

Robotic Arm for Persons with Upper-limb DisAbilities (RAPUDA)

A safe and cost-effective measure for improving the quality of life

We have developed a small and light robotic arm, Robotic Arm for Persons with Upper-limb DisAbilities (RAPUDA), taking into consideration future safety certification standards.

RAPUDA is a robotic arm having seven degrees of freedom in arm and hand parts; it weighs approximately 6 kg and has a payload of 0.5 kg. In RAPUDA, a original mechanism of a linear expansion and contraction is adopted in order to enlarge the field of vision of the user during operation and to reduce the number of pinching parts (joints) of the arm. Since RAPUDA has been designed considering future safety certification standards, double sensors for measuring joint movements, a high-reliability communication system and so on are adopted. Further, cost reduction of the robotic arm is considered and the arm should be available at easily affordable prices.

It is expected that this small and light robotic arm can be operated independently by persons with upper-limb disabilities, who would otherwise require assistance. To realize this, evaluations are carried out by users suffering from muscular dystrophy or cervical spine damage.

Woo-Keun Yoon

Intelligent Systems Research Institute

wk.yoon@aist.go.jp

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RAPUDA attached to an electric wheelchair

QuakeMap: a wide-ranging map showing the detailed strong ground motion

A wide range of information from several institutions is integrated and provided to users

We have developed the Quick Estimation System for Earthquake Maps Triggered by Observation Records (QuiQuake). QuakeMap, a part of QuiQuake, has been published on a website (<http://qq.ghz.geogrid.org/>) since October 13, 2009. In this system, an amplification capability map of ground motion (Vs30 map) based on a 250-m grid cell map of geomorphologic classification in Japan owned by AIST and seismic observation records from K-NET and KiK-net released by the National Research Institute for Earth Science and Disaster Prevention (NIED) are processed on a cluster computer of AIST. The system estimates and illustrates the wide-ranging and detailed ground motion of earthquakes immediately after the release of seismic observation records. Furthermore, ground motion maps for about 5,000 major earthquakes after June 1996 have been computed and archived such that they chronologically represent the seismic motions over the last 13 years. It is expected that these maps will be used as fundamental information for municipalities and private companies to develop business continuity plans (BCPs) and to take effective countermeasures against seismic disasters.

Masashi Matsuoka
m.matsuoka@aist.go.jp

Naotaka Yamamoto
naotaka@ni.aist.go.jp

Information Technology Research Institute

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QuiQuake System Overview
Seismic observation records of NIED and Vs30 maps are integrated and processed on a cluster computer, and published on the web as QuakeMaps.

