

Avoiding Local Optima with User Demonstrations

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ABSTRACT

Interactive Evolutionary Algorithms (IEA) use human input to help drive a search process. Traditionally, IEAs allow the user to exhibit preferences among some set of individuals. Here we present a system in which the user directly demonstrates what he or she prefers. Demonstration has an advantage over preferences because the user can provide the system with a solution that would never have been presented to a user who can only provide preferences. However, demonstration exacerbates the *user fatigue* problem because it is more taxing than exhibiting preferences. The system compensates for this by retaining and reusing the user demonstration, similar in spirit to user modeling. The system is exercised on a robot locomotion and obstacle avoidance task that has an obvious local optimum. The system is compared against a general and a more specific fitness function designed to remove the local optimum. We show that our proposed system outperforms most variants of these completely automatic methods, providing further evidence that Evolutionary Robotics (ER) can benefit by combining the intuitions of human users with the search capabilities of computers.