Title

a building kit for the development of potential information in digital media - translating irritation into information

Abstract

In my thesis i will introduce the concept of a model as theoretical building kit, a concept which i will then demonstrate concretely through my practical project. The concept of model-as-theoretical-building-kit is based upon the integration and interconnection of elements from diverse scientific fields. I name such integrated and interconnected elements analogies. Analogies are the basis of the model to create content. My concept of analogies stems from the postulation of a principle of similarities between those sciences. This model is thus based on the principle of finding and modifying corresponding statements, realizations and principles in different sciences to bring them into a new context. By interconnecting the analogies a construction developes that yields a new understanding of the context in which they stand.

The second principle of my model is modularity. Modularity is defined as the integration of several independent parts into a single integrated whole wherein the parts in turn consist of smaller parts, which are then formed by even smaller parts, and so on. A modular construction does not generate simply from the sum of such parts, but rather from a structured network into which the parts are placed. From this network of modules the specific individual characteristics of such a construction arise. In the application of modularity a higher complexity can develop from many simple components, a special quality-of-being greater then the sum of the single parts. This quality is a characteristic of complex systems and is called emergence.

My model is a modular construction integrating analogies as modules with the aim to find solutions for the following problems: How does information in digital media develop? How can sufficient potential for generating information be ensured for the future so there will be further development of knowledge? With this central question my model is to concern itself, whereby i will concentrate on the concrete field of the interface between man and computer.

To begin, the term information needs to be defined for the purposes of this paper. My usage of the term references the following approaches: (1) niklas luhmann's use of the term in his system theory; (2) the definition of villem flusser, who proceeds from a degree of the possible information ranging on a scale between the two opposites redundancy and information; (3) the mathematical media theory in which information is quantified, whereby it is equated to a freedom of selection and measured by its probability. In the world outside our consciousness, information only exists as virtual (after luhmann) or potential information which registers (after flusser) each as a degree on the scale between redundancy and information. This potential information determines (after the mathematical media theory) the extent of freedom of selection that one has when choosing one message out of others. But instead of the term message i will use the term irritation (after luhmann) in this context. Information can only be generated if the recipient gives this irritation the meaning of information. Therefore information can only arise inside the consciousness of the recipient and hence generates only from communicative interactions. Moreover, an irritation must always be surprising, unpredictable and therefore new to the recipient in order to be translated into information. Thus the more improbable and unordered (after the mathematical media theory) the message or assumed irritation, the greater its potential of information and the higher its degree on the redundancy - information scale (after flusser). So, i differentiate the information term between potential information as the general term for all possible information, irritation for percepted potential information and information for realization generated from irritation inside the consciousness.

The problem i perceive is a growing supremacy of stimuli with a high degree of redundancy and the shift of direct inter-human correlations to a virtual media level which is often characterized by especially high amounts of redundant stimuli. Now, how can sufficient potential for generating information be ensured under such conditions? As i will describe in detail in my thesis, i am convinced that principles of modularity, synergetic and self-organization could fulfill this requirement.

The term synergetic was formed by the physicist hermann haken and means that the correlations of the elements in a system result in a behavior modification which again results in new characteristics on the macro-level. These processes of dynamic behaviour are based on an interaction between order and chaos.

The term self-organization in the way it is applied in this context derives from neuroscience, where it is used in connection with research on the functioning of the brain. Self-organization refers to the correlation of complex systems with their environments and of the single elements with one another inside these systems on the basis of synergetic and chaos theory.

You will find a further description of these principles and their correlations in the main part of my thesis. But all three fields - modularity, synergetic and self-organization - share the tenet that through a network of correlations systems can achieve a high dynamic complexity. To apply this exact principle to the conceptualization and design of communication and information media is the aim of my model.

The elements that yield the analogies in this model derive primarily from the fields of physics, sociology, psychology and neuroscience. Whereas in the field of physics i refer to particle physics and synergetic/ chaos theory for the general regularities of functions inside the model. From sociology the system theory by niklas luhmann draws a model for system structures and correlations. In psychology c.g jungs theory of "synchronizitaet" states an apparently coincidental simultaneity between two independent states or events. Last, in neuroscience i refer to self-organization for the functionality of correlations inside the model.

Whereas the world in which we live already contains various examples of modularity, synergetic and self-organization, the computer was initially a manifestation of the human dream of linearity and causality. In recent years, however, scientists have been working to develop the computer beyond this status. Trough my model i strive towards these ends, after indicating a concrete approach for the design and development of potential interaction between man and digital medium that would provide a high degree of information through communication.

The manner in which i have generated the model forms a closed cycle of courses and correlations; its modularity, however, gives it the potential to change, exchange, delete or add modules, which in turn leaves the model open to change. Moreover, the model itself could be integrated either wholly or in part as a module within other constructions, or used as an analogy.

Parallel to the theoretical model i have also created a concrete project, an interactive installation that is my personal application of this model. To reach the goal of increasing the degree of potential information i chose to develop a modular program on the theoretical basis of the model with the references mentioned before as analogies. The installation consist of (a) the user who becomes a module of the program by <<logging>> himself in, (b) three program instances and (c) a container called informationpool. The user and the program instances form a cycle by their correlations from which the informationpool derives as an output. The input is generated from sound that is emitted from the user in form of voice or any other noise. From this input, objects inside an objectmatrix become irritated. Objects react by sending out so-called <<data packets>>. These packets are made to accelerate and collide with one another. As the result of this collision the new information is generated from the correlations and is presented to the user as an <<answer>>. Now the user himself can answer by giving a new input. Each piece of information that arises from a collision places itself into the informationpool where it stays for a certain time. Thus the pool is in a constant dynamic process and is the <<face>> of the installation generated by the interaction between user and program.

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The installation

A cycle is formed by the user and the instances of the program which generates an informationpool. The program consist of three instances plus the pool. The first instance is an object matrix, the second the acceleration and collision of data packets and the third is the product of the collision a newly generated object. The cycle workes in the following way: the user acts; his action irritates objects contained in the object matrix; certain objects react by sending out so called data packets; two of those packets then collide inside a time based collision window; the result of the collision is presented to the user in form of a new object, so now he act again. The newly generated object integrates itself into the informationpool. It is the output or result of the interaction cycle between the user and the program.

I will now describe each instance and their correlations in detail. the object matrix is formed by several objects. It constitutes a raster the intput coming from the user goes through and by which it gets modified. The objects can be described as small independent systems with different parameters. They all are highly irritable which means that they are controlled by very few control parameters*. Therefore an input can most likely elicit a reaction of the objects. All objects receive the input but not all of them react or show the same reaction. They can only <<percept>> certain inputs and that only individually which depends on their internal structure. Thus one could say that they are <<specific in their perception>>.

If now an input arrives at an object and triggers a reaction this is what happens: One or several parameters change. Once a so called critical value* is reached the system slips into a state of chaos. Now the object sends out data packets so it can <<cool down>> and return into its original state. Those data packets are the output of the matrix.

The data packets are based on the same smallest unit from which they are build. Thus one could say they are the same containers with different content which also means that the amount of contained information can vary. Additionally there are several classifications among them expressed by headlines. These headlines depend on the internal structure and contained information of each data packet. Over every type (headline) a certain regulation for their interactivity potential is placed which is necessary for the collision later on. These regulations have to be compatible so that two can combine to one . All the data packets generated from an input get accelerated.

With the acceleration we now arrive at the second instance, the collision: Only two data packets can collide. But from an input more then two can arise. Therefore two have to be selected. For this selection simultaneity gives the basis of decision. Along the accelerating track a collision window which is defined as a time window is placed. Though the data packets have the same flight direction they vary in their velocity and in the time of their formation. Because of this the data packets arrive at the collision window at different times. The selection of the two colliding packets is now determined by their time distance inside the collision window.

The data packets can be understood as an assembly of descriptions. At the collision these descriptions get reorganized not necessarily resulting in the same number of collided descriptions. It is also possible that descriptions get lost or newly generated. The framework of conditions under which the collision takes place is determined by the collision regulation which is created from the combination of the two data packet regulations. This collision regulation defines the parameters for all possible correlations and interconnections. The result of the collision is a new object as an independent system formed by several description units. This new object now stands opposite the user as a response to or result of his input. He may himself respond and start a new cycle of interaction.

At last i come to describe the informationpool. This pool is a container with dynamic structure, a simple structured memory. Every new object enters this container. The objects are the elements, the content of the pool. Depending on their type and content they take a certain place. For example can elements attract each other or push others off, they can compete, correlate or mediate. But all elements have a defined live time. Therefore the pools shrinks again once the input stops. On the other side it grows when the users activity increases. So a topicality is ensured and the feedback cycle closed. The pool is based on a defined dynamic, with certain restriction parameters, but also with a potential to chaos.