Human Machine Interaction in Design Processes.

A New Search Software to Generate the Simulation of the Increasing Complexity of an Idea about Architecture, Environment and Industrial Design.

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In the proceedings of “Computer Science, Communications and Society“.

NEUCHATEL, 22-24 SEPT. 1993

The designing idea is the natural/artificial dynamic system that everyone try to forge upon the reality, by drawing a model of a possible desirable event, representing own thoughts and wishes. The designing evolution is the sequence of logical procedures to increase performances and complexity, and to open this subjective system to intersubjective and social requests.

Our research is a reflection about some traces of a possible path. It's a reasoning following our own imaginary, forming some possible virtual worlds that evolve with the randomness and the unpredictability of the subjective thought.

But with a particularity. These considerations are not, never, only theoretical reflections. Every hypothesis, every possible path that we propose, every logical approach to design, to the environment, to the architecture has operatively experimented and simulated in its dynamic evolution with one of our original software.

We have performed this approach using the Information Technology, in front of the need to operate a direct entrance, without preclusion, to the complexity of the real environment, to the dynamic of the unpredictables alchemy of environment evolution, to the randomness of possible events, to the chaos, to the creativity identified as the time clock of the evolution.

We need to premise that we cannot use the Information Technologies, neither Artificial Intelligence, to simulate the moment of abduction from reality. The creation of a dynamical model representing our idea follows a subjective evaluation and systematisation of possible differences and hierarchies that we read into the reality. Identifying own wishes is a peculiar human work.

After this abduction, we can represent this dynamical model with a software able to simulate the system and its possible evolutions. Furthermore, we can increase the complexity of this represented idea using human-machine progressive interactions.

This approach to the design, and its result, the "Design of Morphogenesis", is an open conceptual system. A system that uses the secondary oral communication of the electronic devices through software procedures that refer to the structure of the ancient primary oral tradition: the unwritten culture of the world of fables.

With Information Procedures, the subjective suggestion, the human complex and often casual world, and the rational logic can live together. Furthermore, it is possible to put the subjective unpredictability, translated with algorithms, inside the operative and rational approach to design.

The software we have designed is, in fact, a "design of species", and we can use it as an artificial DNA to generate a multiplicity of possible artificial events.

It is based on a presumed homology between natural and artificial spheres, and they're belonging to the world of chaotic systems. o=/9 Following the possible consonances between natural and artificial evolution systems, we can think that, like the DNA in nature, we can assign to the "Design of Morphogenesis" the power to control and increase the evolution procedures, defining the complexity of possible meanings/functions, the stratification of multiple orders, the mode of contamination between orders and between different disciplinary fields, and, shortly, the recognisability of every events the system can generate, apart from the subjective identity of everyone.

The human/machine interaction can manipulate the development of this project operating upon the parameters of the evolution code and not only changing the final arrangement.

Two are the most important topics in designing this tool: The complexity and the relationship between species and individual.

To manage the complexity we referred to the concept that the complexity is not generable ex-novo, but only using a process to stratify sense into a flowing simulation of a temporally irreversible path. We can activate and control this stratification if we design a system with a self-organizing paradigm that can keep sense, (practise) during the simulated time flowing.

To built this paradigm we referred to the chaotic dynamic systems that are suitable to be controlled by algorithms, also, if they produce never the same event.

We have used a fractal but non-deterministic logical frame. In other terms, every decision cycle has inside, nidified, a lot of other cycles, and so on. The structure of these cycles is, as in fractal objects, ever the same. The differences and the unpredictability springs from the resonance with the other cycles, from the time of activation and from the ever different flow of information.

Each cycle represents a whole structure in simulating the decision choices. It operates the transformation of the answers into possible shapes. This device is designed by:

1. The use of a paradigm to control the self-organization procedures. This tool represents and controls the gained complexity but, in the meantime, represent the adaptivity to the incoming developments. it is the device that allows us to reply to an answer putting one of the possible formal matrixes into the paradigm.

2. The identification and sharing of the random margins between answers and shaping reply. The system uses and represents these margins as "operable fields" for the designing choices to improve the project evolution.

3. The set of possible formal matrixes, that are abstract shapes but usable in giving body to a set of possible performances. These formal matrixes are not a database. They are extemporary generated by the bound-up cycles, by a set of simultaneous devices operating into a series of different fields, like geometry, dimension, materials, technology, complexity, and so on.

At the end of every cycle (and of the related and multiple progressive nidifications) the result is:

1. An increasing complexity, and the related passage into a more evolved representation of needs.

2. The production of new needs, for the reason that every event we design was born also in front of a subjective and random approach. The shape we have used was not necessary before but it began necessary after the choice, as a part of the project, it generates further requests. This happens also if we, later, remove it because we consider this event as an obsolete one. The o=/9 event is into the project history, the needs generated by this event have been just satisfied, and we can appreciate its contribution as time patina.

A time patina that measures the gained complexity, the growth of the specific identity of the project, shaped by the past research occasions used as training events.

We have experimented these tools in many fields: the characterisation of environmental shape in the medieval towns, and its relationship with the contamination between natural and artificial events, the role of materials and technologies in a historical town, a research about the possible new evolution of modern environments, the evaluation of possible new identity of the suburbs, the development of the natural/artificial environments like the valleys of Alps, the contamination between nature and architecture in the towns in front of the sea.

More, in the field of architecture, the experimentations on materials, like the new possibility is given by the steel components production, on technology innovations and on component approach in building industrialisation. And, in the field of industrial design, the possibility to design an object defining its morphogenetic code with a software that can be used, in the production process, as a reprogramming device for robots. So we can produce, with the same project, a sequence of ever different object characterised by the belonging to the same species. As in nature.

All the experimentation opportunities have remained in every project/software as a progressive stratification of complexity. We updated our projects not changing one algorithm with a more peculiar one, but redefining the possible field of the past ones and inserting the new one as a new possible point of view that can live together.

Like all scientific experimentations, we used the progressive falsifications and not the linear deterministic paths. We have improved our research with progressive attempts in a variation of the parameters and in using new morphogenetic algorithms in catalyzing the global process. Every effort has been never entirely negative or affirmative. And so we can stratify it, according to the reduction of its possibility to trust the evolution.

This human-machine interaction procedure has improved the experimental tools with the representation of the multiplicity of possible paths to gain the complexity, with a set of interconnected frames of possible and unexpected orders. The parallel refining of the mathematical models of the evolution paradigms has gone together with the progressive flowing from subjective to the inter-subjective sphere.

But, furthermore, this experimentation refines our reflections on the extraordinary path of the designing ideas, on the possible explicitness of the idea in artificial events, on the possibility, for every designer, to tell, perhaps, ever the same fable, but ever different and more rich, improved and shaped by the unpredictability of ever new hearers.

So we can discover again, using IT, the pleasure of scientific pre-modern approach. That is a scientific approach to complexity not based on axiomatic proposals but that appreciates the observation and evaluation of the multiple and often wondering faces of reality.

We have experimented how the time of design draws the feature of infinite and possible parallel histories. But we have found, also, with the human-machine progressive interaction, an operative instrument to overrun the ever different, crafty and o=/9 fascinating path of the discovery of the possible.

Is this Artificial Intelligence? The type of the approach is experimental. And the work we have done is inside the disciplinary field of the design of natural/artificial systems, the design of the interface between man and environment, and it's not referred to the disciplinary field of philosophy of AI.

This research can touch the Artificial Intelligence if we consider this work as a simulation that enlarges the human creativity. This simulation software is a representation of the possible dynamic evolution of an idea, but they cannot generate an idea. Its contribution to the design is a suggestion to knowledge. These simulations un-shut the world of the multiple, light and imperceptible resonances, capable of unexpected reverberations, of overcoming contaminations: the world of the increasing subjective creativity.

The secret complicity between the metaphysical priority of unity over the plurality and the contextual priority of plurality over the unity breaks surface again. It is the post-metaphysical thesis of Habermas: "we can read the unity of reason only through the plurality of its voices".

The design of morphogenesis that defines the DNA of the artificial world is a transcendent approach to real/virtual scenarios through the rational construction of a subjective imaginary universe identified as a "designing idea".