Title Goes Here

Your Names Go Here

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Abstract. Very brief overview of this paper

1 Introduction

Shortly introduce what this paper is about. This does not need to be in-depth, but should at least mention the assignment and your selected algorithm + reference(s), such as to the original paper on particle swarm optimization [1].

2 Algorithm Description

Give a general overview of the working principles of your algorithm. Make sure to always put quotation marks around animal names, and try to use strict formulations. For example, you can introduce your algorithm by referring to 'bats', but afterwards you should refer to them as individuals or search-points.

3 Pseudo-code

Modify the pseudo-code given in Alg. 1. Do not deviate from the format used here. Aim to be as precise as possible, and always use mathematical notation instead of referring to 'bats', 'chickens' etc. Please follow the following notation convention:

- n: The dimensionality of the search space
- $\mathbf{x} = (x_1, x_2, \ldots, x_n)$: A solution candidate from $\mathbb{R}^n$
- $\mathbf{x}_i$: Solution candidate i in the set/array
- $f(\mathbf{x}_i)$: Objective function value of $\mathbf{x}_i$ ($f : \mathbb{R}^n \to \mathbb{R}$)
- M: Number of individuals in set/array
- $\leftarrow$: Assignment operator
- $\mathcal{U}(\mathbf{x}^{\min}, \mathbf{x}^{\max})$: Vector sampled uniformly at random. Here it is 'U' for uniform. For other distributions, use for example $\mathcal{N}(0, 1)$ for a single number sampled according to the normal distribution with mean 0 and variance 1.

If you need to use any other notation, please be consistent and clearly define your added notation. In case of doubt, feel free to ask questions on the blackboard forum.

References

1. Eberhart, R., Kennedy, J.: Particle swarm optimization. In: Proceedings of the IEEE international conference on neural networks. vol. 4, pp. 1942–1948 (1995)

Algorithm 1 Shark Smell Optimization

$NP \leftarrow User \quad assigned$ ▷ Initialize
$\mathbf{k}_{max} \leftarrow User \quad assigned$
$\mathbf{k} \leftarrow 1$
for $i = 1 \to k_{max}$ **do**
  $\alpha_k \leftarrow User \quad assigned$
  $\beta_k \leftarrow User \quad assigned$
  $\eta_k \leftarrow User \quad assigned$
end for
for $i = 1 \to NP$ **do**
  for $j = 1 \to ND$ **do**
    $x_{i,j}^{1} \leftarrow Random \quad assigned \quad within \quad allowed \quad range$
  end for
end for
while $k < k_{max}$ **do**
  for $i = 1 \to NP$ **do** ▷ Forward Movement-Speed
    for $j = 1 \to ND$ **do**
      $v_{i,j}^{k} \leftarrow \eta_k \cdot R1 \cdot \frac{\partial(OF)}{\partial x_j}\Big|_{x_{i,j}^{k}} + \alpha_k \cdot R2 \cdot v_{i,j}^{k-1}$
      if $\left|v_{i,j}^{k}\right| > \left|\beta_k \cdot v_{i,j}^{k-1}\right|$ **then**
        $\left|v_{i,j}^{k}\right| \leftarrow \left|\beta_k \cdot v_{i,j}^{k-1}\right|$
      end if
    end for
  end for
  for $i = 1 \to NP$ **do** ▷ Forward Movement-New position
    $Y_i^{k+1} \leftarrow X_i^k + V_i^k$
  end for
  for $i = 1 \to NP$ **do** ▷ Rotational Movement-Local search
    for $m = 1 \to M$ **do**
      $Z_i^{k+1,m} \leftarrow Y_i^{k+1} + R3 \cdot Y_i^{k+1}$
    end for
  end for
  for $i = 1 \to NP$ **do** ▷ Rotational Movement-Local search
    for $m = 1 \to M$ **do**
      $X_i^{k+1} \leftarrow \max(Z_i^{k+1,m})$
    end for
    $X_i^{k+1} \leftarrow \max(X_i^{k+1}, Y_i^{k+1})$ ▷ Evaluate
  end for
  $k \leftarrow k + 1$
end while