

## I. Basic concept and principle

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In computer science and operations research, the bees algorithm is a swarm-based optimization algorithm. It mimics the food foraging behavior of honeybee colonies. In its basic version the algorithm performs a kind of neighborhoods search combined with global search and can be used for both combinatorial optimization and continuous optimization. The only condition for the application of the Bees algorithm is that some measure of distance between the solutions is defined.

The Bees Algorithm is an optimization algorithm inspired by the natural foraging behavior of honeybees to find the optimal solution [15]. The algorithm requires several parameters to be set, namely: number of scout bees ( $n$ ), number of sites selected out of  $n$  visited sites ( $m$ ), number of best sites out of  $m$  selected sites ( $e$ ), number of bees recruited for best  $e$  sites, number of bees recruited for the other ( $m - e$ ) selected sites, initial size of patches which includes site and its neighborhood and stopping criterion.

**Step 1. Initialize population with random solutions.**

**Step 2. Evaluate fitness of the population.**

**Step 3. While (stopping criterion not met) //Forming new population.**

**Step 4. Select sites for neighborhood search.**

**Step 5. Recruit bees for selected sites (more bees for best  $e$  sites) and evaluate fitnesses.**

**Step 6. Select the fittest bee from each patch.**

**Step 7. Assign remaining bees to search randomly and evaluate their fitnesses.**

**Step 8. End While.**

## II. Compare the Bee algorithm and Ant algorithm to see what advantages and disadvantages of both algorithms

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Bee algorithm is population-based algorithm and Ant algorithm is a model-based search. They are both aiming at finding aiming to search for an optimal path in a graph

**Advantages:** Simplicity, flexibility and robustness, ability to explore local solutions, ability to handle objective cost, ease of implementation, popular, broad applicability, complex functions

**Disadvantages:** Lack of use of secondary information, requires new fitness tests on new algorithm, parameters, higher number of objective function evaluation, Slow when in sequential processing.

### III. Bonus visualization What kinds of problems are suitable to each algorithm?

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Bees algorithm can be used for both combinatorial optimization and continuous optimization.

Ant colony optimization algorithms can be used for Scheduling problem, Vehicle routing problem, Assignment problem, Set problem, Device sizing problem in nanoelectronics physical design, Antenna's optimization and synthesis, Image processing and so on

### IV. Reference

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Comparison of Ant Colony and Bee Colony Optimization for Spam Host Detection (R. Sagayam<sup>1</sup>, Mrs. K. Akilandeswari<sup>2</sup>)  
<sup>1</sup>Research scholar Department of computer science Govt. Arts College (Autonomous) Salem-636007  
<sup>2</sup>Asst. professor Department of computer science Govt. Arts College (Autonomous) Salem- 636007)  
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