Editorial

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This special issue is composed of selected papers from the *2009 IEEE International Conference on Networking, Sensing and Control (ICNSC'09)*. It was held at the Okayama University, Japan, March 26–29, 2009. A total of 211 papers were submitted to this conference among which there were 173 papers presented attracting over 200 participants all over the world. From this conference, five technical contributions of high quality on intelligent control and system are selected into this special issue. The contents of these studies are briefly described as follows.

In the paper, 'Hydrogen gas diffusion imaging using multiple FET type gas sensors', T. Kiwa, T. Yamaguchi, K. Tsubota, W. Naruyama, H. Yamada and K. Tsukada used arrayed sensors system in the cylindrical diffusion tank-shaped simulator to demonstrate the imaging of hydrogen gas concentrations. The field effect transistor type hydrogen sensors with platinum gate electrode are used. The sensitivity of the sensors is around –34.1(mV/dec) and the response time is 1.2 (sec.) in average. By applying a sensor drive circuit to each sensor, the diffusion processes of the hydrogen gas are successfully obtained in time domain and two different processes are demonstrated using 100% hydrogen gas. These results indicate that real-time monitoring of the hydrogen gas distribution can be possible. In addition, the calibration method of the acquired data is proposed.

In the paper, 'Adaptive control scheme achieving smooth control input in the presence of input saturation', N. Takagi, M. Oya, T. Kobayashi and Q. Wang focus on transient property of control input signal, and propose a novel model reference adaptive control scheme for time-continuous single-input single-output linear systems with the input saturation. To improve the control performance, a novel estimator using an observer for the output tracking error signal is proposed. Using the estimator, it can be shown theoretically that the tracking error between the controlled object output and the reference model output can converge to zero when the initial value of the tracking error satisfies a condition. Moreover, in the case when the initial tracking errors are zero, it can be also shown that the control input signal becomes close to the exact model matching input signal rapidly by setting only one design parameter, and then, the input saturation does not occur.

In the paper, 'Road edge recognition for mobile robot using laser range finder' by H. Wang, Z. Hu and H. Yu, it discusses the research status of road recognition for mobile robots, and presents a new method of applying laser range finder to obtain road edge points in order to solve the road recognition problems of outdoor mobile robot. This method makes full use of the advantages of laser range finder such as high accuracy and rapid data acquirement, and can realise the recognition of road edge in real-time. The road boundary recognition algorithm including the feature extraction and coordinate calculation is proposed. The fuzzy rules based data partition and the line-shape fitting using least square method are described. Finally, an experiment is conducted on an even road using a LT3 laser range finder installed on

an omnidirectional mobile robot and the experimental result shows the proposed method to be effective.

In the paper, 'Body-conducted speech retrieval from a noisy environment using differential acceleration' by S. Ishimitsu, M. Nakayama and S. Nakagawa, speech recognition tends to be influenced by noise in the air. Body-conducted speech offers a robust signal extraction method from noisy environments, particularly because body-conducted speech is a propagated sound and not easily influenced by noise. However, when body-conducted speech is extracted with an accelerator, the typical frequency component of 2 kHz or more decreases compared with normal speech. Thus, authors investigate a technique combining differential acceleration and noise reduction to estimate a clear signal using only body-conducted speech from a noisy room. The recognition rate confirmed about 3–4% is improved with proposed method.

In the paper, 'Wireless manual control for human adaptive mechatronics' by K. Tervo, M. Bocca, L.M. Eriksson and A. Manninen, it describes the implementation of a generic wireless joystick control for human adaptive mechatronics applications. The proposed implementation uses state-of-the-art wireless sensor node technology and it is easily installed and modified for the needs of different applications. The inherent drawbacks arising from the use of wireless communications, namely packet losses in the controller-to-actuator link, are tackled by introducing a novel compensation method that contributes to the stability and performance of the manually controlled system. Furthermore, the issues related to signal noise reduction and filtering at the joystick end are addressed. The joystick control is tested in two laboratory processes and the proposed compensation algorithm is implemented and tested in a trolley crane simulator.

As guest editors of this special issue, we would like to thank all the authors for their contributions. We wish that the readers can benefit from the above five papers. Finally, we would also like to thank the reviewers for their excellent job on evaluating these papers.