

2a. The artifact that is presented is the exoskeleton. The intended purpose for this machine was to help people in their physical rehabilitation stages of a body injury or an illness that affected mobility and cognitive ability. It allowed for faster physical healing as well as improvement on every patient's motor and cognitive skills produced by the brain. The exoskeleton is attached to your body, adjusting to your condition as sensors and motors within the machine allow for the patient to move with less frustration.

2b. I developed this artifact using Google Draw and images and gifs from Bing. I decided to use more images than words in my artifact to allow it to speak to my audience without context. The gif image I used of someone wearing an exoskeleton themselves showed exactly how the two function together to create a successful therapy sessions for patients with these conditions. The rest of the images correlated to what the machine uses in order to full function properly, such as neurons from the brain to motorize the movement.

2c. The exoskeleton is extremely beneficial to our society, especially towards our medical field. Since a lot of people, such as veterans, disabled, and physically ill go through physical therapy day and night to improve, this technological advancement has allowed for healing to be faster and more productive than any physical therapist. Before wearing them, patients go through assessments to break down their conditions to incorporate into the machine to allow automatic support and improve the patient's control with each session. As they wear them, therapist can adjust, design, and change tasks for the patient in their process of healing without being directly there, all monitored through physiological data known as EMG signals. Furthermore, the

exoskeleton can be force exerting for those with motor deficits to compensate for their disabilities. In addition, this motor learning allows the brain of the patient to adjust and work with the functions of the machine, a phenomenon called neuroplasticity caused by using the machine to help motor skills from the brain to body.

2d. The exoskeleton inputs data by using sensors, EMG signals, and neurological signals to function properly. An example of this would be an exoskeleton designed for an upper extremity. A REcursive Least Square algorithm was incorporated into the machine which considered the EMG signals from the arm and the sensor data of the machine's force on the patient's body. By inputting this algorithm, it created automatic adjustments every so often to the patient's body until the support is reduced so much the patient doesn't the help to move anymore. A disadvantage to using an exoskeleton is the preciseness of each movement. An example of this would be if a patient had a gait deficit disorder and it was incorporated into the machine to help. With these types of problems, a gait detection (GPD) is added as a component in the system. However, the lower limb exoskeleton must not impair natural gait of its user as long as the patient moves properly.

2e. Hong, Yeo. "Lower Extremity Exoskeleton: Review and Challenges Surrounding the Technology and Its Role in Rehabilitation of Lower Limbs ." *Semantics Scholar*, Australian Journal of Basic and Applied Sciences, 2013, Lower Extremity Exoskeleton: Review and Challenges Surrounding the Technology and its Role in Rehabilitation of Lower Limbs .
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