**Fitness Dependent Optimizer: Inspired by the**

**Bee Swarming Reproductive Process**

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**Abstract Title:**

*Fitness Dependent Optimizer: Inspired by the Bee Swarming Reproductive Process*

**Abstract:**

An optimization algorithm is proposed which is inspired by the Bee Swarming Process during their reproductive cycle of life. When the Scout Bees search for a new location to build its Bee Hive, it gathers important features that it found in that area and then all the Scout Bees meet and exchange the features they got. The feature that most Bees support is considered best location. Likewise, in our Algorithm, we are going to randomly choose some features and move towards best features. Hence, an optimal value for a problem is searched with less time. Instead of searching all the feature combination in a dataset, we find optimal feature based on the information that the Bee gathers. While moving from one feature to another feature combination, we find a pace (velocity) at which it should change. We find this Pace(velocity), by comparing it with the best Bee feature set. If the fitness didn’t improve, we go with the previous pace at which we moved. If still we didn’t get a better fitness, we go with a random walk. We can apply this algorithm in different real-world applications. One such example is, When we have a priority of buildings in a city, we can use this alogrithm to choose the optimal location to build a apartment(flat) in that city. Ie, we choose a optimal location to build the apartment such that Schools, IT parks, Entertainment Malls are nearer to it. When comes to efficiency, we compared this algorithm with different other Particle Swarm Optimization algorithms like Genetic algorithm (GA), Dragonfly algorithm (DA) and Whale Optimization algorithm (WOA). As a result, it out performs these algorithms in some cases and performs comparably in other cases. This algorithm is a Heuristic algorithm. It searches a solution by trial and error. It hopes that the solution found is of good quality and corrects its mistake everytime they move on. It takes less amount of time in comparison with traditional algorithms like Gradient-based and quadratic algorithms. Everytime when a feature set is found, a fitness value is calculated. In this algorithm, we have the freedom to alter the fitness function according to the problem.