handling nodes). Events are the output of the synthesizer.

2.2.3. Node

Node is a system's atom and represents one file (MIME) type with connection to the actual physical files. Original node is created by the user. Under certain event conditions it is possible that the system generates the new node connections and relationships.

So let us imagine an endless table (represented in the system with **Linger Plateau**), as example active work world with user avatars, where we have all the information and links to data needed for the work—mixed media. We call this space INFOSPACE. The next step would be to see this environment as an on-line platform in the collaborative network—"live work", accessible from any place on the world where the Internet connection is existing.

2.3. INTELLIGENCE OF NETWORKED CREATIVE COLLABORATION

Network of relationship configures itself through learning by the user's actions of one collaborative group and self-organizing maps where the system recognizes the possible connections to any input existing in the system. Actions are depended on his interests in specific directions.

The semantic content of the node is not as important as the relative behaviour to the other nodes.

System provides the relationships from one point of view, provides proposal of possible relationships made by other users of the creative group, information of all similar working groups and their relationships in the system. With every input impulse the system learns.

By bringing the new node to the existing direction or to a new direction, the meaning and its impact will be calculated. These introduce the new alphabet of visual descriptive language. This is based on two parameters: *system sensitivity* and *system deepness*.

3. AWSP Prototype

Active Work Server Pages is the modular system of applications and tools

supporting the creative collaborative work through the network.

With those tools the following should be possible:

- Finding the ideas for the projects not yet defined, but supported in a creation and initialization phase (e.g. research, various experiments, and tryouts). The users can add and propose the project ideas or even develop own applications.
- Projects which are in a basic creative pre-design phase (e.g. architectural studies, competitions, etc.). The system should be supportive of the various type of users with the various level of user's skills (even if we consider only the advanced ones), which means that the tools are more generic to use or to program.
- Design laboratory with mostly experimental architecture and net.art projects. The users can write own externals (additional modules), which are basically not meant to be an integral part of the system.

This part of the system is the endless matrix we mentioned earlier. As soon as an idea or pre-design reach its mature phase, which has to be decided by the team and the project leader, it becomes ready for the project development phase and included into INFOSPACE of A.N.D.I (Virtual Office).

The most parts of the applications should be run server-side so that 2 goals can be achieved:

1. The client is relieved and it can be run on not as performable computers (e.g. laptop or even some other mobile device).
2. Common system is used, which means a minimum on software is needed—in most cases only Internet browser. With other words the user can work from stations where he has limited rights for installing the software (Internet cafes, etc.).

In some cases, for example very complex and demanding applications, some additional software has to be downloaded first for the usage. This also considers the necessary plug-ins especially for 3D and 2D graphic applications.

3.1. INTERNAL VISUALIZATION OF THE COLLABORATIVE WORK

In the creative multiple authorships it is important to track every significant input of each collaborator and as well to keep a clear project's overview of every design step.

In this part the work process and its state will be visualized. Every participant has the possibility of seeing his particular inputs in the context of the whole process.

3.2. DESIGN VISUALIZATION TOOLS

Representational models of the data produced by a creative process, which means an interface for the synchronous collaboration in a networked environment.

It is a section for the creative descriptive development of the ideas and design.

3.2.1. User interface

The graphical output is a 2D map of nodes in which each node or node cloud occupies a space proportional to their component's frequency. The more frequent patterns occupy a greater area at the expense of the less relevant ones. Interactive visualization provides an overview of the context and "links" between the relevant documents. It also gives access to the individual documents which are displayed in separate windows.

An example of start of a test project and its elements could be: concept text, research images, site photographs, PDF documents with site drawings, digital sketches, diagrams, ideas and notes, requirements text, budget sheet, renderings, content management html site, etc. The top level map shows the node which is **CURRENT NODE**, with other relevant nodes connected to it and spread in a way to show the value of the relationship. So with time system **LEARNS** which relationships are important and which not for a single user and for the whole team as well. After making the other node current, the system **RECONFIGURES** itself, based on the relationships to the new actual node.

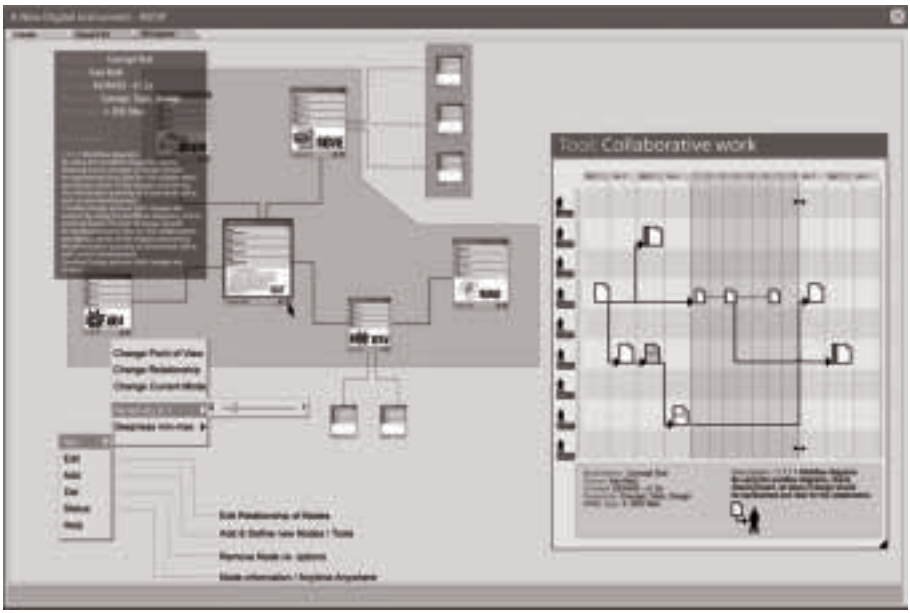

Figure 1. AWSP user interface and navigation.

Acknowledgements

The development of A.N.D.I. until now involved many interdisciplinary actors like architects, programmes, project managers, literates, media theorists and researchers in the last 4 years:
Project principals: Ivan Redi / end-to-end architect and project leader. Andrea Redi / project management and project architect.
Core people: Nebojsa Dinic / lead programmer VirtualOffice and database. Aleksandar Stojiljkovic / system architecture and lead programmer AWSP. Vincent Cellier / GUI and additional programming. Milos Stamenovic / programming AWSP . Dragan Jovanovic / programming VirtualOffice.
Collaborators: Martin Frühwirth / graphic pre-design, Kira Kirsch / assistance, Maia Engeli, Kerstin Hoeger / research on requirements.
Consulting: Ference Schröttner / project management. Martin Krusche / collaboration working environment
Financial Support: Republic of Austria, KUNST.Bundeskanzleramt & Kulturkontakt, Land Steiermark Abteilung Kunst und Wissenschaft & Forschung, Stadt Graz Kulturamt.

References

Project website: http://www.ortlos.at

Web link to AWSP: http://www.ortlos.at/AWSP - to use this Java applet, it is necessary to install newest JDK or at least JRE 1.4.2 or later. If you want to use OpenGL, as in Linger Plateau, then JOGL is needed.

Link to VirtualOffice: http://www.ortlos.at/VirtualOffice