A COMPREHENSIVE STUDY OF VARIOUS ARTIFICIAL BEE COLONY (ABC) ALGORITHMS USING GREEDY AND DYNAMIC TECHNIQUE

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Abstract: This review paper compares the algorithm optimization problems of various bees. When we solve an optimization problem using a greedy technique it will give a suitable result. It will only give a final result. It does not compare to other results. This problem is solved by dynamic technique when we solve the optimization problem using a dynamic technique which checks all the results and gives the best suitable result and also stores the result in the table. The results of various algorithms showed that the algorithm proved effective to improve search performance by using the dynamic techniques in place of greedy technique.

Key Words: Artificial Bee Colony Algorithm (ABC), Dynamic Programming (DP), Particle Swarm Optimisation (PSO), Group Search Optimization (GSO), Hybrid Energy-Efficient Distributed Clustering (HEED), Distributed Local Area Networks (DLAN), Gravitational Search Algorithm (GSA).

INTRODUCTION

Artificial Bee Colony (ABC) algorithm is an efficient optimization algorithm, it is based on mimics the foraging behavior of honey bees [2]. It has few good characteristics, such as simple concept, some control parameters, and strong searchability. ABC algorithm has been widely applied to many optimization problems [3].

Few studies point out that ABC algorithm has snow convergence and weak exploitation ability in solving complex problems [4]. In ABC, there are many bees and food sources (called solutions). The process of search food sources is abstracted to find potential solutions. For bees, Karaboga defined a simple model to search new solutions (food sources) by changing one dimension of the current solutions (parent solutions) [5]. This may result in very small differences between new solutions and their corresponding solutions. Thus, the convergence speed becomes very slow.

Greedy algorithm
A greedy algorithm, as the name suggests, always makes the choice which seems to be the best at that moment. The greedy algorithm always finds the best solution. It is a very important search technique. Mostly researchers used to this technique for search. When we use this technique reduces the path as well as time. A greedy algorithm is algorithmic that follows the problem-solving of making the locally optimal choice at each stage with the hope of finding a global optimum.

Greedy algorithms have some advantages and disadvantages:
It is quite easy to come up with a greedy algorithm (or even multiple greedy algorithms) for a problem. This technique is much simpler than other techniques at run time for Greedy algorithms. For Greedy technology Divide and Conquer techniques, this technique is not yet clear whether it is fast or slow. For Greedy algorithms, we need accuracy issues. More effort is needed to understand. To prove that the greedy algorithm is correct is more an art than a science. Most greedy algorithms are not correct.
List of Algorithm based on Greedy Algorithm
The greedy technique is more powerful and works well for a wide range of problems. Many algorithms can be viewed as applications of Greedy algorithms, such as:

- Prim’s Minimal Spanning Tree Algorithm
- Kruskal's Minimal Spanning Tree Algorithm
- Dijkstra’s Minimal Spanning Tree Algorithm
- Graph - Map Coloring
- Graph - Vertex Cover
- Knapsack Problem
- Job Scheduling Problem
- Travelling Salesman Problem

Dynamic Programming
The dynamic technique is a very important technique, this technique gives very accurate results, its result is always right because it sees every possible outcome and then decides only after that. This is because it stores the result and gives the most accurate result as well as saves time. Since it stores all the results in a table, so whatever result is needed, it first checks in the table. If that result is found. This saves time. This technique gives a hundred percent pure results. Therefore, this technique becomes very important. This technique is much better than the greedy technique.

There are two ways of doing this.
1.) Top-Down: Through this technique, we divide the problem into small parts and solve the problem and store the result in a table. We call it memorization.
2.) Bottom-Up: In this process, it is guaranteed that the sub problems are solved before solving the problem.

REVIEW OF LITERATURE
Celal Ozturk et al suggested that the artificial bee colony algorithm is applied to deploy stationary and mobile sensor network speeds to achieve better results by trying to increase the coverage area significantly by the network. The results suggest that the artificial bee colony algorithm can perform better in the dynamic deployment of wireless sensor networks. The performance of the algorithm has been compared with several particle swarm optimization algorithms, which is also a swarm-based technology and is formerly used in wireless sensor network deployment.

Dervis Karaboga et al suggested that an energy-efficient clustering mechanism, based on an artificial bee colony algorithm, has been demonstrated to prolong the lifetime of the network. A bee colony algorithm, by simulating the intelligent foraging behavior of a bee swarms, has been successfully used in clustering techniques.

R. Vijayashree et al suggested he focused extensively on WSN on a large scale, allowing for a certain amount of data latency by examining mobile sync balancing consisting of three aspects: maximizing data collection, minimizing the path of mobile, And to optimize network reliability. To address these problems, this paper proposes several mobile sink based data collection algorithms, which introduce energy balanced clustering and artificial B colony based data collection.

Palvinder Singh Mann et al proposed the clustering algorithm presents an efficient cluster formation mechanism with improved cluster head selection criteria based on a multipurpose fitness function. This is a very good algorithm. It takes minimum energy for algorithmic data transmission. The routing algorithm is designed to consume the minimum energy with the least hop-count for data transmission.

Sung-Soo Kim et al presented the simulation results show that the ABCC algorithm uses particle swarm optimization (PSO), group search optimization (GSO), low-energy adaptive clustering hierarchy (LEACH), LEACH-centralized (LEACH-C), and hybrid energy-efficient distributed clustering (CWSNs in energy). HEED for management. It is very useful for energy management. Different algorithms have been compared.

Ying Liu et al presented a research paper focusing on the basic biological principles and mathematical operators of ABC has been presented, and then-recent critical research on ABC with algorithm improvements and aspects of engineering applications has been widely presented and analyzed.

Amani Saad et al presented a goal programming-based multi-objective artificial bee colony optimization algorithm to solve the problem of the topological design of distributed local area networks.

Hashim A.Hashim et al proposed approach improves the network lifetime considerably when compared to solutions reported in the literature such as Shortest Path 3-D grid Deployment (SP3D) algorithm.

Tauseef Ahmad et al proposed it is stated here that the fitness function for ABC is calculated based on three parameters, namely, residual energy; Distance from the sink station; And intra-cluster distance.
Alina Rakhk Ajayan et al suggested an improved ABC algorithm has been proposed to match the various features of the wireless sensor network deployment process, which would be very good for real-time dynamic network functioning. Wireless sensor networks play an important role in the modern-day world; therefore it is important to develop an optimal design flow. This is excellent.

Zaher Al Aghbari et al proposed much research has been done over the past years to determine an optimal path between source and destination nodes, resulting in maximizing the energy conservation of a network. The challenge is to create a routing algorithm that takes into account the major issues of minimizing energy consumption and maximizing the lifetime of the network. This paper is presented to minimize energy consumption and maximize network life.

Satvir Singh et al proposed here is how to better determine the locations of the base transceiver station, so that they can set up a minimum number of BTS to cover a large number of customers at a lower infrastructural cost. The need for optimal utilization of available resources has pushed researchers towards investigating swarm intelligence-based optimization algorithms to support design and planning decisions. Population-based Evolutionary Algorithms are developed by modeling the behaviors of different swarms of animals and insects, e.g., ants, termites, bees, birds, fishes.

Babajide O. Ayinde et al proposed Here RN deploys using two other evolutionary techniques - Gravitational Search Algorithm (GSA) and Differential Evolution (DE) and compares them with existing solutions using ABC.

S.Sivakumar presented In this algorithm, sensor nodes use the location information of beacon packets of mobile anchor nodes as well as packets in the location of neighboring nodes to further improve accuracy in the localization of sensor nodes. The proposed artificial bee colony (ABC) algorithm is included with MAP-M. The main idea of localization is that some nodes with known coordinates that are deployed called anchor nodes transmit beacons with their coordinates to help other nodes in the sensing region to localize themselves.

**METHODOLOGY**

In this review, we see the difference between greedy and dynamic techniques. Study the various papers on greedy technique and we got a fast accurate result. When we find the largest number in a graph and give different values and use to greedy technique, then we fail to find the accurate result, and also it doesn’t memorize the result. When we use the dynamic technique, then we got a fast result and also memorize the result. When we find the largest number in a graph and give different values and used to the dynamic technique, then we got an accurate result, and also it is memorizing the result.

**Example:** In this graph, we find the largest number using the greedy technique. When we are implementing the greedy technique, then we got the result is 48. The greedy technique always chooses the minimum path in the above graph it is choosing to 8 and then 40 but we want to largest number in this situation greedy technique fail. When we are implementing the dynamic technique, then we got the result is 75 which is the largest number of the graph. Dynamic technique always chooses to all path of the graph and makes a table and stores the all data then give the result which we want minimum or maximum.

**The general scheme of the ABC algorithm is as follows:**

1. Bee Initialization Phase
2. Set the Loop Employed Bee
3. Phase Onlooker Bee
4. Phase Scout Bee Phase
5. Dynamic Search (Memorize the best solution found)
6. Until the loop is terminated
CONCLUSION

In review, the various bee colony algorithms and works of literature show that different algorithm gives different result if compare one to another algorithm then they give a better result. There are lots of opportunities to improve search performance using the dynamic technique in place of the greedy technique. In research, it is still needed to identify the problems where the ABC algorithm can do better as compared to other optimization algorithms. If we use the dynamic technique in place of the greedy technique then we got a better result as compared to the greedy technique. There is an opportunity to improve search performance using the dynamic technique in the artificial bee colony algorithm.

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