Random Search Algorithms

Artificial Bee Colony (ABC) Algorithm
This algorithm classifies inspired by bee colony behavior that assign agents to specific roles known as the employed, onlooker, and scouts. This algorithm accomplishes the goal of optimally exploring and collecting the most food sources from a unknown region for large swarms with large search area. The implementation is simple and utilizes random walk. Works best when the number of agents is equal to or greater to the number of available sources.

Cuckoo Search with Levy Search Algorithm
Algorithm inspired from the Cuckoo birds who increase their likelihood for reproduction by laying their eggs in a host bird nest. The fascinating thing is that they carefully select nests that resembles their owns. It is said that once a chick is hatched, their extinct is to evict the host eggs. This ensures that with each egg the likelihood that a cuckoo finds the best nest will increase and in turn successfully deliver baby chicks for survival. In addition, the algorithm uses levy flight behavior inspired by insects like the fruit flies that goes paths goes straight path and with a sudden 90 degrees turn. The benefit of this algorithm is that Levy walk is said to the best solution for fast local search. This algorithm is comparative to existing GA and PSO methods since it utilizes metaheuristics of the search with levy flight. Results from the simulation shows that the Cuckoo Search is more efficient and have higher potential success rates than other Generic algorithms due having fewer parameter to turned.

Distributed Random Search Algorithm
Algorithm focuses on satisfying the following characteristics minimal probability of failure, scalability , inexpensive , parallel tasking. The algorithm have five behavioral rules and are prioritized by order. 1) Avoid obstacle and fellow robots, 2) Find targets and alert neighboring robots. 3) Response to neighboring robots' messages, 4) Follow external commands. 5) Wonder in the environment. Each robot is said to be controlled independently by those behaviors. Robots are limited to 8 cells surrounding them. The environment is discretized into unit cells. Local communication and sensing are limited to those neighbor cells. The results show that their is a good threshold of robots in the environment before the challenge of overcrowding happens. The things relevant to our research are those basic behaviors could be implemented into physical robots, the prioritized behaviors are similar to the basic behavior of our swarm, and it discretized area to enhance search time.

References
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