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Letter to Editor

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ISVHAAI Letters: Letter No. 2

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ABSTRACT

International Society for Very Highly Advanced Artificial Intelligence (ISVHAAI) is an Artificial Intelligence Society which improves and applies Very Highly Advanced Artificial Intelligence (VHAAI) for solving various problems. This is the Letter No. 2 of ISVHAAI AI Society Letters. In this Letter No. 2, a new PSO algorithm titled "Kindness and Excellence Particle Swarm Optimization (KEPSO)" is designed.

Keywords: AI, VHAAI, ISVHAAI, PSO, Kindness, Excellence, Kindness and Excellence PSO, KEPSO.

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Introduction

Articles [1] - [12] shows the application and popularity of Particle Swarm Optimization (PSO) algorithm. In this letter, a unique PSO algorithm based on Kindness and Excellence has been designed. Section 2 shows PSO algorithm. Section 3 shows designed Kindness and Excellence Particle Swarm Optimization (KEPSO) algorithm. Conclusions are made in Section 4. References are shown at the end.

Particle Swarm Optimization

This Section shows PSO algorithm. Particles are initialized in line no. 1. In line no. 2 generation count is set to 0. Local best of each particle and Global best of all particles are identified in further lines. Velocity and Position of particles are updated in line no. 5 to line no. 8. Line no. 9 increments Generation counter. This process is continued and the loop terminates in line no. 10 when termination condition is reached.

Procedure

Particle Swarm Optimization (PSO)
1) Initialization of particles
2) Generation equals zero
3) Local best identification
4) Global best identification
5) Repeat for all particles and each dimension
6) Velith,dth = Weight*Velith,dth + Cone*Rnd(0,1)*(parbith,dth – posith,dth) + Ctwo*Rnd(0,1)*(gbdth – posith,dth)
7) posith,dth = posith,dth + Velith,dth
8) Loop end
9) Generation equals Generation plus one
10) End loop if termination condition is reached

Kindness and Excellence Particle Swarm Optimization

In Kindness and Excellence Particle Swarm Optimization (KEPSO), one particle is selected as Kindness particle and another particle is selected as Excellence particle. In KEPSO, velocity is updated where each particle (posith) moves towards kindness particle and excellence particle in addition to movement towards local best of each particle and global best of all particles. In line no. 8, kparticle means Kindness particle and KC stands for Kindness acceleration coefficient whereas eparticle stands for Excellence Particle and EC stands for Excellence acceleration coefficient. Hence in KEPSO movement of particles is guided by not only local best and global best but also the positions of Kindness particle and Excellence particle.

Procedure

Kindness and Excellence Particle Swarm Optimization (KEPSO)
1) Select one particle as kindness particle
2) Select one particle as excellence particle
3) Initialization of particles
4) Generation equals zero

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5) Local best identification
6) Global best identification
7) Repeat for all particles and each dimension
8) Velith,dth = Weight*Velith,dth +
Cone*Rnd(0,1)*(parbith,dth – posith,dth)
+ Ctwo*Rnd(0,1)*(gbdth – posith,dth)
+KC*Rnd(0,1)*(kparticleith,dth – posith,dth)
+ EC*Rnd(0,1)*(eparticleith,dth – posith,dth)
9) posith,dth = posith,dth + Velith,dth
10) Loop end
11) Generation equals Generation plus one
12) End loop if termination condition is reached

Conclusions

Two concepts Kindness and Excellence are incorporated into PSO algorithm to design a new KEPSO algorithm. There is scope to deal with Kindness and Excellence separately and design separate algorithms for Kindness and Excellence like Kindness Particle Swarm Optimization (KPSO) and Excellence Particle Swarm Optimization (EPSO). However, in this letter both concepts are added to PSO algorithm to design a novel KEPSO algorithm.

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