

## 20. Title: Exoskeleton device for upper limb rehabilitation

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**Keywords:** Stroke, Wrist, Finger, Rehabilitation, Robot, Exoskeleton device

**Domain:** Healthcare

**Summary:** AI based Exoskeleton Device for Upper Limb Rehabilitation is developed for real-time monitoring of forearm muscle activity. The developed device will be used for rehabilitation of upper limb disabilities by using a brain computer interface robotic device to train the brain of the Paralytic patients. It is a Single device for all phases of recovery and works on Flexion and extension movement of wrist and finger joints. The main objective of the device is to provide the faster recovery and to improve the activities of daily living and improving their quality of life. The device has potential application in various neuromuscular disorders such as stroke, brain injury, spinal cord injury, cerebral palsy, etc. or any neurological disease-causing upper limb disabilities. This invention has been tested on stroke patients.



*Image: Robotics Exoskeleton Device*

### Advantages:

- » Movement parameters, range of motion and speed can be customized as per patient requirement
- » Provides precise repeatability and assistive therapeutic training
- » Scored ~85 in System Usability Scale (SUS)

- » Gives performance based adaptive visual biofeedback in real time
- » Focuses on reducing spasticity in muscles
- » Low cost and Light weight
- » Self-operable and user friendly
- » Movement parameters controlled by patients depending on the symptoms.
- » Easy manufacturing and maintenance

**Applications:** Robotics and Healthcare

**Scale of development:** Functional Prototype developed and Clinical Trials Phase-3 ongoing

**Technology Readiness Level:** 8

**IP Status:** Indian Patent Application 201711037641, US Patent Application 15/733,028, EP Patent Application 18871528.8