Cybernetic Augmentation - a Key to Utopia or Dystopia?

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Abstract

Here goes the abstract

I. Introduction

The source of the prosperity that humans have achieved in the last few millennium is the ability to make tools to complement ourselves; we have made tools to adapt the environment more habitable, ensured our food supply, increased our strength and dexterity, widened our knowledge and improved our ability to carry out mental activities. However, after the millennium of progress we are approaching a new dimension of technology; a dimension which some believe will be our salvation while others would easily relate to the legends of Icarus, Pandoras box and Prometheus fire. The dimension referred to is the prospect of actively and intrusively improving the human mind and body. Developments in fields such as electronics, nanotechnology, robotics, cybernetics, information technology, neurotechnology, genetic engineering and pharmacology, among others, are enabling a new field of technology labeled by some as Human Engineering to emerge.

The authors of this paper realize that human engineering is a very broad and trans-disciplinary field, and it would take volumes to analyse its ethical implications; thus this paper attempts to narrow the field by only looking at the ethical implications of one form of human engineering; namely cybernetic human augmentation. For the purpose of this paper cybernetic human augmentation is defined as the following: any (1) electro-mechanical addition to the human body that (2) becomes a natural part of the human body and that (3) improves the performance of an individual beyond normal human capacities. Needless to say genetic or chemical forms of human augmentation are external to the purview of cybernetic augmentation.

The paper is structured as follows; the first part of the essay looks at the effects of cybernetic human augmentation on society; following this an ethical perspective is used to analyse the effects of augmentation. After looking at the effects and their ethical implications, recommendations are made to support the implementation of cybernetic augmentation on society. Finally, the conclusions are drawn regarding the viewpoints and approaches towards the cybernetic augmentation, its ethics and future humanity.

II. Analysis

To explore the potential ethical implications of cybernetic augmentation in a more structured manner, a distinction is made between the two types of cybernetic augmentations:

1. Augmentations to enhance the user's physical ability
2. Augmentations to enhance the cognitive/sensory ability.

In this essay, physical cybernetic augmentation is defined as any kind of cybernetic augmentation that enhances the physical (i.e. of the body) qualities of a human being. Examples of physical improvement include among others a reconstruction/replacement of certain body parts with enhancement of physical abilities, or modification of the body to adapt to diverse environments (e.g. giving human beings gills and webbed feet to adapt for life underwater or improving the lungs and skin to tolerate different types of atmospheres).

As for the cognitive cybernetic augmentation, there are mainly three primary types: 1. improvement of thinking capacity; 2. improvement of sensory capacities; 3. accommodation for a interfacing with the external world. Current innovations have only began to scratch the surface of devices that may lead to the second or third type of enhancements. Most of the devices being researched are not intended for enhancement rather aiding people with existing mental or physical disabilities; however, one need only apply a little imagination to see how the application of these technologies to people without illness or disabilities may lead to enhancements of their functionalities.

With such a distinction in mind, let us analyse and discuss the ethical implications of cybernetic augmentation. Before we start, it is important to ask ourselves "What is meant by an ethical implication?". According to the Longman Dictionary of Contemporary English, an implication means "a possible future effect or result of an action, event, decision, etc" [1]. Therefore, an ethical implication would mean the possible future effect or result with regard to associated moral values and principles of morality. For analysis, this section is divided into three main parts:

1. Potential benefits of cybernetic augmentation

2. Potential risks of cybernetic augmentation
3. Application of ethical theories

The first two parts provide an insight into the possible social, economical, and technological influence of the development and application of cybernetic augmentation technology, as well as its potential direct impact on users' physical and psychological state. Finally, the ethical implications of the technology are analysed and discussed by relating to the existing ethical theories and models.

A. Benefits of cybernetic augmentation

There can be numerous potential benefits when the cybernetic augmentation is implemented to enhance the user's physical and/or cognitive ability. For example, these are: better well-being, increased efficiency and productivity, self-defense, further development of technology. Of course, there will be many other unmentioned potential benefits (and risks), but it should be noted that our intention is to give an overview and "food for thought" that is useful and adequate to comprehend the general implications, rather than to give you an exhaustive list of every possibility in the future.

Better well-being of the user
One way that the cybernetic augmentation can be used to achieve the sense of better well-being is by enabling the users to carry out their daily actions in a more convenient way. For example, with augmented arms or legs, one may never have to struggle when lifting or carrying things. Also, the level of pain might be controlled in those augmented organs - for example, when you touch something very cold or hot beyond a certain threshold level, then it may regulate the synaptic information to your nerve system that you do not feel the pain you would have felt if you were not augmented. Such technology can give the user more control over their bodies, and thus reducing the level of inconvenience and stress.

In addition, the cybernetic augmentation can help the users maintain or improve their health by incorporating advanced medical technology. For example, the research is ongoing on the development of the nanorobots which are designed to navigate through our bodies' blood vessels, detect the cancerous cell, and kill it [2]. Through the technology of cybernetic augmentation, such nanorobots can monitor our body more comprehensively, and perform medical tasks more quickly and efficiently at an early stage.

Such strengths gained by the cybernetic augmentation are likely to increase the chance of the user's survival in wild nature (or in the unfamiliar environment or situations) as this technology can possibly allow him/her to evolve into a stronger and more adapted species.

Another view with respect to the well-being is that cybernetic augmentation can positively affect the users not only physically, but also mentally, as the extra abilities can plausibly help them gain higher self-esteem and confidence. In particular, for those people with the psychological complex about certain parts of their body, or abilities which they feel inferior themselves, the cybernetic augmentation could be used to overcome such complexes and give them more sense of happiness and better well-being.

Increased efficiency and productivity
An enhanced physical capability of the workers by means of cybernetic augmentation is most likely to increase the efficiency and productivity of the work and industry. This would be a good news to the employers, since they can either reduce the labor cost by employing less number of people to do the same job, or increase the profits with the same number of employees because the they would have enhanced efficiency and productivity, thanks to cybernetic augmentation.

Self-defense and military application
One may claim that cybernetic augmentation which enhances the physical ability would lead to more security as it can be used as means of self-defense. However, this is indeed subjected to the dispute that it can be used also as a weapon to attack others, which is analogous to the current debate regarding the gun control issue in U.S. Nevertheless, it is hard to deny that the cybernetic augmentation can be used to enhance the level of self-defense of the user, compared to the non-users of cybernetic augmentation.

Such advantage of cybernetic augmentation can be most extensively exploited in the field of military application; the soldiers with high-level cybernetic augmentation can gain enhanced physical combat ability.

Further development of technology
Once the physical cybernetic augmentation becomes an active trend of the society, there will be more initiatives for the further research, development and application of the technology in the fields of not only in cybernetic augmentation, but also in other fields of technology and industries. For instance, the design of the interfaces of many electronic gadgets or machines can change into a more efficient form (e.g. semi-automated guns that can be attached to the part of an augmented arm, or infrared monitors/screens when the visible frequency of our eyes can be controlled using an advanced electronic lens, etc)

B. Risks of cybernetic augmentation

This section needs further elaboration. A basic overview is given in bullet points.

- Short-term risks that the lack of knowledge and maturity of the technology may harm the bodies and decrease the convenience, as opposed to the original intentions.
- Unknown psychological side-effect
- Increased life expectancy has side effects: over population, increased social-welfare cost, youth unemployment, etc.
- Increased sense of insecurity (Analogous to gun control issue)
- Employment issue (i.e. few people replacing many people's job)
- Military application can be problematic in view of ethics. Can we justify the use of cybernetic augmentation to produce a stronger army? What is the soldiers' point of view, and what is the significance for the humanity?
- Necessity to change many regulations and laws, as well as to create ones
- Inequality issue - The rich is most likely to get an earlier (or even monopolistic) access to such technology and gain an unfair advantage of cybernetic augmentation.
- Human dignity - loss of "humanness"

C. Ethical implications of CA

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III. Recommendations

These are our recommendations

IV. Conclusions

This is the conclusion

References

[1] Pearson Education. *Longman Dictionary of Contemporary English*. 2007.

[2] Alla Katsnelson. Dna robot could kill cancer cells. `http://www.cs.york.ac.uk/hise/cadiz/home.html`, 2012.