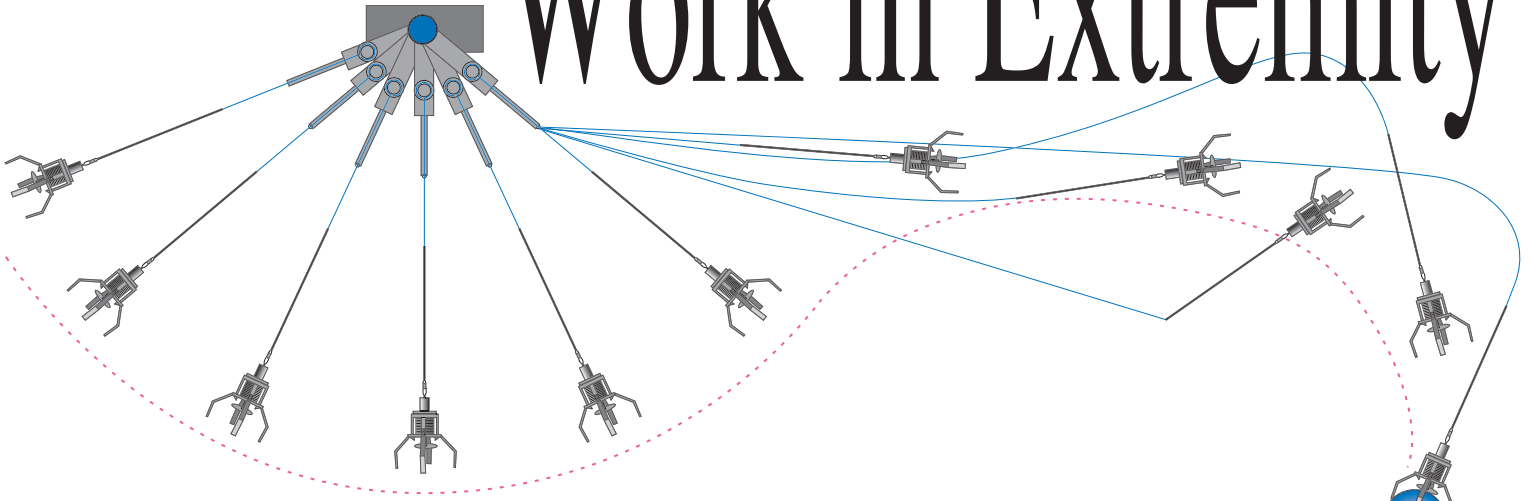


Work in Extremity



Never Off Target Casting Robot

The casting robot was developed, inspired by "fishing". Flexible materials similar to ropes or fishing line are incorporated into the mechanism in this invention. This robot has the ability to handle distant objects by "out-in" movement of its light-weight and flexible arms. It can also cast a "hand" to grip objects (gripper) to a target position with accuracy and controls the flying movement of the gripper to collect the target objects by changing the tension of the rope through the use of a braking system.

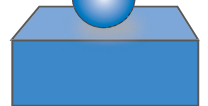
The casting robot ensures an extensive working area and it features a high moving speed and reduced energy consumption. On account of these advantages, it is expected to take an active role in field works which may be dangerous for humans such as civil engineering and construction projects, disaster relief, recovery efforts etc.



Gripper seizes a target object (Above)
Image of 3 Link Casting Robot (Left)

Free to Go, Free to Transform

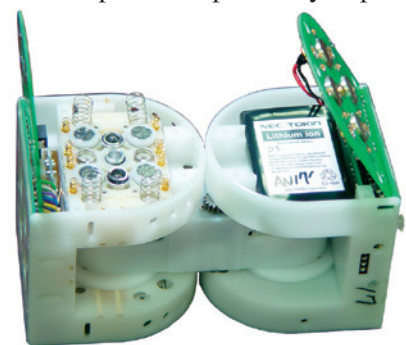
Modular Robot: M-TRAN



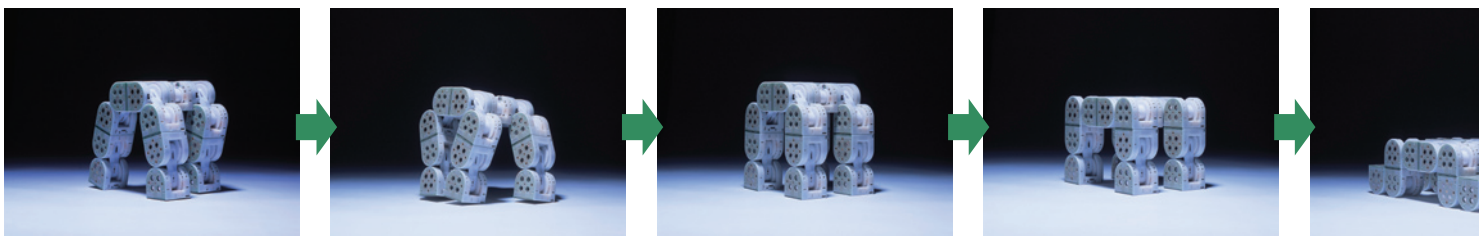
M-TRAN is a robot composed of several identical components called a module. A module works as a joint powered by an electric motor that is capable of controlling the connection with adjacent modules and communicating with other modules to determine the next move. The combination of the modules enable a robot to transform itself into another shape. The robot goes through a narrow ditch in a shape of a snake, walks and crawls on a flat terrain in a different form. It climbs over an obstacle which it runs into. Even if some of the modules fail to operate, it has a remarkable ability to maintain the integrity of overall functions by disposing of the broken modules and reconfiguring the entire system.

Various improvements were made to reduce the size and weight of the robot and to realize its battery operation. M-TRAN II is an important step forward towards the practical application in extreme conditions including in rescue operation, planetary exploration and so on.

(also see p.17 under)



M-TRAN II Module



Robotics at AIST for the Creation of Systems to Cater to Versatile Needs

Robotics research at AIST, boasting a thirty-year history, has contributed largely to the development of robotics and related industries by playing a major role in the promotion of national projects of research and development which aim at strengthening the foundations of the robot industry in Japan. The projects include the creation of robots working in extreme conditions, humanoids, etc.

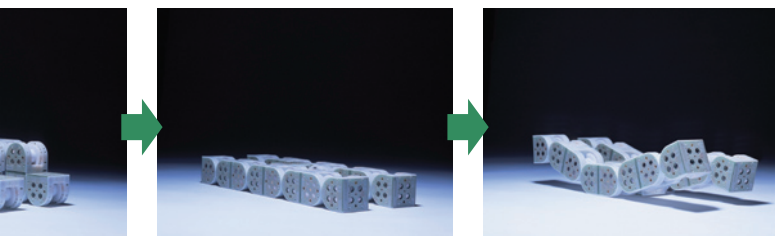
AIST researchers engage in research and development of the robots with various abilities under the motto of "Creation: Drawing a picture on an empty canvas according to the people's desire". There are a variety of robots, including those which function to replace people under various situation. There are robots with highly sophisticated abilities comparable to human specialists. The robots profiled in this feature article represent the achievements of our efforts to offer robots with smart intelligence that serve a useful purpose in society.

There are demands for robotics as resolution to a number of issues of the 21st century, such as an ageing population, environmental concerns, creation of new industries, etc. AIST must explore a scenario to expand the industry, fulfilling these expectations.

Although it is commonly recognized that Japan's robotic industry has international competitiveness, it is also true that the market size is limited as the technology application is focused on the manufacturing industry.

Enormous efforts will be called for in order to respond to the versatile needs of the users through the creation of products which will serve as a core of a new industry. AIST will assess the needs which can be met by the implementation of various technological seeds of AIST from the broader range of social demands. It is also demanded to propose and advocate the new concept of a robot that is feasible and meets social needs, based on the technological seeds AIST can offer.

AIST is striving for the further advancement of robotics research projects including the robots introduced in this article and development of robotics industry, that, we believe, will lead to the resolution of the key issues of our society in the 21st century.



Authors

World's Most Therapeutic Robot "Mental Commit Robot"

Nickname: "Paro"

Intelligent Systems Institute

Takanori SHIBATA

E-mail : is-office@m.aist.go.jp

Deft Fingers for Micro Manipulation Robot working in microenvironment

Intelligent Systems Institute

Tamio TANIKAWA

Kohtaro OHBA

E-mail : is-office@m.aist.go.jp

Safe, Precise and Minimal Intervention in Surgery

World's first MR-compatible surgical robot

The Institute for Human Science and Biomedical Engineering

Kiyoyuki CHINZEI

Home Page : <http://unit.aist.go.jp/humanbiomed/index.htm>

Handy Hands for Housework Robot with interchangeable hands

Intelligent Systems Institute

Fuminori SAITO

E-mail : is-office@m.aist.go.jp

Vision System for 3-D Perception and Recognition

"VVV" acts for human vision

Intelligent Systems Institute

Fumiaki TOMITA

E-mail : is-office@m.aist.go.jp

Robot Arm with Tactile Sensor throughout Body

Intelligent Systems Institute

Takashi SUEHIRO

E-mail : is-office@m.aist.go.jp

Haptic Interface Carries All Kinds of Force and Motion Information

Intelligent Systems Institute

Woo-keun YOON

E-mail : is-office@m.aist.go.jp

Ultimate Robot Humanoid Robot

Intelligent Systems Institute

Hirohisa HIRUKAWA

E-mail : is-office@m.aist.go.jp

Never Off Target Casting Robot

Intelligent Systems Institute

Hitoshi ARISUMI

E-mail : is-office@m.aist.go.jp

Free to Go, Free to Transform Modular Robot : M-TRAN

Intelligent Systems Institute

Haruhisa KUROKAWA

E-mail : is-office@m.aist.go.jp