SPECIAL ISSUE ON NEW TRENDS IN SMART SENSOR SYSTEMS

PREFACE

Advances in sensor technology have made it possible to acquire various real-world data. Sensing targets have also diversified, including humans, artifacts, and the natural environment. In addition, the technological innovations in artificial intelligence (AI), big data, and Internet of Things (IoT) enable the collection and analysis of a large amount and variety of sensor data. As a result, modern smart sensor systems with intelligent capabilities have been developed in various fields.

Traditionally, the information contained in sensor data has been extracted by matching with rules created by experts. However, as the scale of the system grows, the number of rules becomes enormous, the program becomes complicated, and many exceptions occur. To overcome the limitations of such rule-based heuristic approaches, intelligent sensor applications aimed at automating rule acquisition using AI represented by deep learning have been developed in recent years.

In the manufacturing industry, AI is used to extract information from sensors attached to production machines. The obtained information is used for product quality evaluation and equipment maintenance. Even in agriculture and fisheries, where IT has not been used extensively, the use of smart sensor systems is gradually increasing. In these areas, AI is used for determining the growth status of crops and monitoring the condition of fish in cages. A similar trend can be seen in the healthcare and wellness areas. For the purpose of evaluating and managing health conditions, monitoring devices such as wearable sensors and cameras installed in an environment are used, where AI is used for the analysis of behavior logs obtained from these devices. In the field of education, e-learning systems have been developed, where AI behaves like an educational concierge that presents individually optimized learning for each learner.

In this special issue, we focus on new trends in smart sensor systems that contribute to people's daily lives, economic activities, agriculture and fisheries, education, healthcare and wellness, and so forth. After a thorough review process, seven papers related to smart sensor systems were accepted. It is expected that these papers can provide researchers with valuable resources and motivations to work on the challenging issues in different research themes.

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