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CHAROTAR UNIVERSITY OF SCIENCE AND TECHNOLOGY

ALGORITHM:

CL_HC2RCEDUMDA: CHAOTIC LEVY Hybrid Ring Cellular Encode-Decode UMDA

Developed by:

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CL_HC2RCEDUMDA : It is the modified version of the HC2RCEDUMDA using CHAOTIC LEVY distribution. This algorithm uses a cellular estimation of distribution algorithm similar to CUMDANCauchy. The search space is reduced by transforming continuous variables to categorical variables and then inverting the process, basically using an encoding-decoding method. This algorithm also estimates an univariate marginal distribution from the neighborhoods' best individuals. More information about the HC2RCEDUMDA is given in [1].

LEVY DISTRIBUTION

It is a random walk, the length of which is derived from the Levy distribution as described in following equation. Where, 'u' and 'v' obtain from the normal distribution. The most species (e.g. swordfish and Silky sharks) and insects use Levy flights to hunt for food . In CL_HC2RCEDUMDA algorithm, the function of levy step is to efficiently exploit and explore the search space by generating the new population using the LEVY STEP to obtain the global solution. The behavior of Levy flights in 50 successive steps beginning at origin (0,0) is illustrated in Figure 1.

$$Step\_Length = \frac{u}{|v|^{1/\beta}}, Where, u = rand(0,1) * Sigma, v = rand(0,1)$$

$$Sigma = \left\{ \frac{\Gamma(1+\beta) * \sin(\Pi * \beta)}{\Gamma[(1+\beta)/2] * \beta * 2^{(\beta-3)}} \right\}^{1/\beta}$$ Where β called levy co-efficient.

$$ccrand = rand(1, I\_D)$$

$$ccpos = ((1./ccrand) - floor(1./ccrand))/2$$

$$CHAOTIC\_LEVY\_DISTRIBUTION = unifrnd(0.2, 0.2, 1).* Step\_Length * (ccpos)$$

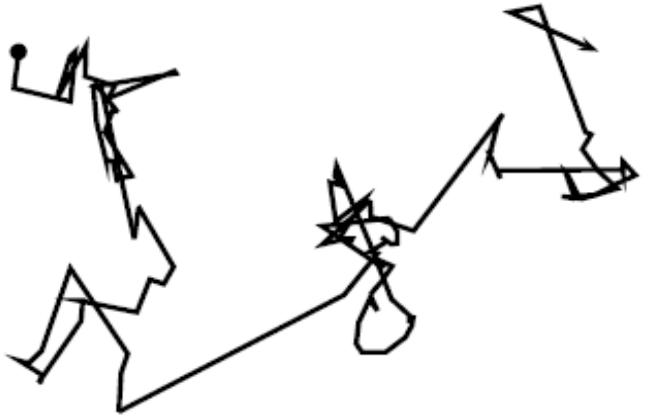

FIGURE 1 . Illustration of levy flight .

CHAOTIC LEVY DISTRIBUTION is the enhance version of the levy distribution. In this, the randomly generated number using GAUSS map CHAOTIC equation is used in the levy distribution for improving the diversity and quality of new population and it finally improves the global search ability of the algorithm.

References

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