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## FOREWORD

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### Special Section on Brain Communication

Recent progress in brain science, especially in non-invasive methods, has enabled quantitative evaluation of human behavior and operation of electronic communication devices by direct brain-derived signals. Neural activities in cerebral cortex and peripheral nerves have been analyzed using imaging techniques, providing us with several models associated with human recognition and action. These advancements have lowered the barrier to realize the seamless communication between human and machine. In view of these circumstances, an interdisciplinary and comprehensive approach incorporating basic research is important to develop future brain-communication networks and to facilitate human communication effectively. The goals include biosignal-based communication network technology, novel intelligent device technology, and preference-based neuromarketing technology. Therefore, the Technical Committee on Brain Communication of Communication Society in IEICE organized a special issue to discuss recent advances in Brain Communication; it includes the following topics of interest:

- Brain-machine interface and neural prosthesis
- Brain functional imaging and signal processing techniques
- Memory and learning models in cerebral cortex
- Biofeedback in biomechanical system
- Communication of thoughts and *kansei*
- Neuroinformatics and retrieval methods

This special section consists of three invited papers, two selected papers and one letter that were selected from six submissions excluding three invited papers. The invited papers provide new aspects of human sensorimotor-learning and internal models, mentalizing-ability and its capability to human communication, and neural prediction for decision-making processes. The technical papers that this issue covers represent a wide range from brain-computer issues such as robot-arm control with alpha waves, NIRS-based toy-train operation to retrieval methods such as computer model-based prediction from eye movements. We hope that papers presented in this issue will provide useful insight and good references to researchers and engineers in this field.

Finally, I thank all the members of the editorial committee for their excellent work without which this issue could not be published.

Members of the Editorial Committee:

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Kazuhiko Sagara, Guest Editor-in-Chief

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**Kazuhiko Sagara** (*Member*) received the B.E., M.E. and Ph.D. degrees in electrical engineering from Keio University, Kanagawa, Japan in 1979, 1981 and 1991, respectively. He joined Central Research Laboratory, Hitachi, Ltd., in 1981, where he was engaged in the research and development of silicon devices, neural networks, photonic networks and ubiquitous-network architectures. He is now a senior researcher of Network Systems Department, Central Research Laboratory, Hitachi, Ltd. Since 2006, he has been active in the development of brain communication technologies and the chairman of the IEICE Technical Committee on Brain Communication. He was the recipient of the international professional of the year 2005 and the man of the year 2007. He is a senior member of IEEE.

