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The passage from the creator's intelligence which is intrinsic to the works of art, to artificial intelligence. A proposal for a new field of research that combines art with artificial intelligence. Case study: The Kandinsky project.

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Abstract

The pictorial representation as a human creation and product, since the beginning of its origins encompasses a complex intelligence which is transferred by the creator to every sub level of its depiction. The digital image has the facility as an independent autonomous component to record a different kind of intelligence called artificial intelligence. This constitutes a dimension dynamically determined by time and the direct automatic process of new information stressed upon the image.

The combination of these two different procedures of intelligence contributes to a novel field of research and training which offers the prerequisites for the discovery of new data initiated from the region of the unimaginable. The Kandinsky project was created as part of the effort to explore the potential of this field. It is based upon the rules set by the painter Kandinsky as described in his book "Point, line, plane" and their application on a robot in order for it to create artworks.

The construction and programming of the robot was performed by the students of the Multimedia-Hypermedia laboratory of the Athens School of Fine Arts (ASFA) in collaboration with students from the Laboratory of Automatic Control (sector of Mechanical Constructions and Automatic Control, School of Mechanical Engineering, National Technical University of Athens (NTUA) and was used the Lego Mindstorm platform.

Keywords

Art, robotics, inspiration, education, Kandinsky project, lego mindstorms, creativity

1. Introduction
The relation between image, intelligence and technologies of pictorial representation

Since the very early years of pictorial representation, man has been able to express very complex ideas upon a two dimensional surface. Gradually, there has been developed a dense and multi-layered imagery that not only conveys visual information but also reveals the structure of this process, from which originate the three major attributes I will analyze in this paper: perception, intelligence and art. Thus, the birth of pictorial representation leads to the birth of written language.

Creativity itself stems from the conjunction of different mechanisms such as memory, visual, textual and spatial perception and attains to a result of a visual system of three dimensions which is finally transferred into two dimensions (Cartesian).

Leroi-Gourhan [1] describes this as "a procedure where the analytical human thought extracts symbols and signs from the surrounding reality and reconstructs them into a parallel reality which comprises the world of language through which the capture of reality is ensured.

During the Paleolithic period, that process of the analytical human thought, which was previously expressed in the phonetic and mimic languages of first humanoids, enables man to handle pictorial representation and therefore to express notions beyond the material world.

In the operational field, through the same sources, two languages are being formed: The first is that of the *audition* which is connected with the evolution of the brain areas that coordinate sounds. The second is that of the *sight*, which is connected with the brain areas that coordinate human gestures, translated into symbols and implemented in a graphic way."

Leroi-Gourhan makes also an interesting remark about the effects of the human attributes upon pictorial representation: "It is obvious that graphic symbolism, in comparison to phonetic language, benefits from a certain independence: its content expresses in three dimensions of space what phonetic language expresses in the one and only dimension of time."

Although Leroi-Gourhan's view concerns mainly with the ideograms, however, it is valid to any other patterns of shapes and forms of pictorial representation that man creates.

To express it in a different way, the creation of an image, regardless of how it has been performed and for what purpose, constitutes a procedure which is much more related to the intellect.

Descartes, is the one who opens the way towards the transfer of complex concepts to their visual representation. Even though he had intensively worked with the optics[1], he is finally the one who established the grounds upon which digital representation will later develop, due to the conceptual way of representing reality as in contrast to the visual. The application of algebraic concepts to three dimensions which he introduces, prepared the way for a pictorial representation that emerges as part of a complex process of thinking within space.

When this representation is realized automatically with the help of the computer, in its Cartesian screen, in fact what is achieved (almost 5 centuries after Descartes' theory) is the direct conjunction of numeral-textual with visual perception. In this manner, a truly new method is being developed, that of creation of visual representations with numeral-textual tools, which will later produce the digital image.

During that time, in 1525, Durer, with his book *Instruction on the manner of measurement,* will engage with almost the same concepts from the side of the painter–researcher, who depicts what he perceives, and designs mechanisms that help man transferring this perception onto paper, strongly reminding of a Cartesian table. [Fig. 1]

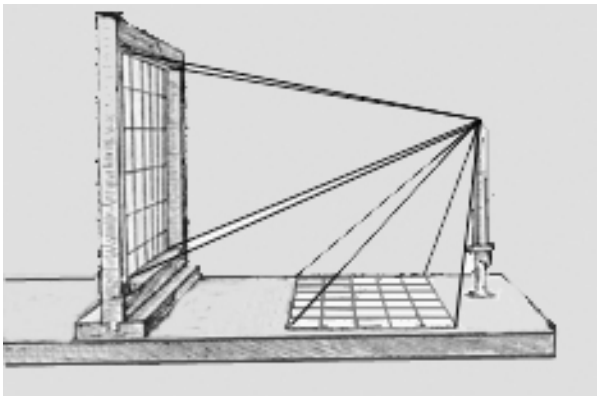


Fig.1 Study from Durer's design tool 1525 Kupferstichkabinett Staatliche. Mussen Preussischer Kulturbesitz, Berlin

[1] He discovers the law of diffraction (1631 -2), also he writes the book *le Monde ou le Traité de la lumière* (1633) in this subject). His basic book Le *Discours de la méthode* was essentially the preface of three books which were related with the optics: *la Dioptrique* , *les Météores*, and *la Géométrie* which examined the issue of "heliocentric", which is why he didn't publish them (he was afraid of having the same luck with Galileo)

When painters depict a scene, they do not simply convey a visual representation of it, but at least two conceptual systems, which not only relate to its construction (rules of visual composition and signal transfer), but also to the notions they want to communicate (historical, cultural, metaphysical) or even the feelings they want to evoke to those who will see the painting. Therefore, the painting acts as a visual interface between the creator and the receiver.

Notwithstanding, one could observes, that there always three elements reoccurring in the procedure of creating an image:

a) The technique with which the image is depicted in the medium, which at the very beginning of crafting refers to the tools man uses by hand and through the passage of time it evolves to a technological system of recording.

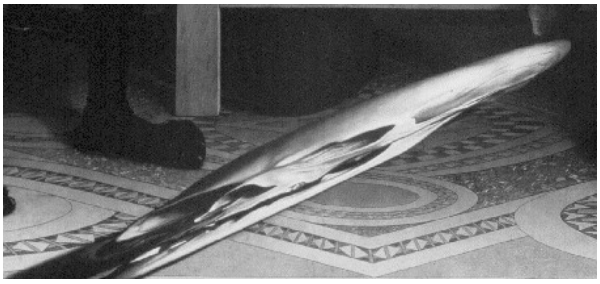
b) The rules of representation the creator is using, depending on the age of time this is produced, and

c) The information the creator wants to communicate, to "in-scribe" in the artwork.

All three elements are related to and derive from the intelligence of the creator, which consequently is transferred into the artwork.

This intelligence can be observed in high levels of creative activity, like in the *shape forming* (geometric rules like the golden section, algorithmic relations of sizes, illusions, scientific information etc), in the use of s*ymbolisms* (the use of lightning in Rembrandt, objects and the reformed skull [Fig. 2] in the artwork «the Ambassadors of Hans Holbein) [2] and certainly in the *conveyance of complex concepts* and theories like in the applications of the law of relativity in cubism starting with the painting of Picasso «Les Demoiselles d'Avignon», influenced by the theories of Jules- Henri Poincaré when at the same time these ideas affect Einstein in recording arithmetically and textually the same relation [3] .

Hence, the pictorial representation has always been closely related with a significantly developed intelligence. What changes, is the way it is transferred from the creator to the creation, which is subject to the provided technologies.



Fi.g 2 Detail from the artwork "the Ambassadors" of Hans Holbein)

2. The Digital Culture and the procedures of the reformation of intelligence to the new tools

The Digital Culture resets data. Mainly, it places intelligence to a different area, involving the creator, the artwork, and the technology used for its production.

Artist {intelligence} = visual artwork
|
technique / representation technology

Artist = {intelligence} visual artwork
|
programming / representation technology

As A. Molles mentions, [4] the artist, with the help of modern technology, is not a creator of artworks, but the creator of ideas concerning the artworks, like and even more the computer scientist is.

This occurs because the nature of the digital image acquires additional attributes.

A digital image relates to a file that has a recorded "memory" which allows it to encompass simultaneously the final shapes, the expressed thought of the creator, and the technology of its creation. Indeed, these parts of information are separately kept, and when required, they can be grouped and exported, a procedure well known as of "rendering".

It is also possible to incorporate other features which are directly related with the real world, allowing the image to act within a space which complies with the natural rules.

In regards to it Manovich [5] mentions: "The computer based image consists of two levels, a surface appearance and the underlying code (which may be the

pixel values, a mathematical function, or a HTML code) … an image acquires the new role of interface (for instance, image maps on the web or the image of a desktop as a whole in GUI) Thus image becomes image – interface. In these roles it functions as a portal into another world….

Along with functioning as image – interfaces, computer images also functions as image – instruments. If an image – interfaces controls a computer, an image – instruments allows the user to remotely affect physical reality in real time…. A computer image is frequently hyperlinked to other images, text, and other media elements…"

The image and its evolution in all forms (artistic, scientific, religious, propagandistic) throughout history, regardless the use of technology, has been developing predominantly evolved mechanisms concerning intelligence.

3. From the intelligence to the artificial intelligence

The attempt to develop artificial intelligence, with the form it is presented today,[2] has a small history, dating back half a century.

One of the most fundamental ideas that led to this direction was articulated by Turing, principal scientist of the modern computer science and the artificial intelligence.

The article of Turing[3] written in 1936 about the problem of decision, resets the action of calculation (calcul) recognizing its double meaning, that of enumeration, and that of decision, which in other words allows the control of the calculation.

Research results on artificial intelligence could have been more impressive if experimentations and work on this field would have had included areas in which intelligence and its process manifests itself often without the use of technology.

Such an area is the production of the visual artwork. Generally speaking, it must be said that there isn't great communication between the fields in which the artificial intelligence is evolving and other fields of intelligence manifestations and processing such as art, and philosophy for example, even though it has being utilized as a tool. Yet, it seems that there is a big difference between the use or modification of an application of artificial intelligence and the research and processing of it that that exploits another aspects of intelligence. That difference raises up questions and issues for discussion.

Admittedly, only in the recent five years there are serious attempts to develop intermediate spaces, regarding *computers and philosophy* or *artificial intelligence and visual arts*. [7]

4. Current conditions

In the dawn of the 21st century, the technological evolution regarding the image generation provide the necessary conditions for such a development in a large scale, articulating the needs of both artists and scientists, assisting the evolution of thought in areas which appeal not only to the creators of technology but to every human intellectual production

In addition, during the recent years and through the relation between culture and computers, one becomes aware of the precedence of text over image, looking at regions such as the semantic web, ontologies agents etc. [9] In regards to image, we come across with interesting applications like the 'pattern recognition' and others which however, do not develop evolution procedures beyond the perfection of the existing system or of one of its applications. None the less, the development of the specific field is feasible and certainly very interesting. Artificial entities are of

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[2] One could assume that in all kinds of technology even the simplest mechanisms include a kind of intelligence: the intelligence of the creator of these mechanisms. Also, there is a great effort put by man in order to develop mechanisms of memory processing, which dates back to Ancient Greece, to the work of Simonides of Ceos and continues in the Medieval and Renaissance years with the mechanisms of memory. Indeed, Lulle and Bruno had constructed a system of moving circular devices for different letter combinations. Eventually, those attempts stop with the development of the printed books and the organized libraries. [6]

[3] «The etymology of the word calcul originates from the Latin word calculus. It characterizes a small conch which was used for polling in assemblies or trials or for counting by enumerating monads.
The relation between the calculation and the computer seems to us that it is a relation between calculating and voting which means deciding something that is less obvious. Besides, the meaning that originates from Latin «mark with a white stone» which records a pleasant event, proves yet that: in a vote during a trial in Rome, the white conch meant exonerate and black convict. The double essence of the concept of the word «calculus», is found again within the concept of calculation processed by Turing. [8]
The one which allows taking decisions is also the one used for the enumeration (computable number).

particular interest as well, since they visualize genetic algorithms which are lately used widely by the Arts[4].

5. The possibilities of creative cooperation between intelligence and artificial intelligence in education and research

A potential field of evolution for artificial intelligence could be that which concerns the transition of the intelligence of a visual artist to its creation, in other words, a common space of concepts formation related with the procedure of the image creation.

Hence, the procedure of artistic creation could be included in the artificial intelligence research.

The proposed solution can be uttered as follows: the progress of artificial intelligence research, should consider the notion of inspiration in conjunction with the intention to transfer absolutely specific concepts to an artwork that eventually modify it. In this way, we could define the procedure of developing an artwork by exploiting state-of-the-art technology and science.

It is worth noticing that often, important technological discoveries remain unexploited because they are not combined with intellectual processes as opposed to mechanistic applications.

Indicative of this trend to separate the intellectual from the technical, or the experimentation from the application is the remark of Leroi-Gourhan [10] who comparing the mechanic loom of Jacquard (1752-1834) with the system for organizing the library mentions: «The punched cards used for organizing the library, represent a complementary stage comparable with that of the first automatic machines… We meet the same principle that is valid in the loom of Jacquard.

It is surprising that it took more than one century for the documentation materials to meet the stage that textile art had overcome in the 19th century …»

Accordingly, we must not ignore the fact that the wide spread of computers took place when software programs were developed, like Lotus and Spreadsheet, which were easily usable and programmable by every user.

[4] In Art we see particularly interesting cases which concern the image and the artificial intelligence, like the artificial entities, Exploitation of Chatbot etc [11],[12]

6. The role of the Artist as a creator of worlds and the concept of the "new"

The artist has always been a creator of the new. Francastel [13] claims that in the visual representation he demonstrates, he incorporates the newly discovered scientific ideas of his time.

He, like scientists do as well, aim at discovering something that does not exist.

In other words, the artist compresses into the artwork complex notions developed in his/her times, which are transferred to the public through a communication protocol.

7. The separation of the areas of intelligence processing and the problems of communication

The growth and the cultivation of intermediate spaces that haven't been developed in the past are now even more feasible. In some cases, these intermediate spaces provide considerable solutions as they make possible the shift from a difficult problem to a different level in which the solution is possibly more obvious or easier.

Such a request found ground in Turing's position who solved the problem of the computer development by interpreting differently (in another level) the needs of its operation.

8. Description of a model for image processing and artificial intelligence

As shown so far, Art, since the origins of human existence, has always been the place which allows the cultivation and the combination between intelligence and the image.

Latest technological, scientific, and artistic evolutions confirm the new opportunities given for common action between the Art and artificial intelligence (the 3IA' 2007 International Conference is a great example!).

Driven by the above assumption we propose a model of collaboration between Art and artificial intelligence which possibly distinguishes a new scientific field concerning the Digital Arts and computer science. The difference of this proposal from other synergies between heterogeneous intellectual fields is that its target is defined by the presumption that both fields will be evolved in equal terms.

9. The Kadinsky Project: an experiment towards this direction.

The Multimedia-Hypermedia Laboratory of the Athens School of Fine Arts (ASFA) has experimentally investigated the above direction, through the *Kandinsky project*. The approach which was adopted was that of artificial creation through theoretical, artistic, and scientific (computer science and robotics) aspects. The experiment was realized in the academic years 2003-2004 and 2004-2005.

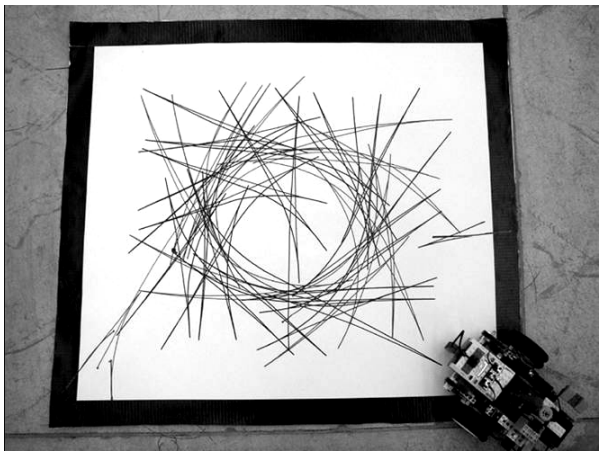

Fig.3 The first drawings realized by the robot

9.1. Description of the project

That project aimed at the construction of a robotic system which could draw according to the rules of Kandinsky, in their simpler form of course, as they are described in his book «Point, line, plane [5]».
The Lego© platform for gaming and training children in robotics was used.
For the realization of the project, collaboration was established with the Laboratory of Automatic Control (sector of Mechanical Constructions and Automatic Control, School of Mechanical Engineering, National Technical University of Athens (NTUA)), supervised by the Associate Professor E. Papadopoulos.

The stages of the project were:

1a. Introduction to programming and 1b. Introduction to robotics.
2. Introduction to the theory of Kandinsky about the point, the line and the plane.
3. Design and construction of the robotic system, (optimization).
4 Transfer of rules to mechanical behavior. Programming.
5.Experimentation (trans-university team)

9.2 The concept

The whole work of Kandinsky touches the two extremes which characterize the creation of an artwork. On the one hand, he explores the «spiritual» in Art and on the other hand he constructs «applied rules» for the development of a method towards the creation and analysis of artworks.
Kandinsky's intention, having realized that Art is moving into a vast adventure with an unknown future, was to create a complete system of Art rules, capable of defining a science, something which he believed was necessary in order to control its evolution.

The ultimate goal of that science was to be the «absolute composition», which goes beyond the boundaries of Art , allowing the artist to control his creation by using the means offered by applied science.

The research on Kandinsky starts out from the elements that are essential for the existence of painting: the point and the line.

The method proposed by the artist is first to study these two elements as abstract concepts without a material underlayer, and then in relation to a material surface, i.e. a plane.

Therefore, Kandinsky is trying to study the relation between the human and the image by reversing the succession, as analyzed previously by Leroi-Gourhan. (that is from the recording to the concept).

Kandinsky is trying to condense the thinking process in painting to basic rules so that according to his view the quality of the painting becomes measurable.
At the same time, his own attitude is making an excess (this originates from his double capacity: on the one hand before becoming an artist he was a brilliant law scientist, on the other hand he is a supporter, with intense activity, of a theosophical school).

The system that he proposes had strongly the component of extemporization (random), the treatment of a simple condition which originates from random situations created by the immediately previous situation.

This relation is easily translated to the robot language, for example the reaction to a color for the

[5] The book «Point, line, plane », organic continuity of «Spiritual in Art» was published in 1926 by the publishing book Albert Langen in Munich. It was the 9th book of Bauhaus Bucher's collection published by Walter Gropious and Laszlo Moholy – Nagy.

drawing of a corresponding line, based on the rules and the random. This simple reaction of the computer, together with random values and/or suitable algorithms, which are continuously multiplying (if it continues to paint), is an approach to this concept.

Kandinsky acts between scientific rationalism and the extreme metaphysical (a non-identifiable space). He touches the area of speculating how much the machine should acquire further actions than it can calculate.

From the scientific point of view, the particular experiment constitutes one of the aims of artificial intelligence, which is the creation of a mechanism capable of moving over a plane and of graving points or lines neither in an absolutely controllable, nor in a predictable way, but rather based on a series of rules (aesthetic in our case).

It is important to stress that at the time Kandinsky writes his book, neither the digital image, nor the computer exists. On the contrary, there are intense considerations about the development of the computer.

9.3 Data from the experiment

The students, first of all, created a table with the rules from Kandinsky system and then they described the commands for the movements of the robot (examples 1 and 2). Many of them didn't know how to program.

Example 1

CHARACTERIZATION	COLOR	SHAPE	LINE
warm	yellow, red, orange	triangle square	straight vertical acute angle right angle
cool	blue, green, violet	circle	horizontal obtuse angle curve
bright	white		vertical
dark	black		horizontal
Lyric-(harmonic)			diagonal βγ
dramatic(discordant)			diagonal αδ

Example 2
Straight line:
Movement towards a specific direction and with particular speed, take down of the lever until the tool of writing touches the plane of writing, movement with certain and same speed in both wheels (so that a certain length of a straight line is created), stop at the end of the movement time, take up of the lever.
Curved line normal- circle:
Movement towards a certain direction and with a certain speed, take down of the lever until it touches the tool of writing in the plane of writing, movement with certain but different speed in both wheels and at certain time depending on the curvature and the length of the curved line, stop at the end of the curve, take up of the lever.
Curved line non-normal:
Movement towards a certain direction and with certain speed, take down of the lever until the tool of writing touches the plane of writing, movement with speed change in both wheels and at certain time, depending on the curvature and the length of the curved line, stop at the end of the curve, take up of the lever.

Fig. 4 RCX (Robotic Control X) of LEGO©

9.4 Description of the technology

Lego© Mindstorms© or RCX (Robotic Control X) technology was exploited. [14]
RCX is a microcomputer that [Image 4] can accept sensors and engines and through the use of common ad hoc structural components of Lego© can lead to the construction of simple or complex robots.
It is a technology that targets at the creative occupation of children, over 12 years old.
Many universities exploit this technology for research. For this reason, more evolved languages have been developed.
This platform was also used in Greece, among others, from the Laboratory of Automatic Control (School of Mechanical Engineering, of the National Technical University or Athens), by the research team of the Associate Professor E. Papadopoulos.

Since 2006 a more evolved model is available in the market with many more capabilities.
Lego© robots can execute sets of commands given as programs that can be created in any computer with Lego© software installed. The commands are transferred to the robot through infrared rays.

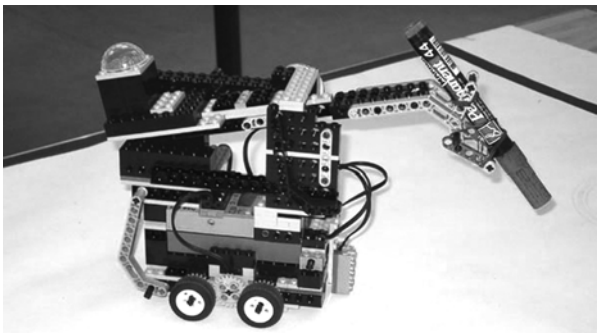

Fig.5 First attempt to construct the robot

Also, through infrared rays, RCXs can communicate with each other.
They constitute the last series of LEGO ROBOTICS SYSTEMS which started in 1986 with the LEGO TC logo, after research conducted in MIT laboratories about the smart brick.
At the beginning, those elements used LOGO-based programs, developed by Logo Computer systems Inc. But nowadays, the basic software with which Lego accompanies the RCX system includes a diagrammatic programming language, which as Cathy Feet Group LEGO LOGO foundation claims is easier for the children. [15]
MIT, from which the development of this platform originated is very active on its evolution. In 1991 they established the LEGO Robot Design Competition, a kind of competitive seminar for postgraduate students, in which everyone designed and constructed his own autonomous robot.
The concept was based on theories of learning developed by Seymour Papert [16], who is responsible for the research on the smart brick.
According to the theory of "Constructionism" [17], the acquisition of knowledge, capabilities and prowess is a vivid and creative procedure in which the student is actively involved. The procedure can be completed as soon as the student constructs something in the world. At the same time the student builds knowledge into his/her mind. The product created acts as an "object to think with", according to the terminology of Papert, which allows the student to present ideas, as those are expressed through the project itself..[16]

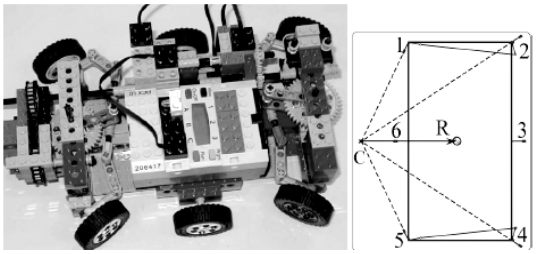

Fig. 6 Construction of the robot by the NTUA team

As described in a relevant article [18] the experiment has been treated by the Laboratory of Automatic Control of the School of Mechanical Engineering of the National Technical University of Athens as an approach in the area of Educational Mechatronics/ Robotics Platform
It is mentioned that:
« we investigate the possibility of using low cost commercial material as a means of learning, research and experimentation, in fields such as mechatronics, robotics and automatic control. The capabilities and limitations of the selected platform, i.e. of the LEGO® elements, is studied via two projects that were designed and carried out, including a number of enhancements that address hardware and software limitations. The first project involves a robotic vehicle that can follow predefined paths, while the second concerns two robotic vehicles cooperating in a specific task. Algorithms and additional hardware were developed and the overall results are presented. It was found that the platform is suitable for teaching many diverse issues of central importance in the areas of interest.»
NTUA students gathered ideas, needs, and proposals from the ASFA students about their practical exercising. After the processing of data, conclusions were derived which evolved the application which was again exploited by the ASFA students.
The partial aims from the NTUA side were : …to construct a robotic vehicle to scan and read data from a Kandinsky painting and next to interact with it, drawing lines, according to an intelligent algorithm.»
The developed scenario includes two autonomous robotic vehicles, a remote PC, and a simple painting acting as the workspace. The painting-workspace contains a few basic geometric shapes, called targets, filled with a single colour each, and unknown to the agents. Vehicle 1, the Explorer, is responsible for exploring the workspace and collecting all necessary data to fully identify the geometric characteristics and topology of the targets. Vehicle 2, called the Painter, acts on the painting after having received and processed information about the characteristics of the

workspace. The host PC is a remote computational node performing all necessary heavy calculations.

10. Conclusions – proposals

A) State of the art

There is an activity in regards to robots performing drawing [19], as well as to programs of automatic drawing utilising automatic entities, genetic rules and others [20].

In addition, there is a massive application in film industry where 3D avatars develop in the battles they participate, an autonomous action by using the technique of behavioral animation.

B) How the Kandinsky proposal differs

The objective of Kandinsky project is not concerned with the creation of a drawing simulation or of an automatic system for drawing. It is rather concerned with the exploration of the human inspiration and in particular, with that area which is responsible for it during the drawing procedure.

It is exactly that procedure during which "something" is being revealed not as the solution of a problem but as a version of something which for some unintelligible and unaccountable reasons it is conceived as the best option for that very moment (not the unique option which is correct but the most "interesting" one which is selected with criteria of a not absolute calculating module of comparison as it is developed within the Fuzzy Sets theory [21]).

That small area of thought is predominantly interesting because it particularly depends upon an abstract system of measurement thus it offers the prospect of research development.

C) in relation to the experiment

The aim of the experiment was not the construction of a robot which would be able to imitate the painting of Kandinsky, but to set students from both Universities to work in the region, so called *inspiration* according to the painters and its recording, and the so called *programming* according to the computer scientists creating thus new data and ideas

The experiment was relatively successful, but because it didn't constitute a complete course the capabilities of the platform were not excessively exploited as a research and training tool.

In the future, the attempts will be continued.

D) in relation to artificial intelligence

As I have mentioned above, in the last five years, the relation of Artificial Intelligence with text has made a remarkable progress. It tends to create a new situation in regards to knowledge processing, in a cultural level, accessible from the public, through ontologies and Semantic Web. [9]

Gradually, the image has being developing an equivalent situation.

The questions that arise in a philosophical level are common in both cases and reach mostly the same end: the "human interface". To state it differently, how new could be those needs, so that they cause an innovation, and how explicitly can be described the data produced, so that there is the possibility of translators in the area of programming.

If we exclude specific applications, such as works in which the aim is known previously and regard an improvement according to which success is quantitatively measured (faster, more specific, more complex, etc), then what is left to examine is the space which is determined by the goals belonging to the field of the unimaginable which is however possible. [22]

This is the space where mainly artists act and perform work.

In the digital culture, artistic creation embraces research for smart images as well as the environment they are developing, that of collaboration, research and training.

Only through the association of art and artificial intelligence can the specific procedure proceed further, because art like mathematics represents an abstract way of thinking, interrelated to a set of rules which constitute a system.

In this system, the creators-researchers are trying to redefine its continuity with concepts which do not yet exist. Within this context, we propose as the appropriate environment for the evolution of art and the science of artificial intelligence, what artists-researchers of the Renaissance adopted: a common research lab.

It is not accidental that we have chosen the case of the *Kandinsky project*. The time when Kandinsky expressed his ideas (early industrial revolution) has many things in common with our time.

Then, like in the present time, they and we balance on the edge of two civilizations.

Then, the transition from manual to industrial construction was the dominant state of affairs.

The machine imposed its aesthetics because of the method of processing the materials and essentially because of its weakness to entirely copy the manual creation. Nowadays, we are moving from the self-organization to machine-organization of thought. A common laboratory and a reconsideration of the book «point-line-plane» might possibly create the appropriate conditions for the recording of the unimaginable.

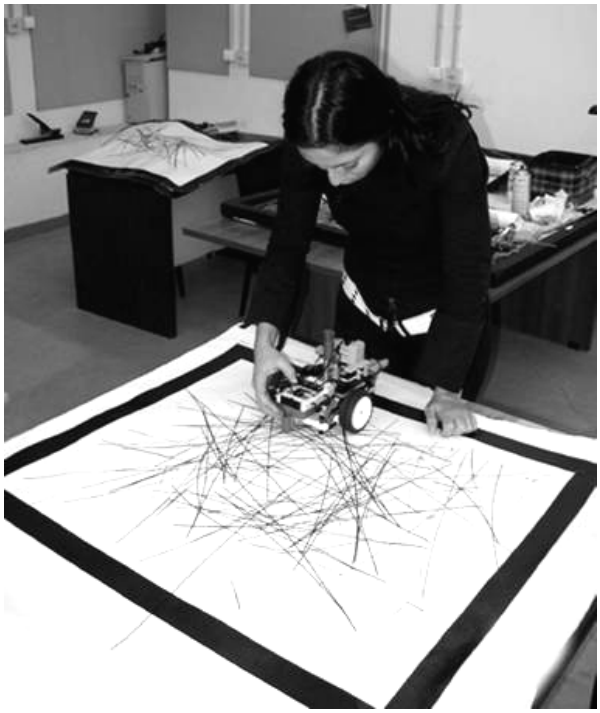

Fig. 7 The Multimedia-Hypermedia Laboratory of the Athens School of Fine Arts

E) Objective of the paper

The purpose of this particular paper is not directed at confirming that the thoughts of an artist (including the tools of the art form he/she uses) can be formulated through the symbols of an artificial intelligence scientist (this wouldn't be significant since it would invalidate the variation). On the contrary, it aims at relating the artistic creativity, that which principally uses informatics, with areas from Artificial Intelligence which worth a thorough and extended research from both directions.

10. References

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