EVOLUTIONARY DYNAMIC MULTIOBJECTIVE OPTIMIZATION

Due to the widespread interest in dynamic multi-objective optimization in real-world applications, more and more approaches exploiting machine learning are deployed to tackle this type of problems. Unfortunately, recent works do not make full use of the data obtained during the optimization process, which could be benefit for model training thereby mining the dynamic characteristics of the underlying problem. To address this issue, we will survey recent research findings in deploying machine learning for dynamic multi-objective optimization driven by transfer learning, reinforcement learning and inverse reinforcement learning. Specifically, a knee point-based transfer learning method, called KT-DMOEA, for solving dynamic multiobjective optimization problems is recently proposed. In the proposed design, a trend prediction model is developed for producing the estimated knee points. Then, an imbalance transfer learning method is proposed to generate a high-quality initial population by using these estimated knee points. The advantage of this approach is that the seamless integration of a small number of high- quality individuals and the imbalance transfer learning technique can greatly improve the computational efficiency while maintaining the quality of the solution. On the other hand, IRL is widely used to recover the unknown reward function, making it possible to perform at an expert level. The notable features of the algorithm mainly include data-driven evolutionary technique, which uses inverse reinforcement learning as a surrogate-assisted model for model training. This design makes full use of the surrogate

management strategy based on inverse reinforcement learning to optimize the reward function within a reinforcement learning framework. At the same time, the algorithm can generate a promising policy based on limited training data during the optimization process to achieve better algorithm evolution and guide the search. The experimental results on the benchmark problems validate that the proposed algorithms above to be effective in dealing with dynamic multi-objective optimization.