Happiness and Health Particle Swarm Optimization

Satish Gajawada
IIT Roorkee Alumnus
satish.gajawada.iit@gmail.com

Abstract—**Happiness and Health Particle Swarm Optimization (HaHePSO) algorithm is created by incorporating the Happiness and Health concepts into Particle Swarm Optimization (PSO) algorithm.**

Keywords—Particle Swarm Optimization, PSO, Happiness, Health, Happiness and Health Particle Swarm Optimization, HaHePSO, Artificial Intelligence, AI

I. INTRODUCTION

In [1] Money Particle Swarm Optimization (MyPSO) is created by incorporating the money concept into Particle Swarm Optimization (PSO) algorithm. In this article the concept of health and happiness is incorporated into PSO algorithm for creating Happiness and Health Particle Swarm Optimization (HaHePSO). For the sake of simplicity the literature review [2] – [20] for this article is taken from article [1]. For the sake of completeness it is necessary to show second section PARTICLE SWARM OPTIMIZATION in this article. Hence second section is taken from article [1] without any modifications and placed in this article as second section. Happiness and Health Particle Swarm Optimization (HaHePSO) is explained in third section. Finally conclusions are made in fourth section.

II. PARTICLE SWARM OPTIMIZATION

In PSO, at first all particles are initialized. Current Generation is initialized to 0. The local best of each particle is identified. The global best of all particles is identified. Velocity and Position are updated as shown in Step 5 to Step 8. Current Generation is incremented by 1. This loop is continued until termination condition is reached in step 10.

Procedure: Particle Swarm Optimization (PSO)
1) All particles are initialized
2) Current Generation is set to 0
3) Identify local best of each particle
4) Identify global best of all particles
5) For each particle and for each dimension do
6) $v_{i,d} = w*v_{i,d} +$
$\qquad C1*Random(0,1)*(pbest_{i,d} – x_{i,d})$
$\qquad + C2*Random(0,1)*(gbest_d – x_{i,d})$
7) $x_{i,d} = x_{i,d} + v_{i,d}$
8) End For
9) Current Generation is incremented by 1
10) loop until termination condition is reached

III. HAPPINESS AND HEALTH PARTICLE SWARM OPTIMIZATION

In Happiness and Health Particle Swarm Optimization (HaHePSO), local happiness best (happiness_pbesti), global happiness best (happiness_gbest), local health best (health_pbesti), global health best (health_gbest) are maintained in addition to local best of each particle and global best of all particles. In HaHePSO, velocity is updated where each particle (xi) moves towards local happiness best (happiness_pbesti), global happiness best (happiness_gbest), local health best (health_pbesti), global health best (health_gbest) in addition to local best of each particle and global best of all particles.

Procedure: Happiness and Health Particle Swarm Optimization (HaHePSO)
1) All particles are initialized
2) Current Generation is set to 0
3) Identify local best of each particle
4) Identify global best of all particles
5) Identify local happiness best of each particle
6) Identify global happiness best of all particles
7) Identify local health best of each particle
8) Identify global health best of all particles
9) For each particle and for each dimension do
10) $v_{i,d} = w*v_{i,d} +$
$\qquad C1*Random(0,1)*(pbest_{i,d} – x_{i,d})$
$\qquad + C2*Random(0,1)*(gbest_d – x_{i,d})$
$\qquad +C3*Random(0,1)*(happiness\_pbest_{i,d} – x_{i,d})$
$\qquad + C4*Random(0,1)*(happiness\_gbest_d – x_{i,d})$
$\qquad +C5*Random(0,1)*(health\_pbest_{i,d} – x_{i,d})$
$\qquad + C6*Random(0,1)*(health\_gbest_d – x_{i,d})$
11) $x_{i,d} = x_{i,d} + v_{i,d}$
12) End For
13) Current Generation is incremented by 1
14) loop until termination condition is reached

IV. CONCLUSIONS

Happiness and Health Particle Swarm Optimization (HaHePSO) algorithm is introduced in this article. In this algorithm each particle is associated with happiness and health variables. In HaHePSO algorithm each particle moves towards local happiness best (happiness_pbesti), global happiness best (happiness_gbest), local health best (health_pbesti), global health best (health_gbest) in addition to local best of each particle and global best of all particles. As stated in [1], one may not conclude that Happiness and Health Particle Swarm Optimization (HaHePSO) algorithm will perform better than plain PSO algorithms which don't have happiness and health variables associated with each particle.

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