SYMPOSIUM 'GERONTROGICAL ROBOTICS'; CHAIR: TAKANORI SHIBATA (JAPAN)

Realization of an advanced robotic residence for the elderly / the physically handicapped

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This paper introduces a new (robotic) residence, 'Intelligent Sweet Home', developed at Human-friendly Welfare Robot System Engineering Research Center, KAIST, Korea for testing advanced concepts for independent living of elderly and physically handicapped individuals. The work focuses on human-friendly technical solutions for motion/mobility assistance, health monitoring, and advanced human-machine interfaces that provide easy control of both assistive devices and home-installed appliances. To improve the inhabitant's comfort, an intelligent bed, intelligent wheelchair and transferring system between bed and wheelchair were developed and tested. The solutions applied to their design comply with the most of users' requirements and suggestions collected by special questionnaire survey among the Korean handicapped persons. The smart house behaves in accordance with user's commands, recognized user's intentions, and current health status. Various interfaces based on hand gestures, voice, body movement and posture, and health monitoring system were studied and tested. In this paper, the design and functionality of main system components of 'Intelligent Sweet Home' are explained with emphasis on the overall structure of the system.

Report of continuous passive motion technology applying for therapeutic exercise

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It is normal to feel reluctance about many things, and aggressiveness tends to deteriorate when people get old. That is why the development of equipment that can induce spontaneous exercise (passive training for the person concerned) by compulsory training (active training for the person concerned receiving the exercise training) is demanded. The purpose of this study is how simply to construct the machine by using the result of the gotten/detected biological information of health enhancement. And this result is gotten by using the system which consists of multiple degree of freedom with the accurate control system for passive training, which makes trigger to induce the exercise by himself/herself. This reports the outline of this study to come up with the concrete method bringing the advantage of continuous passive motion technology by introducing along the following lines. First, the muscular strength effect and insulin sensitivity improvement are shown by using the horseback riding therapy system, which generally takes good result of balancing and activating the muscles of spinal, and legs as passive training. Second, the newly concept passive machine of focusing to the glucose uptake is introduced.

Tactile feeling device for touch-screen interface and its application to life-supporting robot

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This paper presents a transparent tactile feeling input device on the touch screen interface and its application to life-supporting robot system.
Touch-screen interface is commonly used around our lives because of its user-friendliness operationally and design flexibility. However, on the other hand, lacking of the tactile feeling on virtual displayed buttons becomes one of the disadvantages. We designed and fabricated transparent switch structure using silicone elastomer. In this case, high visibility was realized by attaching of the solvent which have the same reflective index as silicone. Click feeling are yielded by buckling phenomenon and measured in quantitatively by comparing of its keystroke and reaction force on the key top. Our device structure is so simple that it can fit on the ordinal touch screen interface easily. Furthermore, we applied the device to the life-supporting robot. Our face robot called CRF3 (Character Robot Face 3) has same input ways such as voice recognition or image recognition by cameras. But the ordinal characters or select inputs are depended on keyboard or mouse. So we applied the device as the input device on the screen in order to make the robot touchy-feely for beginners, children and elders.

Robot assisted activity for elderly people for one year - Progress report of long-term experiment

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A long-term experiment of robot assisted activity for elderly people has been conducted at a health service facility for the aged since Aug. 2003. Three therapeutic seal robots, Paro, were introduced there. The elderly people have interacted with Paro about one hour at a time, twice a week (Wednesday and Saturday). This paper describes the results of the experiment for one year. Face scales that consist of illustrations of person's faces were used to evaluate person's moods. In addition, Geriatric Depression Scales were used to measure person's depression by questionnaires. As the results, feelings of the elderly people were improved by interaction with the seal robots. Moreover, the robots encouraged them to communicate with each other and caregivers. The robots were very loved, and given new name, Maru, Maro, and Hana, respectively. In addition, the results of case studies showed that the seal robots kept its effects for one year. Especially, the robots improved their depression. We expect that the seal robot, Paro will come into wide use in elderly institutions, and improve their quality of life.

Efficacy of robot therapy evaluated by DIMENSION

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Playing with a pet robot 'Paro' causes activation of brain cortical neurons of demented patients, and this efficacy was quantitatively confirmed by DIMENSION which is based on 21ch EEG analysis. The patients were treated by 20-min robot therapy followed by 2-hour art therapy. Positive efficacy of the art therapy was already confirmed by DIMENSION and MMSE. In the present study improvement of cortical neuronal activity in eight patients was observed after 20-min robot therapy, and the following art therapy did not show further improvement. On the other hand, the art therapy caused improvement in four patients for whom the robot therapy had no effect.

PAPER SESSION 'COMMUNICATION (1)'; CHAIR: ARNE AARÅS (NORWAY)

Using the systems approach to develop computer training course guidelines for older adults

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Adults over the age of 65 are the fastest growing segment of computer users. Due to this increased demand, effective training programs are essential. Although previous research findings illustrate the importance of older adults' goals, abilities, and experience levels in learning to use computers, these factors are often neglected in the development of computer training courses. We apply a systems approach to help bridge this gap between research and application to address the disparity between what older adults would like to learn and the content of computer training courses. We review the literature on training older adults to use computers and report data from a set of structured interviews to illustrate the criticality of each step in the systems approach. Lastly, we provide the means to evaluate existing computer training programs and suggest modifications for improvement. Our purpose is not to evaluate specific programs, but to educate developers about an approach that has proven successful. Specifically, we provide suggestions for effective computer training for older adults.