

Special Session Proposal

Title:

Transfer Learning

Abstract

Transfer Learning (TL) aims to transfer knowledge acquired in one problem, the source problem, onto another problem, the target problem, dispensing with the bottom-up construction of the target model. The TL approach has gained significant interest in the Machine Learning (ML) community since it paves the way to devise intelligent learning models that can easily be tailored to many different domains of applicability.

The following aspects have recently contributed to the emergence of TL:

- Generalization Theory: TL often produces algorithms with good generalization capability for different problems;
- Efficient TL algorithms: TL provides learning models that can be applied with far less computational effort than standard ML methods;
- Unlabeled data: TL can be advantageous since unlabeled data can have severe implications in some fields of research, such as in the biomedical field.

The topics of this special session are:

- Big Data with Deep Neural Networks;
- Generalization Bounds;
- Domain Adaptation or Covariate Shift;
- Algorithms for TL;
- New advancements in TL;
- Real-world applications.

Prospective papers:

Our team will send at least two papers and we are currently making efforts towards identifying potential submissions from other groups.

Some examples of our group's recent work on TL:

1. Amaral, T., Silva, L.M., Alexandre, L.M., Kandaswamy, C., de Sá, J.M., Santos, J.: Improving Performance on Problems with Few Labelled Data by Reusing Stacked Auto-Encoders. In: ICMLA (2014).
2. Amaral, T., Silva, L.M., Alexandre, L.M., Kandaswamy, C., de Sá, J.M., Santos, J.: Transfer learning using rotated image data to improve deep neural network performance. In: ICIAR (2014).
3. Kandaswamy, C., Silva, L.M., Alexandre, L.M., Santos, J., de Sá, J.M.: Improving Deep Neural Network Performance by Reusing Features Trained with Transductive Transference. In: ICANN (2014)
4. Alexandre, L.A., "3D Object Recognition using Convolutional Neural Networks with Transfer Learning between Input Channels", 13th International Conference on Intelligent Autonomous Systems, Springer, July 15-18, Padova, Italy, 2014.
5. Amaral, T., Silva, L., Alexandre, L.A, Kandaswamy, C., Santos, J.M., Marques de Sá, J. "Using different cost functions to train stacked auto-encoders", 12th Mexican International Conference on Artificial Intelligence, IEEE, November 24-30, 2013, Mexico City, Mexico, 2013.

Organizers:

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