Multiobjectivity and complexity in embodied cognition

Abstract

We propose a novel perspective on the use of evolutionary multiobjective optimization (EMO) as a paradigm for evolving embodied organisms and as a framework for characterizing complexity. The paper demonstrates novel experiments that show the power of EMO in generating robots with different morphologies, yet with very similar locomotion abilities. The proposed framework for comparing the complexity of an object across different complexity measures allowed meaningful and quantifiable comparisons between the evolved organisms. We show empirically that the partial order feature inherited in the Pareto concept exhibits characteristics which are suitable for comparing between the complexities of artificially evolved embodied organisms.