TRANSFER LEARNING IN EVOLUTIONARY COMPUTATION

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Data mining, machine learning, and optimisation algorithms have achieved promises in many real-world tasks, such as classification, clustering and regression. These algorithms can often generalise well on data in the same domain, i.e. drawn from the same feature space and with the same distribution. However, in many real-world applications, the available data are often from different domains. For example, we may need to perform classification in one target domain, but only have sufficient training data in another (source) domain, which may be in a different feature space or follow a different data distribution. Transfer learning aims to transfer knowledge acquired in one problem domain, i.e. the source domain, onto another domain, i.e. the target domain. Transfer learning has recently emerged as a new learning framework and hot topic in data mining and machine learning.

Evolutionary computation techniques have been successfully applied to many real-world problems, and started to be used to solve transfer learning tasks. Meanwhile, transfer learning has attracted increasing attention from many disciplines, and has been used in evolutionary computation to address complex and challenging issues. The theme of this special session is transfer learning in evolutionary computation, covering ALL different evolutionary computation paradigms, including Genetic algorithms (GAs), Genetic programming (GP), Evolutionary programming (EP), Evolution strategies (ES), Learning classifier systems (LCS), Particle swarm optimization (PSO), Ant colony optimization (ACO), Differential evolution (DE), and Evolutionary Multi-objective optimization (EMO).

The aim is to investigate in both the new theories and methods on how transfer learning can be achieved with different evolutionary computation paradigms, and how transfer learning can be adopted in evolutionary computation, and the applications of evolutionary computation and transfer learning in real-world problems.

Topics

- Evolutionary supervised transfer learning
- Evolutionary unsupervised transfer learning

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- Evolutionary semi-supervised transfer learning
- Domain adaptation and domain generalization in evolutionary computation
- Instance based transfer approaches in evolutionary computation
- Feature based transfer learning in evolutionary computation
- Parameter/model based transfer learning in evolutionary computation
- Relational based transfer learning in evolutionary computation
- Transfer learning in in evolutionary computation for classification
- Transfer learning in in evolutionary computation for regression
- Transfer learning in in evolutionary computation for clustering
- Transfer learning in in evolutionary computation for other data mining tasks, such as association rules and link analysis
- Transfer learning in in evolutionary computation for scheduling and combinatorial optimisation tasks
- Hybridisation of evolutionary computation and neural networks, and fuzzy systems for transfer learning
- Hybridisation of evolutionary computation and information theory, statistics, etc., for transfer learning machine learning
- Transfer learning in evolutionary computation for real-world applications, e.g. text mining, image analysis, face recognition, WiFi localisation, etc.