

## CALL FOR PAPERS IEEE Sensors Journal Special Issue on

### *Deep Learning for Multi-Source Multi-Sensor Fusion*

With the rapid development of the internet and various electronic sensing systems, information fusion is today experiencing a radical transformation of which the coherent merging of information from multiple sources and sensors has become an important issue. In Industry 4.0, sensor fusion and machine learning are key components in cyber-physical systems, internet of things, cloud computing and cognitive computing for industrial automation. This new trend in manufacturing requires efficient technology to confront the challenges of sensing, transducing, processing, learning and evaluating on multi-sensor information. Deep learning, composed of multiple processing layers to learn representations of data with multiple levels of abstraction, have dramatically improved the state-of-the-art in many fields. It is specialized at discovering intricate structure in large data sets and among quantities of data objects.

Considering the new requirements of multi-source multi-sensor systems, a straightforward approach is to apply deep learning on different levels of fusion for mining information of the sensor data, e.g., pixel/signal, feature, decision, etc., for its inherent advantage. However, several issues still need careful considerations, from camera object recognition, activity recognition and analysis with smartphone sensors, detection and processing with infrared sensors, to efficient fusion strategy, uncertainty in sensing systems, data imperfection and conflicting, etc. In such a scenario, the project and development of deep learning as well as other intelligent vehicles for solving challenging problems of the multi-source multi-sensor information fusion need specific research and practical application.

Several perspectives and open research problems have to be investigated such as new architectures of deep learning for sensor fusion, cyber-physical systems, distributed sensor networks, applications to autonomous vehicles, Internet of Things (IoT), etc. Research and development have an important task to improve performances and features of multi-source multi-sensor fusion systems by including issues such as green communication, reliability assurance, high accuracy and system maintenance.

#### Scope

The present Special Issue aims to present and highlight the advances and the latest novel and emergent technologies, best practices, implementations, applications and even innovative research outcomes concerning the design and the development of deep learning for multi-source multi-sensor fusion and its applications. The scope of this Special Issue is to provide readers with a clearer overview of the current state-of-the-art on this field; the proposal will also stimulate international scientific community to suggest new features and ideas. It will provide a forum for the research community to share advances and new ideas in sensor fusion technologies.

The Guest Editors encourage submission of papers addressing sensing systems with deep learning, reinforcement learning and other intelligent technologies and the application fields. Original research contributions, tutorials, and review papers are even encouraged. Manuscripts should provide content to be accessible to general audiences working in the field. This call invites significant contributions in the field of deep learning dedicated to multi-source multi-sensor fusion on, but not limited to, the following topics:

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|--------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| Sensor detection and signal modeling using deep learning                             | Sensor fusion in distributed sensor networks and internet of things                                            |
| Novel deep learning structures for information fusion                                | Efficient multi-source multi-sensor fusion strategy                                                            |
| Multi-sensor object tracking and recognition                                         | Unsupervised learning for information fusion                                                                   |
| Activity recognition and analysis of smartphone sensors with artificial intelligence | Sensing and fusion in imperfect, imprecise environments                                                        |
| Information fusion of integrated wearable sensors                                    | Coping with uncertainty in fusion systems                                                                      |
| Situation awareness and resource allocation using deep learning                      | Applications to autonomous vehicles, cyber-physical systems, industry 4.0, defense and security, robotics etc. |

#### Submission Guideline

All manuscripts shall undergo the standard IEEE Sensors Journal peer review process. All manuscripts must be submitted on-line, via the *IEEE Manuscript Central*<sup>TM</sup>, see <http://sensors-ieee.manuscriptcentral.com/sensors>. When submitting, please indicate in the "Manuscript Type" roll down menu, and also by e-mail to Lauren Young, [l.young@ieee.org](mailto:l.young@ieee.org) that the paper is intended for the "Deep Learning for Multi-Source Multi-Sensor Fusion" Special Issue. Authors are particularly encouraged to suggest names of potential reviewers for their manuscripts in the space provided for these recommendations in *Manuscript Central*. For manuscript preparation and submission, please follow the guidelines in the *Information for Authors* at the IEEE Sensors Journal web page, <http://www.ieee-sensors.org/journals>.

#### Schedule

- **Submissions deadline: 31 Jan 2019**
- **Author notifications: 31 May 2019**
- **Revised manuscripts due: 31 July 2019**
- **Expected publication date: 1 Sept 2019**

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