Thesis Project Portfolio

Practical Exosuit Design for Patients with Amyotrophic Lateral Sclerosis
(Technical Report)

How Wearable Robotics Can Affect the Quality of Life of Both Patient and Caretaker
(STS Research Paper)

An Undergraduate Thesis

Presented to the Faculty of the School of Engineering and Applied Science

University of Virginia • Charlottesville, Virginia

In Fulfillment of the Requirements for the Degree

Bachelor of Science, School of Engineering

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Sociotechnical Synthesis

ALS is a degenerative neuromuscular disease that affects many people in the United States, and around the world, that currently has no cure. Because of the nature of this disease and others like it, new technologies are being researched that will give affected persons ease of life and more autonomy in their daily lives. The creation of a fully-soft, wearable exoskeleton suit is one of the solutions that is being tested to help ALS patients with activities of daily living. The exosuit that is being created for the technical portion of this project is truly novel when compared to other products like it because of its fully-soft nature and the implementation of a Bowden cable actuator. Because of the nature of the project, it is important to understand how the technology will affect each stakeholder in the design and application of the suit. That is why it is our goal to make the suit accessible, affordable and adjustable so any victim of this disease can use it.

The framework that will be used to analyze the problems in this research is the Social Construction of Technology framework from Pinch and Bjiker. By using this theory, I can find out which stakeholders are directly affected by ALS so that I can better understand the role of wearable robotics in the lives of patients, their families and their caretakers. This will help me analyze feedback from each of the parties to create the best design for the most people. By using the case study method, I plan on finding how wearable robotics are used for rehabilitation and how they are used for activities of daily living. This will allow me to collect data and information about the different movements that are desired by patients and doctors, and how our specific model can be created with the best intentions. This method will, hopefully, give me insight into the implementation of novel, wearable exosuits. This technology has the potential to affect the lives of ALS patients for the better, while simultaneously creating a more beneficial relationship between the patients and their family and caretakers.