

FUTURE USES OF EXOSKELETON IN MEDICAL INDUSTRY

Midhat Nizam

Student, Dept. of Mechanical Engineering, Dronacharya College of Engineering, Haryana, India

Abstract: Exoskeleton is used in now a day in medical industry for rehabilitation for people who lost coordination in movement, due to paralysis, Parkinson's diseases or some other reason. Before that, physiotherapy is used to restore the coordination between the muscle and brain. Currently, lower body exoskeleton is used to restore the coordination between them. In this researcher paper we basically talking about what are the future scope of Exoskeleton in medical industry for individuals whose suffer Neurotically diseases who are unable to do physical activity.

Key Words: Exoskeleton, Neurological diseases, Paralysis, Brain waves, Spinal Cord Injury (SCI)

1. INTRODUCTION

Exoskeleton is the wearable external body frame which is worn by the person to support the body, either to help a person to overcome an injury or enhance the physical abilities. There was a time when we say exoskeleton its sound completely science friction but due to recent advancement in robotic exoskeleton, it is possible now.

In 2014, an adult paralyzed from the waist down, kicked off the world cup in an exoskeleton. The exoskeleton is mind-controlled, as a result, the exoskeleton's steps were controlled by the paralyzed wearer's thoughts [1]. Its open up the new opportunity in exoskeleton, such as brain computer interface (BCI), sometimes it's called direct neural interface (DNI) in which direct communication pathway between an enhanced or wired brain & an external device. When neurons in the brain interact via chemical reactions, measurable currents called brain waves are crated using these brain waves patterns to control any device by using thoughts [2].

2. CURRENT APPLICATION:

1. Exoskeleton is currently used in industry such as Raytheon Sarcos's Guardian XO is used in industry to increase human strength, agility and endurance capabilities of the person wearing it. [1]



Fig 1: Sarcos's Guardian XO

2. The U.S. Army is developed an exoskeleton called MAXFAS, to automatically steady a soldier's firing arm. The tech actively senses & cancels out arm trembling & keeps the shooter's arm free to point at target. [2]

3. Lockheed Martin's untethered, hydraulic-powered anthropomorphic exoskeleton called HULC provides users with ability to carry loads of up to 90kg for extended periods of time and over all terrain. It enables fighters to carry heavy combat loads with the help of powered titanium legs & an onboard micro-computer that ensures the suit moves in concert with individuals. [3]

4. ReWalk, developed by Argo Medical Technologies, is the first motorized exoskeleton cleared by the FDA for personal use. Designed to help people with lower body paralysis from spinal cord injury (SCI), the technology provides a wearable brace support, a computer-based motion sensor, users can stand, walk & climb stairs with some motorized help. [4]

3. FUTURE SCOPE:

In near future we may see exoskeleton used in diseases like Amyotrophic Lateral Sclerosis (ALS) in which nerve cell break down, which reduces functionality in the muscles that they supply [5], which has no cure currently, but using this technology may give a new way of life for those individuals. Exoskeleton can be wearable for long time without any issue to the wearer, more light weight easy to carry everyone can afford it. By using this technology individuals can work without any risk of life in industry or construction site or in logistic department.

4. CONCLUSION:

This paper explores the usages of exoskeleton in medical industry thus providing a view of usage of exoskeleton in medical field to enhance the individuals to overcome from SCI. It also explores the usages of BCI to provide a new field of using exoskeleton. With the use of this technology, it can be expected that the future patients with SCI or any neurological disease are able to recover easily and come back in real life as normal individuals.

REFERENCES:

1. <https://www.seeker.com/exoskeleton-controlled-by-brain-waves-1770157815.html>
2. <https://www.eletimes.com/controlling-electronic-devices-brain-waves-2#:~:text=The%20four%20main%20types%20of,the%20object%20to%20be%20controlled>
3. <https://phys.org/news/2010-10-lockheed-martin-advanced-hulc-robotic.html>
4. <https://rewalk.com/rewalk-robotics-announces-expansion-to-india-with-saimed-innovations-2-2-2-3-2-2-2-3-2-2/>
5. https://www.google.com/search?q=amyotrophic+lateral+sclerosis&rlz=1C1CHBF_enIN850IN850&oq=amyotrophic+lateral+sclerosis&aqs=chrome..69i57j0l7.267j0j7&sourceid=chrome&ie=UTF-8