COMPUTATIONAL INTELLIGENCE AND INFORMATION TECHNOLOGY
Communications in Computer and Information Science, 2011, Volume 250, Part 2, 630-636, DOI: 10.1007/978-3-642-25734-6_108

Discrete Binary Honey Bees Mating Optimization with Capability of Learning

Vahid Azadehgan, M. R. Meybodi, Nafiseh Jafarian and Farshad Jafarieh

Abstract

Honey Bees Mating Optimization (HBMO) is a novel developed method used in different engineering areas. Optimization process in this algorithm is inspired of natural mating behavior between bees. In this paper, we have attempted to create a reciprocal relation between learning and evolution which can produce an algorithm with the power of dominating local optimums and finding global optima. In the proposed model, a set of learning Automata, which can produce reinforcement signal by obtaining feedback from queens, is attributed to each drone. Simulation and comparisons based on several well-studied benchmarks demonstrate the effectiveness, efficiency and robustness of the proposed algorithms.

Keywords Honey Bees Mating Optimization - Learning Automata - Function Optimization

Fulltext Preview

Discrete Binary Honey Bees Mating Optimization with Capability of Learning

Vahid Azadehgan[1], M.R. Meybodi[2], Nafiseh Jafarian[1], and Farshad Jafarieh[1]

[1] Department of Information Technology, Sufi Razi Institute of Higher Education, Zanjan, Iran
[2] Soft Computing Laboratory, Department of Computer Engineering and Information Technology, Amirkabir University of Technology, Tehran, Iran
{V.Azadehgan,N.Jafarian,F.Jafarieh}@sufi.ac.ir,
MMeybodi@ce.aut.ac.ir

Abstract. Honey Bees Mating Optimization (HBMO) is a novel developed method used in different engineering areas. Optimization process in this algorithm is inspired of natural mating behavior between bees. In this paper, we have attempted to create a reciprocal relation between learning and evolution which can produce an algorithm with the power of dominating local optimums and finding global optima. In the proposed model, a set of learning Automata, which can produce reinforcement signal by obtaining feedback from queens, is attributed to each drone. Simulation and comparisons based on several well-studied benchmarks demonstrate the effectiveness, efficiency and robustness of the proposed algorithms.

Keywords: Honey Bees Mating Optimization, Learning Automata, Function Optimization.

1 Introduction

A very interesting swarm in nature is honey bee swarm that allocates the tasks dynamically and adapts itself in response to changes in the environment in a collective intelligent manner [1]. Honey Bees Mating Optimization (HBMO) algorithm is a typical swarm-based approach to optimization, in which the search algorithm is inspired by the honey bees mating process. The Honey Bees Mating Optimization Algorithm was first presented in [2], [3], and since then it was used on a number of different applications [4][5][6]. HBMO is an evolutionary computation algorithm which simulates the mating process of the queen of the hive. The mating process of the queen begins when the queen flights away from the nest performing the mating flight which the drones follow the queen and mate with her in the air .Learning Automaton (LA) is a general-purpose stochastic optimization tool, which has been developed as a model for learning systems. They are typically used as the basis of learning systems, which through interactions with a stochastic unknown environment learn the optimal action for that environment. The learning automaton tries to determine, iteratively, the optimal action to apply to environment from a finite number of actions that are available to it. The environment returns a reinforcement signal that shows the relative

V.V. Das and N. Thankachan (Eds.): CIIT 2011, CCIS 250, pp. 630–636, 2011.