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Mechanical systems that function like living organisms

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Abstract

The purpose of this research was to discover the relationship between the human body and technologically advanced mechanical systems or in other words, robotics. More specifically, we looked at how robotics play a part in serving as a prosthetic or an artificial limb for other living organisms. During the research we looked at the anatomy of the body, putting a focus on the nervous system, bone structure and their movements, tissue and muscle relationships and the neurological response of the brain. A close look was also taken at how the human body reacts and responds to artificial limbs magnifying the best ways to introduce unnatural mechanical systems to the body. Different types of nervous system and muscle tests were performed to find optimal placement of electronics on the body and it was found that the prosthetics work best with painless implants to the nerves within the body. Research is still being done by multiple colleges and universities around the world and we are learning new things every day about the limitations of the body.

Why Bionics?

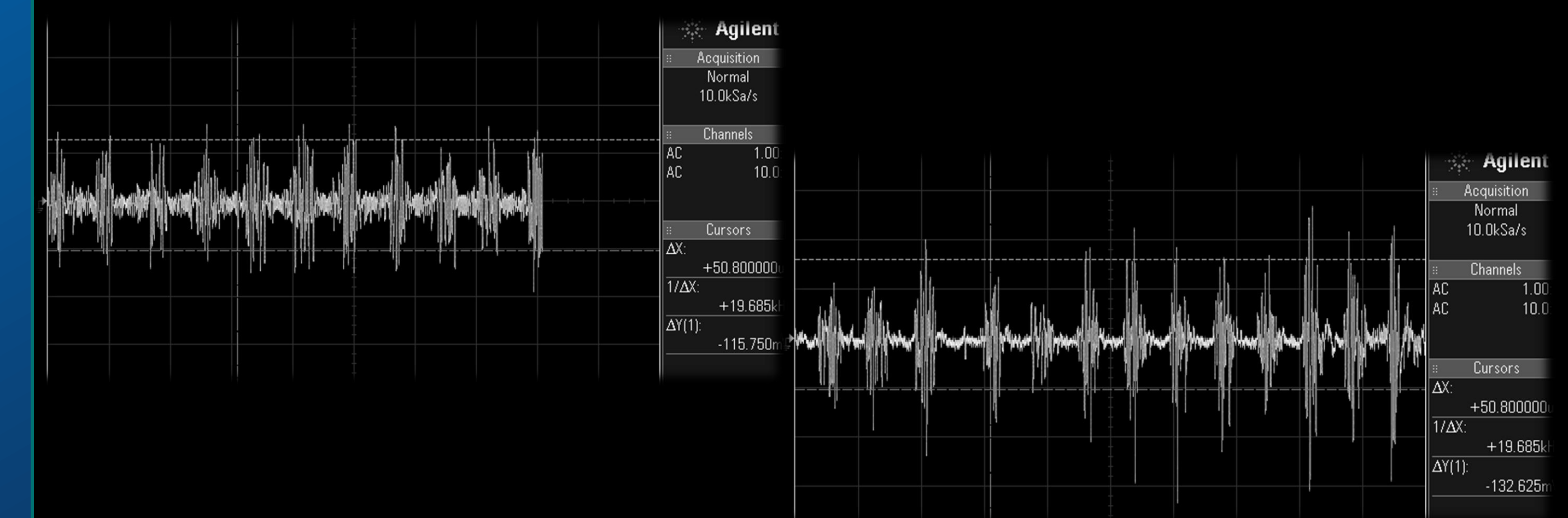
- More functionality compared to traditional prosthetics.
- Has the potential to return sensations and functional properties to that of a human hand.
- Could reduce the percentage of people that struggle with depression and anxiety due to limb loss.
- Could serve as the primary replacement for traditional prosthetics.

Background

- Over two million people in the U.S are living with amputated limbs.
 - 54% of amputations are due to cardio vascular disease.
 - The remaining 45% is due to trauma and cancer.
- 1,550 military personnel lost limbs due to wars in Afghanistan and Iraq.
- 30% of people with limb loss depression or anxiety.

Methods and Research

- Attaching probes to various places on the body to detect nerve signals.
- Analyzing the differences between each data set.
- Reviewing research and advancements conducted by others.



These images show voltage spikes that happened when a finger was moved

Significance

- Advancements are being made on artificial tech.
- Body movements are able to be detected electronically and can be tracked more accurately with better equipment.
- Bionics can help millions by providing them with functions that were lost due to limb loss.
- Cant yet fully replicate the movements of a human limb.

References

- [1] Mischa, "Bionic limbs," *Australian academy of science*, 26-Sep-2017. [Online]. Available: <https://www.science.org.au/curious/people-medicine/bionic-limbs>. [Accessed: 25-Feb-2019].
- [2] "Home | Touch Bionics," *About | Touch Bionics*. [Online]. Available: <http://touchbionics.com/>. [Accessed: 25-Feb-2019].
- [3] "Nervous System: Explore the Nerves with Interactive Anatomy Pictures," *InnerBody*. [Online]. Available: <https://www.innerbody.com/image/nervov.html>. [Accessed: 25-Feb-2019].
- [4] I. P. Clements, "How Prosthetic Limbs Work," *HowStuffWorks Science*, 28-Jun-2018. [Online]. Available: <https://science.howstuffworks.com/prosthetic-limb.htm>. [Accessed: 25-Feb-2019].

