Transhuman Augmentation: A Posthuman Overview & Forecast

What is Posthuman

According to Miller (2004), the concept of *Posthuman* postulates the advancement of unlimited mental or physical augmentation and alteration, immortality through self-programming and self-regulating abilities, and age- and disease-resistant mechanisms, such as life-extension practices and cryonic suspension. Although ethics and law have always pushed back in question of the morality behind post-humanizing activities (e.g. stem cell research, body microchips,…etc), there is still much fear for the inevitable. In ACM's (Association for Computing Machinery) 2011 article about Dave Evans' perspective of technological innovations, one of the ten most disturbing of emerging technologies that calls for our attention is the augmentation of the human body, where human life can, in theory, be radically extended and improved. Thus the purpose of this paper is to present the findings of current posthuman technologies as well as providing a forecast about this technology in the next decade.

Finding 1: Prosthetic Carbon-fiber Limbs

In 2011, double amputee Oscar Pistorius won second place in a race against able-bodied runners, racing with his pair of prosthetic carbon-fiber legs. According to howstuffworks.com, this technology allows an internal frame structure to be attached to the residual limb, where the residual limb has a device (like a socket) that interfaces with the frame structure. Currently, the most cutting-edge prosthetic limbs utilizes a technology called targeted muscle reinnervation (TMR) developed by Dr. Todd Kuiken at the Rehabilitation Institute of Chicago, which allows amputated nerves to be redirected to produce electrodes that signal a prosthetic limb to move a certain way. Thus amputees are now capable of moving a prosthetic limb by naturally and directly accessing motor nerves and making complex human-like maneuvers. Understanding this area more can lead to completely replaceable or improved limbs.

Finding 2: Wearable Technology

In 2010, Raytheon Company (NYSE: RTN) invented the hydraulics exoskeleton suit, which allows an operator to augment his/her strength by leveraging hydraulic technology, sensors, actuators, and controllers to perform heavy-lifting tasks. According to a CNN Interview (Marrapodi & Lawrence, 2010) of Raytheon's power suit, the suit provides up to seventeen times more strength to lift supplies and currently costs around $150,000. However, the suit is currently only operable with a close-by power source, and has a very bulky and cumbersome design, which is inconvenient when it comes to the mobility of the suit. Raytheon is now looking to continue and develop this technology into a slimmer, more power efficient, independent, and user-friendly as the suit takes on more improvements. Hence, this can potentially lead to wearable technology such as a jacket which provides various attributes.

Finding 3: Therapeutic Implants

Just recently, SPR Therapeutics, a medical device company, has done its first trial on a fully implantable device that functions to reduce muscle pain, called "Subcutaneous Pain Relief." This technology utilizes peripheral nerve stimulations to treat the pain of patients who have suffered strokes. It is currently under testing and is awaiting approval from regulations. In addition, St. Jude Medical Center has developed the world's first pebble-sized, rechargeable spinal-cord stimulator, Eon Mini Neurostimulator. This device also functions to alleviate pain for people who have had failed back surgeries or chronic back pain. The device connects to the spinal cord and the electrodes placed at the end of the spinal cord disrupt and "masks" the pain signals transmitted to the brain.

Finding 4: Ingested Monitors

Only a couple years ago, the only way to keep track of a human body's health was to hook it up to a bunch of hospital devices that monitors the details or wear watch that measured simple body activities. But this year, Proteus Biomedical, Inc. has announced that its "raisin system" will be sold in commercial settings. The raisin system is a tiny pill (hence its name) that functions as a tracker for the human body. The user simply ingests the pills, which are activated by stomach fluids and work to track drug levels in the bloodstream as well as vital signs. Thus this technology can potentially offer the ability to better monitor our bodies and feed it the nutrition it needs in the future, which could tremendously help controlling obesity.

Future Scenario Implications

Given these posthuman technologies, there are various levels of physiological augmentation that a human can attain in the future, for better or worse. In this, there may be five kinds of scenarios that these technologies may follow in the future. The first scenario consists of wearable technology, where further advances in nanotechnology is capable of downsizing the attribute requirements (such as hydraulics) to create an efficient power suit or jacket that is light as nylon and have the strength of a bulldozer. This technology offers humans the ability to easily immerse and eject from the augmented human function and experience and is the lowest level of involvement for human augmentation technologies. A second scenario can be that augmented technologies come in cycles/phases, where a safe technology is assimilated or digested into the human body system and is expelled after the full duration of the cycle period to provide critical information, functions, and/or insights about body. The third possible scenario of posthuman technologies consists of permanent implants that are only given to certified adult professionals (by choice) to further improve upon their strengths and specializations. For example, an expert in

web development could be implanted with a chip that optimizes the electrode stimulation of the left side of your brain (without neglecting the right side) to code programs. Unlike permanent implants (which are an add-on to what the human body has), the future of prosthetics, the fourth scenario, converges with the sophistication of robotics and actually displace parts of the human body. Hence, it may be possible that prosthetic limbs function to "redesign [and replace] the human condition in the face of evolution, allowing for personal growth beyond the current biological limitations" (Miller, 2004). As a result, athletes may be improving their performance by replacing their physique with aerodynamic prosthetics. The changes brought by prosthetics will not only be permanent, but completely erase the need for the human experience and is the most likely to raise a strong ethical pushback from activists.

However, given the consideration of the ethical, legal, and political implications of human augmentation, these scenarios may never become commonplace because it is important for mankind to develop sufficient systems and police and govern these technologies. Thus it is important for policymakers and scientists to keep in mind that "genetics, nanotechnology, and robotics would [unintentionally] threaten to make humans endangered species" (Joy, 2000).

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