

義肢

◎ 義肢(人造肢體)

- 功能性：取代肢體
- 美觀性：掩飾傷殘
- 上肢義肢、下肢義肢

- ◎ 電子義肢：
利用電腦及小型驅動器
- ◎ 電子生化義肢：
大腦透過神經傳遞電子訊號

- ◎ 肌電訊號：協助增強力量
 - 在原來斷肢的連接處植入電極
 - 由皮膚感應微弱電流訊號
- ◎ 腦電訊號：精密細微的動作





outline

- ◎ 機械戰警
- ◎ 醫工義肢

電子義肢

- ◎ 傳統義肢用來取代肢體的功能障礙，或是用來掩飾肢體傷殘
- ◎ 下肢義肢都會裝有關結及彈簧系統，甚至有電子動力回饋系統等，上肢義肢則有許多會利用鋼絲和彈簧，達到抓握等動作。
- ◎ 出現一些電子義肢，裡面裝有電腦及小型驅動器，能協助機械關節作出更恰當的細微動作。

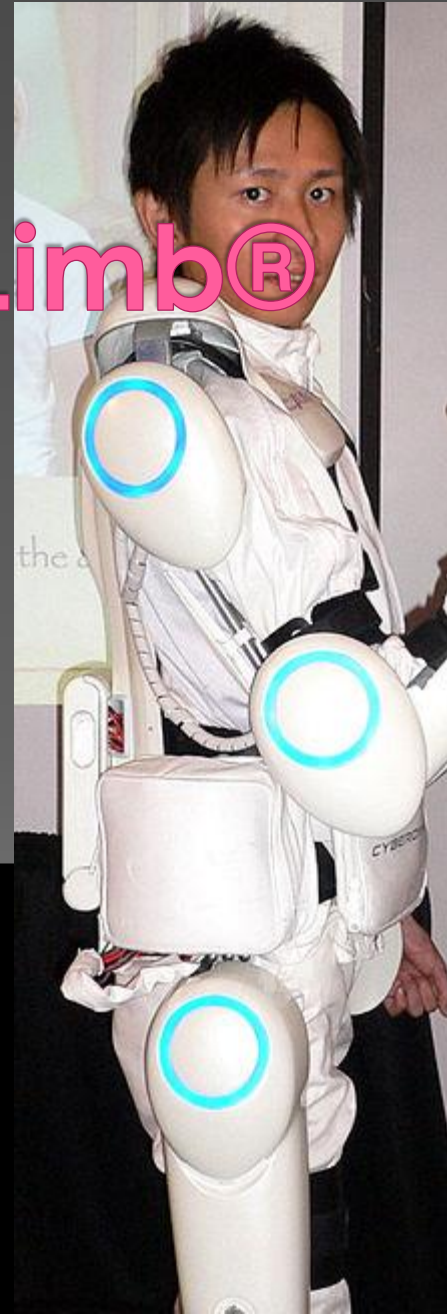
醫工義肢

- 目前醫學工程界亦積極研究人造神經或人造肌肉的研究，在將來，截肢者有望可以透過這些新科技，完全恢復肢體功能

實驗影片

- ◎ Monkey's brain controls robotic arm
<http://www.youtube.com/watch?v=wxlgdOIT2cY>
- ◎ Dean Kamen's Robotic "Luke" Arm
http://www.youtube.com/watch?v=R0_mLumx-6Y (1:40~)

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What's HAL

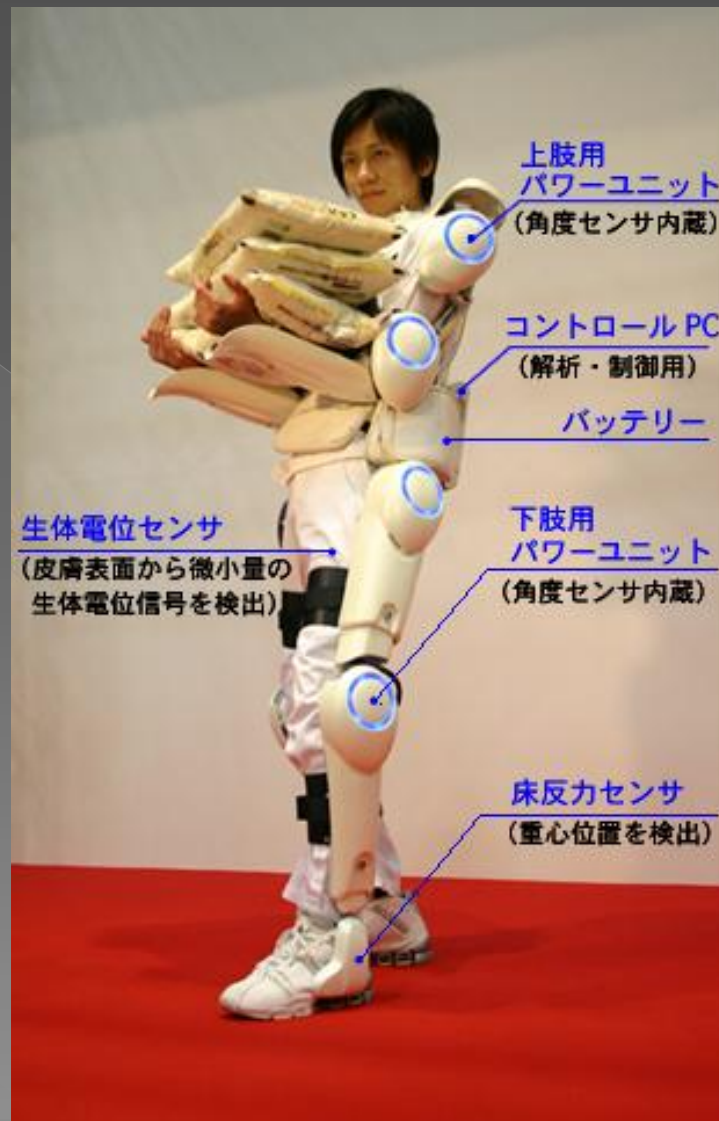
- A Robot Suit
- Exoskeleton



HAL-5 Type-B Specifications

Size	wearable robot Height 1,600mm
Weight	Full Body Type approx. 23kg (Lower body approx. 15kg)
Power	Battery Drive Charged battery(AC100V)
Continuous operating time	Approximately 2 hours 40 minutes
Motions	Daily Activities(standing up from a chair, walking, climbing up and down stairs) Hold and lift heavy objects and more...
Operation	Hybrid Control System
Working Environment	Indoor and outdoor

Mechanism



Functions

- ◉ 2 Control Modes Available
 - > Voluntary Control System
 - > Robotic Autonomous Control System

Cybernic Voluntary Control (Bio-Cybernic Control System)



When a person attempts to walk, for instance, the brain sends electrical impulses to muscles. when they arrive at muscles, faint bio-electrical signals appear on skin surfaces. "HAL"s system works as described below.



Faint bio-electric signals are observed on the surface of the skin.

Power units generate torque and put limbs into action.



Thus, HAL assists the wearer with an intended movement.

Robotic Autonomous Control System

- Use elementary movement in the database
- Forming a motion by constituting elementary motions
- Using the database coordinate each motion smoothly by power units
- Assisting the subject when there's no good bio-signal

Usage

- ◉ Rehabilitation support
- ◉ Physical training support in medical field,
- ◉ ADL support for disabled people
- ◉ Heavy labour support at factories
- ◉ Rescue support at disaster sites
- ◉ Entertainment

- ◉ <http://youtu.be/fy7ipDAyXtl>

Reference

- ◎ <http://www.cyberdyne.jp/>
- ◎ <http://sanlab.kz.tsukuba.ac.jp/>
- ◎ <http://www.wikipedia.org/>