IEEE TRANSACTIONS ON NEURAL NETWORKS AND LEARNING SYSTEMS

Special Issue on

Deep Representation and Transfer Learning for Smart and Connected Health

Deep neural networks (DNNs) are one of the most effective and popular learning systems. However, determining how to best learn a set of data representations that are ideal for a given task remains a challenge. Representation and Transfer Learning (RTL) can facilitate the learning of complex data representations by improving the generalization performance of DNNs, and by taking advantage of features learned by a model in a source domain, and adapting the model to a new domain. Nonetheless, contemporary theory in RTL is unable to deal with issues such as: the inherent trade-off between retaining too much information from the input or learning universal features, limited data and changes in the joint distribution of the input features and output labels in the target domain, dataset bias, among others. Therefore, new theoretical mechanisms and algorithms are required to improve the performance and learning process of DNNs.

Smart and Connected Health (SCH), an emerging and complex domain, can benefit from new advancements in RTL. For instance, RTL can overcome the limitations imposed by the lack of labelled data in SCH by (i) training a model to learn universal data representations on larger corpora in a different domain, and then adapting the model for use in a SCH context, or (ii) by using RTL in conjunction with generative neural networks to generate new healthcare-related data to address class imbalance. Additionally, the use of RTL in designing SCH applications requires overcoming problems such as rejection of unrelated information, dataset bias or neural network co-adaptation.

This special issue invites novel contributions and high quality research articles addressing theoretical aspects of representation and transfer learning methods as well as theoretical work aimed to improve the generalization performance of deep neural network models. State-of-the-art works on applying RTL for developing smart and connected health intelligent systems are also welcomed. Topics of interest for this special issue include, but are not limited to:

Theoretical Methods:

- Distributed representation learning;
- Transfer learning;
- Invariant feature learning;
- Domain adaptation;
- Neural network interpretability theory;
- Deep neural networks;
- Deep reinforcement learning;
- Imitation learning;
- Continuous domain adaptation learning;
- Optimization and learning algorithms for DNNs;
- Zero and one-shot learning;
- Domain invariant learning;
- RTL in generative and adversarial learning;
- Multi-task learning and Ensemble learning;
- New learning criteria and evaluation metrics in RTL;

Application Areas:

- Health monitoring;
- Health diagnosis and interpretation;
- Early health detection and prediction;
- Virtual patient monitoring;
- RTL in medicine;
- Biomedical information processing;
- Affect recognition and mining;
- Health and affective data synthesis;
- RTL for virtual reality in healthcare;
- Physiological information processing;
- Affective human-machine interaction;

IMPORTANT DATES

- 31 March 2019 – Deadline for manuscript submission
- 30 June 2019 – Reviewer's comments to authors
- 31 August 2019 – Submission of revised papers
- 31 October 2019 – Final decision of acceptance
- December 2019 – Tentative publication date

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SUBMISSION INSTRUCTIONS

1. Read the Information for Authors at http://cis.ieee.org/tnnls.
2. Submit your manuscript at the TNNLS webpage (http://mc.manuscriptcentral.com/tnnls) and follow the submission procedure. Please, clearly indicate on the first page of the manuscript and in the cover letter that the manuscript is submitted to this special issue. Send an email to the leading guest editor, Dr. Vasile Palade (vasile.palade@coventry.ac.uk), with subject "TNNLS special issue submission" to notify about your submission.
3. Early submissions are welcome. We will start the review process as soon as we receive your contributions.