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Describing the content of a video/image automatically using natural language is a challenging task, which is significantly harder than image labelling and objects recognition. It requires not only accurate recognition of objects and background scenes but also their attributes, relations, and saliency (i.e., the likelihood of a recognized object to be mentioned in the generated text). Deep learning models have demonstrated great success in dealing with such complex computer vision tasks. Examples include the use of deep convolutional neural networks combined with recurrent models for image caption generation. Nevertheless, such deep learning approaches tend to lose details pertaining to important regional aspects in the image, and the generated captions tend to be short and less informative. As a result, complex deep learning models that are able to capture and translate regional details for better people/object/scene classification to facilitate accurate image label description generation are required. On the other hand, the success of deep learning models also relies on the identification of optimal architectures and hyperparameters that fit the task. In this regard, the superior search capabilities of evolutionary computing algorithms allow them to tackle diverse optimization problems including identification of optimal architectures and hyperparameters of deep learning models.

This special issue is dedicated to mathematical modelling, simulation, and/or analysis of deep learning and evolutionary computing models with complex, adaptive behaviours, and phenomena in science and in real life, as well as application and implementation of such complex deep learning and evolutionary computing models to computer vision tasks. The aim is to stimulate studies pertaining to not only complex deep learning-based computer vision systems but also optimal topology and hyperparameter identification for such deep complex networks through evolutionary computing and related paradigms.

Potential topics include but are not limited to the following:

- ▶ Complex deep neural networks on image description generation
- ▶ Complex deep neural networks on visual question generation or answering
- ▶ Deep neural networks and complex modelling on image segmentation
- ▶ Deep neural networks and complex modelling on visual saliency detection
- ▶ Deep neural networks and complex modelling on human or object attribute prediction
- ▶ Deep neural networks and complex modelling on large-scale object recognition
- ▶ Deep neural networks and complex modelling on scene classification
- ▶ Deep neural networks and complex modelling on human action recognition
- ▶ Deep neural networks and complex modelling on age estimation
- ▶ Deep neural networks and complex modelling on facial and bodily expression recognition
- ▶ Deep neural networks and complex modelling on language generation and speech recognition
- ▶ Evolutionary computing techniques for optimal structure identification for diverse deep complex neural networks and modelling
- ▶ Evolutionary computing techniques for optimal hyperparameter selection for diverse deep complex neural networks and modelling
- ▶ Evolutionary computing techniques for optimal topology and hyperparameter identification for diverse complex ensemble neural networks and modelling
- ▶ Complex neural networks for health monitoring and surveillance
- ▶ Deep learning applications and complex system modelling for social media data analysis (e.g., Facebook photo description generation, online news/medical image annotation, script generation for movies, automatic description generation for historical photos/paintings in museums, and health/security surveillance)

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