Explore – Impact of Computing Innovations
Written Response Submission Template

Please see Assessment Overview and Performance Task Directions for Student for the task directions and recommended word counts.

Computational Artifact

2a)

The computing innovation I chose to represent with my artifact submitted is Electromyographic (EMG) prosthetic limbs. EMG prosthesis is meant to provide those who are missing limbs an opportunity to live a normal life. Thanks to the technology's ability to sense brain signals, process them and actuate a prosthetic limb. My computational artifact shows the cycle of how this process takes place.

2b)

I used Microsoft's Powerpoint to create a smart chart with the four stages of EMG prosthesis in a cyclical diagram. I then used Google's search engine to find online images of brain signals, EMG sensors, mobile processors and a prosthetic arm. I then took those images and placed them in their respective stage then removed their backgrounds.

Computing Innovation

2c)

The primary benefit EMG prosthesis has had on society is it's provision of limbs to those who were either born without limbs or lost them in an accident. Though there were earliewr forms of prosthetics that gave handicapped individuals limited range of motion and grip, EMG prosthesis unlocks the possibility for virtually natural motion and limited sensations for those missing limbs. Unfortunatly there might arise instances of accidental or unintended motion due to the open loop design of the prosthetics. Imagine a situation where an individual utilizing one of these prosthetics were to suddenly lose control of their arm while driving or operating any type of heavy machinery then suddenly lose control. The results of any error in the sensors or the user's muscles could lead to potential disaterous outcomes.

2d)

These prosthetics utilizes myoelectric signals to simply activate mechanical motors in a prosthetic appendage. These prosthetics simply consumes the electromyographic data sent to specific muscles on the user's body from the brain. This data is received through the EMG sensors that are attached to the proper muscles on the wearer. These EMG signals, once received, are transmited to a signal processor that identifies which sensor is transmitting a signal then appropriately actuates a combination of cervos and motors in order to properly move the prosthetic as if an appendage was there.

References

2e)

Chadwell, Alix et al. “The Reality of Myoelectric Prostheses: Understanding What Makes These Devices Difficult for Some Users to Control.” Frontiers in Neurorobotics 10 (2016): 7. PMC. Web. 25 Apr. 2018.

“Myoelectric Technology.” Myomo, myomo.com/myoelectric-technology/.

Reilly, Claire. “Wearing a Deus Ex-Inspired Bionic Arm Is the Future of Prosthetics.” CNET, CNET, 10 June 2016, www.cnet.com/news/wearing-a-deus-ex-inspired-bionic-arm-is-the-future-of-prosthetics/.

“MyoWare Is an Arduino-Compatible, Wearable Muscle Sensor Platform | IT Eco Map & News Navigator.” ITers IT Eco MAp & News Navigator, itersnews.com/?p=97348.