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# Exploring Artificial Intelligence Utilizing BioArt

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**Abstract.** While artificial intelligence combined with Bioinformatics and Nanotechnology offers a variety of improvements and a technological and healthcare revolution, Bioartists attempt to replace the traditional artistic medium with biological materials, bio-imaging techniques, bioreactors and several times to treat their own body as an alive canvas. BioArt seems to play the role of a new scientific curator in order to manipulate laboratory aesthetics and bridge trans-humanism creations with culture and tradition.

**Keywords:** Artificial Intelligence, BioArt, Bioethics, Post humanism

## 1 Introduction

“...υπό δ’ αμφίπολοι ρώοντο άνακτι χρύσειαι, ζώησι νεήνισσιν εϊκύιαι της εν μεν νοός εστί μετά φρεσίν, εν δε και αυδή και σθένος...”.

As indicated in the Greek mythology, Talos is said to be the first Artificial Intelligence Robot that Hephaestus created in his ancient lab, as well as golden maids who could move, speak and think like human beings and tripod tables for the automatic transfer of food and drink to gods. It seems that the necessity of creating metallic assistants-robots constitutes a spontaneous attribute of human culture and temperament with roots reaching back to the dawn of our civilization.

According to Humanism, human beings have the right and responsibility to give meaning and shape to their own lives, building a more humane society through an ethic based on human and other natural values in the spirit of reason and free inquiry through human capabilities. The moral person guided from his evolving social behavior, can easily comprehend and be committed to laws and principles that a scientific field, such as Artificial Intelligence (AI) or Nanoscience set as a precondition, in order to improve the structural elements of human biological existence [1-2].

The fact of the upcoming era of Post humanism, hypothetical raises various questions and bioethical issues, such as the degree of influence of human consciousness, dignity, rights and fundamental freedoms by merging human beings and machines. Additionally, the Universal Declaration of Human Rights on genetic data defines

personal identity as a combination of distinctive genetic makeup with educational, environmental, personal, emotional, social, spiritual and cultural factors.

Modern sciences that complement Medicine and Biology, such as Nanotechnology, Bioinformatics, stem cell technology, transgenic organisms, neural prosthetics and AI applications, have enhanced human intelligence, offering new possibilities for the human body, documenting the potential immortality of our biological existence. Thus a series of philosophical questions and ethical considerations rises through these innovative applications of human intellect. Bioethics, as a field of philosophical and critical approach, have an essential duty to contribute to the regulatory investigation of ethical issues rising from biomedical applications, but also to clarify the relationship between the life sciences and art, as is now expressed through biotechnology.

Artists involved in biological sciences, have now adopted a very unique way of expression, while laboratory components have already become an integral part of the artistic process or art masterpieces, a few times. It is a fact, the presence of artists in modern biological laboratories, in order to overcome the well-known effects and decorative of Fine Arts and manipulate life. BioArt is not a simple theme or artistic movement, but a complex tool for creating projects such as: use and transplant of mechanical devices in humans, creation of robot-clones etc.

## **2 Super Intelligence in the Post Mondo**

By definition super intelligence is any intellectual component that generates the best human brains, including scientific creativity, general wisdom, and social skills [3]. Obviously super intelligence can produce new knowledge and solutions to hard i.e. a smart Nano machine can recognize cancer cells using the tunneling phenomenon, or a machine learning algorithm could give right decisions in the forecast of neurodegenerative diseases like epilepsy [1].

On the other hand the parallel innovating structure of the so called ‘convergent technologies’, referring to the NBIC tools and including Nano science and nanotechnology, biotechnology, biomedicine and genetic engineering, information technology and cognitive science, seems to remove any barrier in scientific and technological achievement [4]. The Nano devices which can repair cells, promise great improvements in longevity and quality of life, involving radical modifications of the human genome and leading to the old but diachronic issue of human immortality [5].

Unlike mankind, AI applications can use and manipulate the storage knowledge through scientific or social networks in a more efficient way. Therefore one of the best ways to ensure that these super intelligent creations will have a beneficial impact on the world is to endow it with philanthropic values and friendliness [6]. Additionally, super intelligence could give us indefinite lifespan, either by stopping and reversing the aging process through the use of Nano medicine [7].

Often Art is prior to Science and has the ability to envision and create projects which is not yet feasible to be implemented, or be applied in human societies. For all innovative artists, art often works in a Post Mondo (“Perfect Future”), which constitutes the past, from a given starting point onwards.

In other cases Science comes to inspire Art, give stimuli for new ideas and techniques and give new directions in the use of innovative tools and materials. While Science and Art are the most common human types of knowledge and emotional expressions, they have to be perpetually in a dynamic interdependence, interactive communication and exchange principles in order to be more understandable and representative of human existence and dimension.

- It is imperative to answer a series of questions before establishing the hypothetical era of Post Mondo and Super Intelligence:
- How the world would like if the scientific achievements were accessible to all people (cloning, production of human organs, personalized gene therapy etc.)?
- If for any illness or any form of disability there was a proper treatment, what would be the structure of any future Perfect World?
- Human societies will tolerate smart, intelligent and strong members and on what life expectancy?
- In human societies of perfect and potentially immortal beings is it possible to adjust the principles of economics and politics and the traditional values of relationships?
- While the achievement of human perfection, the progress of genetics, the use of mechanical additives and the creation of transgenic animals improve cell physiology, could this lead to people who will not obey to laws as we know them now?

In order to develop the Perfect-Human, all the human structural elements have to be immortal, overcoming the Central Dogma of Genetics and upsetting the fundamental principles of human evolution. If we also take into consideration the studies of modern genetics on the non-mental and spiritual identification of clones with their original organism (i.e. the case of twins) another important question raises:

- Are there any psycho-spiritual disruptions in cloned organisms or in organisms with prosthetic biological implants?
- Have we already excluded the possibility of cultured tissues reaction (i.e. BioArt Semi-Living) with the environment and human actions [8]?

The study on perfection's definition and principles consist of a major philosophical enquiry for thousands of years. Is there perfection in Nature and Evolutionary Laws? Perfect creations follow the natural law of evolution or they are kept unaltered in order to remain perfect? Perfection's evolution does ultimately equate with the supernatural?

### **3 Seeking for a New Role - Ethical Challenges**

The development of nanotechnology is moving rapidly, and without any clear public guidance or leadership as to the moral tenor of its purposes, directions and outcomes; where nanotechnology is leading and what impact it might have on humanity is anyone's guess [9]. What appears to be missing at the present time is a clearly articulated

prognosis of the potential global social benefits and harms that may develop from further scientific and technological advances in all of these areas [10].

Super Intelligence should be comprehensible to the public, including activities that benefit society and environment, guided by the principles of free participation to all decision-making processes; AI techniques in Biomedicine, should respect the right of access to information, having the best scientific standards and encouraging creativity, flexibility and innovation with accountability to all the possible social, environmental and human health impacts.

BioArt even today, represents all those forms of art, associated in any way with the life sciences, and uses the life and living things both as a medium and as objects' expression. In the trans human' era, BioArt requires close cooperation between artists and scientists, and also a thorough understanding of the research process, from the artists mainly. Obviously, laboratory techniques associated with biotechnology, such as stem cell research and its applications have already been implemented by specialized scientists around the world. Bio Artists have to communicate and share this scientific knowledge with the society, in the way that they perceive and accept it as part of human evolution. Sometimes hybrid art offers to the audience macabre and repulsive artistic creations, using human body as the basic material like Stelarc, Orlan and Franko-B [11-13], transgenic art creations like Kac [14], Cybernetics technology like Haraway and Warwick [15-16], hyper-real sculptures like Piccinini [17].

BioArt searches for the meaning of human existence in relation to the natural environment and enhances the value of parts of the human body as autonomous and interdependent subsets. Judging from the already registered events and the historical development of Arts today, there is a strong possibility that BioArt outline a total new future serving as a communication channel between science and society, while humans are still trying to conquer the torrent of scientific knowledge.

According to philosopher Nietzsche, the distance that separates Perfect-Man from man is identical to that which separates man from monkey. The transition in a supernatural state involves an evolutionary leap and a profound change in human nature. BioArt is willing to lead this evolutionary perspective, through the expressions of Nanotechnology, Neuroengineering, Bioinformatics, Molecular Biology and Cellular Therapy, but also to establish new rules through the methodological approaches of bioethics.

BioArt must highlight and promote the uniqueness of the individual, to strengthen the role of man in the AI and probably to propose solutions for the improvement and protection of life according to human ideals. In order to achieve this, a dialogue about what is ethical and legal to be expressed through BioArt must start immediately, such as the use of human organs, tissues, blood, bacteria and viruses or even more the intentional infliction of pain.

- Can we assume that BioArt main objectives are the selection of a new way of achieving Post humanity and biological immortality, by not following the common paths of aesthetic expression and traditional -for human senses- beauty?

- Harmony and aesthetic which are features of our nature, is it possible to remain stationary into the acceptable social contexts or will adapt new data and scientific challenges without the discrete and finite limits of human consciousness?
- Could harmony and aesthetics reflect human vision and its finite capabilities (human perception of three-dimensions) or are there independent natural rules which are not influenced by our evolution?

It is clearly that BioArt can apply innovative techniques for example on exploiting or creating new sensations in cases of disabled people, in the technological application of the phenomenon of quantum entanglement, in the education process and in support the AI products integration into society (e.g. Robot-clones). BioArt seems to be the play the role of scientific curator presenting the products of AI in an acceptable way for the human brain, providing also a set of principles and rules such as: aesthetics, behavioural properties, boundaries and functions, adaptation and harmonization in customs. Additionally, BioArt should examine the developmental stages of human cognitive and determine ethical and adaptation rules for artificial intelligence's products in human evolution.

Appears however that this new Art, exists only in technologically advanced societies where science works as a tool, raising ethical questions about equality and accessibility on super intelligence among people and nations.

## 4 Conclusion

For over 100 years, the scientific activity experiencing such growth, that seems to replace the entire culture. Initially this is an illusion caused by the speed of this development and this qualification triumph that characterizes Science, gave the right to dominate the entire culture. Few researchers also, fearing the domination of society by the science, predict the destruction of culture [18].

Science, however changes the 'DNA of our thinking', expression, perception and our aesthetics. Additionally through Art's manipulation, we can compete and imitate nature using AI applications, only if we manage to discover and model mechanisms and structural elements.

According to Zarr and Catts [8] it is important to mention that BioArt is a pluralist practice with its artists occupying different ethical positions such as the creation of public acceptance for biotech developments or the generation of heated public debate about their uses.

Therefore it is obviously that many ethical and legal challenges seek for answers concerning BioArt and hybrid art in general and their different approaches from artists, art theorists, curators, ethicists and philosophers, scientists and engineers.

## 5 References

1. Alexiou, A., Psiha, M., Vlamos, P.: Ethical issues of Artificial Biomedical Applications, In: 7th Artificial Intelligence Applications & Innovations, Springer IFIP Advances in In-

- formation and Communication Technology series, volume 364, 297-302, doi: 10.1007/978-3-642-23960-1\_36 (2011)
2. Alexiou, A., Vlamos, P.: Ethics at the Crossroads of Bioinformatics and Nanotechnology, In: 7th International Conference of Computer Ethics and Philosophical Enquiry (2009)
  3. Bostrom, N.: How Long Before Super intelligence? *International Journal of Futures Studies*. 2 (1998)
  4. Roco, M.C., Bainbridge, W.S.: Converging technologies for improving human performance. *Journal of Nanoparticle Research*. 4, 281-295 (2002)
  5. Drexler, E.: *Engines of Creation*. Bantam. New York (1986)
  6. Kurzweil, R.: *The Age of Spiritual Machines: When Computers Exceed Human Intelligence*, Viking: New York (1999)
  7. Moravec, H.: *Robot: Mere Machine to Transcendent Mind*. Oxford University press: New York (1999)
  8. Zurr, I., Catts, O.: The ethical claims of Bioart: Killing the Other or Self Cannibalism. *Art and Ethics*, vol. 4, issue 2 (2003)
  9. Berne, R.W.: Towards the conscientious development of ethical nanotechnology. *Science and Engineering Ethics*, 10, 627-638 (2004)
  10. Sweeney, E.A.: Social and Ethical Dimensions of Nanoscale Research. *Science and Engineering Ethics*, vol. 12, issue 3, 435-464 (2006)
  11. Stelarc website, <http://stelarc.org>
  12. Orlan website, <http://www.orlan.eu>
  13. Franko-B website, <http://www.franko-b.com>
  14. Kac, E.: Transgenic Art. *Leonardo Electronic Almanac*, vol. 6, issue 11 (1998)
  15. Haraway, D.: A cyborg manifesto. *Science, Technology and socialist-feminism in the late twentieth century. Simians, Cyborgs and Women: The reinvention of nature*. In: New York Routledge, pp.149-181 (1991)
  16. Warwick, K.: Future issues with robots and cyborgs. *Studies in Ethics, Law, and Technology*, Vol. 4, issue 3, pp. 1-18, doi: 10.2202/1941-6008.1127 (2010)
  17. Piccinini website, <http://www.patriciapiccinini.net>
  18. Prigogine, I., Stengers, I.: *Order out of Chaos*. University of Michigan: Bantam Books (1984)