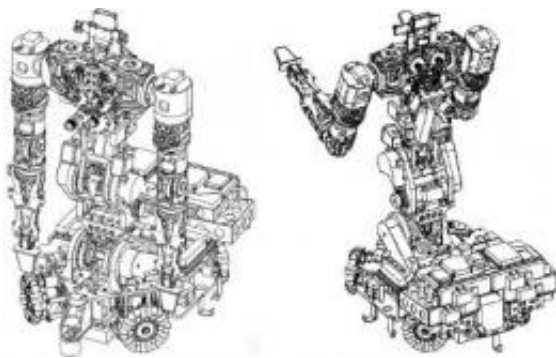


RIBA-II, the next generation care-giving robot

August 2 2011

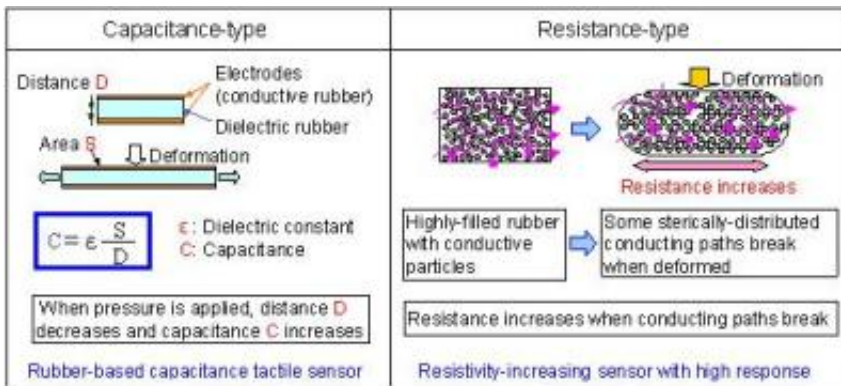


This shows the mechanical assembly of RIBA-II. Credit: RIKEN

A new robot using high-precision tactile sensors and flexible motor control technology has taken Japan one step closer to its goal of providing high-quality care for its growing elderly population. Developed by researchers at RIKEN and Tokai Rubber Industries (TRI), the new robot can lift a patient up to 80kg in weight off floor-level bedding and into a wheelchair, freeing care facility personnel of one of their most difficult and energy-consuming tasks.

With an elderly population in need of nursing care projected to reach a staggering 5.69 million by 2015, Japan faces an urgent need for new approaches to assist care-giving personnel. One of the most strenuous tasks for such personnel, carried out an average of 40 times every day, is that of lifting a patient from a futon at floor level into a wheelchair.

Robots are well-suited to this task, yet none have yet been deployed in care-giving facilities.

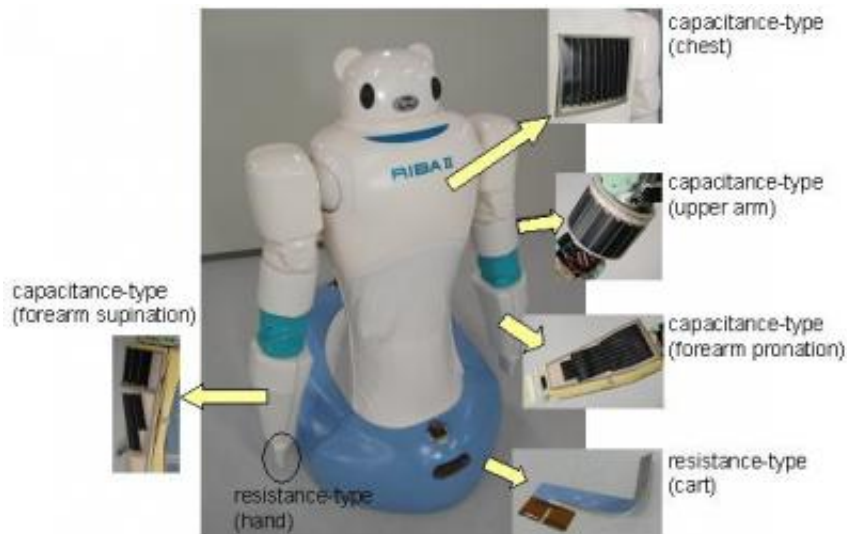


This table displays the capacitance and resistance-type Smart Rubber sensors in RIBA-II. Credit: RIKEN

In 2009, the RIKEN-TRI Collaboration Center for Human-Interactive [Robot](#) Research (RTC), a joint project established in 2007 and located at the Nagoya Science Park in central Japan, unveiled a robot called RIBA (Robot for Interactive Body Assistance) designed to assist in this task. The first robot capable of lifting a patient from a bed to a wheelchair and back, RIBA charted a new course in the development of care-giving robots, yet functional limitations prevented its direct commercialization.

RTC's new robot, named RIBA-II, overcomes these limitations with added power and functionality. New joints in the robot's base and lower back enable RIBA-II to crouch down and lift a patient off a futon at floor level (Figure 1), the most physically strenuous task for care-givers and one that RIBA was not able to do. RIBA-II accomplishes this task using newly-developed Smart Rubber sensors (Table 1 and Figure 2), the first capacitance-type tactile sensors made entirely of rubber. Printed in sheets and fitted onto the robot's arms and chest, the sensors enable high-

precision tactile guidance and allow RIBA-II to quickly detect a person's weight from touch alone, guaranteeing patient safety.



This figure shows the locations of Smart Rubber sensors in RIBA-II. Credit: RIKEN

In the future, RTC researchers will work together with partner [nursing care](#) facilities to test RIBA-II and further tailor it to the needs of care-givers and their patients, while also developing new applications in areas such as rehabilitation. TRI aims to bring care-giving robots like RIBA-II to the market in the near future, promising support for aging populations in countries around the world.

Provided by RIKEN

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