GENETICS-BASED MACHINE LEARNING TO EVOLUTIONARY MACHINE LEARNING

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Evolutionary Machine Learning (EML) explores technologies that integrate machine learning with evolutionary computation for tasks including optimization, classification, regression, and clustering. Since machine learning contributes to a local search while evolutionary computation contributes to a global search, one of the fundamental interests in EML is a management of interactions between learning and evolution to produce a system performance that cannot be achieved by either of these approaches alone.

Historically, this research area was called genetics-based machine learning (GBML) and it was concerned with learning classifier systems (LCS) with its numerous implementations such as fuzzy learning classifier systems (Fuzzy LCS). More recently, EML has emerged as a more general field than GBML; EML covers a wider range of machine learning adapted methods such as genetic programming for ML, evolving ensembles, evolving neural networks, and genetic fuzzy systems; in short, any combination of evolution and machine learning. EML is consequently a broader, more flexible and more capable paradigm than GBML.

From this viewpoint, the aim of this special session is to explore potential EML technologies and clarify new directions for EML to show its prospects. This special session is the third edition of our previous special sessions in CEC2015 and CEC2016. The continuous exploration of this field by organizing the special session in CEC is indispensable to establish the discipline of EML.

Topics

- Evolutionary rule-based learning systems (e.g., learning classifier systems)
- Evolutionary reinforcement learning
- Evolutionary fuzzy systems
- Evolutionary neural networks

- Evolutionary systems applied to machine leaning (Genetic Programming, Artificial Bee Colony)

- Evolutionary feature selection and construction for machine learning

- Evolutionary Transfer learning

- Accuracy-Interpretability tradeoff in EML

- Applications and theory of EML

- Artificial immune systems