

Search space difficulty of evolutionary Neuro-controlled legged robots

Abstract

The application of evolutionary computation for designing and generating artificial creatures such as robots and virtual organisms have become an important endeavor in artificial life and robotics research. However, the underlying fitness landscape for evolving artificial creatures remains largely unexplored. Furthermore, current landscape analysis methods fail to discriminate between the search space difficulties associated with different artificial evolutionary systems. In this paper, we provide a simple characterization of the search space associated with four basic types of ANN used for the control of legged robots. We show using random sampling and hill-climbing that a significantly large proportion of sampled genotypes yielded extremely low quality solutions. This is an indication that the objective space for evolving artificial creatures is highly skewed.