

# IEEE TRANSACTIONS ON NEURAL NETWORKS AND LEARNING SYSTEMS

## Special Issue on Effective Feature Fusion in Deep Neural Networks

Due to the powerful ability of learning hierarchical features, Deep Neural Networks (DNNs) have achieved great success in many intelligent perception systems with image data and/or point cloud data and have been widely used in developing robust automotive driving, visual surveillance, and human-machine interaction. For example, state-of-the-art performances in image classification, object detection, semantic segmentation, and cross-modal perception are obtained by different kinds of DNNs. To a great degree, the success of DNNs stems from properly fusing the hierarchical features which are diverse in semantic-levels, resolutions/scales, roles, sensitivity, and so on. Representative fusion schemes include dense connection, residual learning, skip connection, top-down feature pyramid, and attention-based feature weighting. However, there is a large room for developing more effective feature fusion to improve the performance of DNNs so that machine perception can approach or exceed human perception.

This special issue focuses on investigating problems and phenomena of existing feature fusion schemes, tackling the challenges of semantic gap and perception of hard objects and scenarios, and providing new ideas, theories, solutions, and insights for effective feature fusion in DNNs for image and/or point cloud data. The topics of interest include, but are not limited to:

- Feature fusion for effective backbones and prediction
- Feature fusion for image/video data using deep neural networks
- Feature fusion for point cloud data using deep neural networks
- Adaptive feature fusion networks
- Criteria and loss functions for feature fusion in deep neural networks
- Feature fusion for detecting/recognizing small objects
- Feature fusion for detecting/recognizing occluded objects
- Attention-based feature fusion in deep neural networks
- Visualization and interpretation of feature fusion
- Feature fusion for semantic segmentation
- Feature fusion for object tracking
- Feature fusion for cross-modal/domain learning
- Feature fusion for 3D object detection
- New feature fusion problems and applications

### IMPORTANT DATES

- November 30, 2020: Deadline for manuscript submission
- February 1, 2021: Reviewer's comments to authors
- April 1, 2021: Submission deadline of revisions
- June 1, 2021: Final decisions to authors
- July 1, 2021: Publication date (Early access)

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