Throughput Comparison using Artificial Bee Colony (ABC) Algorithm with Dynamic Technique for Improving Data Optimization

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Abstract:

The artificial bee colony algorithm may be an effective optimization method for the acquisition model of bees where Clustering is a good approach to provide a better route that doesn't cause any problems when transmitting data. Also, clusters have a high degree of resemblance within themselves but a low degree of similarity between them. For processing large dimensional data, the usual optimization approach is ineffective. Hence, this paper introduces Throughput Comparison using Artificial Bee Colony (ABC) Algorithm with Dynamic Technique for Improving Data Optimization Technique to generate an initial population of pathways connecting the source and destination node. Consequently, to pick a food source **Employee bees** linked with explicit food sources, **onlooker bees** watching the movement of employee bees inside the hive to pick a food source, and **scout bees** looking for food sources randomly make up the condition of artificial bees in the ABC algorithm. This paper show the better throughput as compare to FANET-GSO, IGSO, UCRA-GSO and ACI-GSO Techniques.

Keywords: Artificial bee colony algorithm, dynamic technique, data optimization, wireless sensor network, throughput, better route.

Nomenclature

P_j	Probability
D	Dimension vector
y^i_{min} and y^i_{max}	Boundaries of the parameters.
$\phi_{ji}(y_{ji} - y_{ki})$	Step size
$k \in \{1,2 \ldots . S_n\}$ and $i \in \{1,2 \ldots . D\}$	Two indices
fit_j	Fitness of jth source

1. Introduction

WSNs (Wireless Sensor Networks) may self-organize a large number of small sensor nodes with limited battery power [1]. With the limitation of radio range, the sensor nodes in the network are efficient enough in facilitating packet transmission between them. These sensor nodes are also capable of sensing, monitoring, and recognizing physical elements in real-time environments [2].

This sensor network is made up of an infinite number of sensor nodes that may communicate with each other and with an external base station to provide dependable data distribution [3]. Low cost, small size, high compute power, ease of communication over short distances, and many functional features of data processing, routing, and sensing are all possible properties of wireless sensor nodes [4].It is used to perform data aggregation and sensing activities. Sensor devices, in particular, present a challenge in terms of recharging their power sources in hostile environments where they are neglected. As a result, the energy conservation of sensor nodes in a hostile environment is a hot topic that needs to be addressed to extend the network's lifetime cost-effectively and efficiently [5].A variety of research strategies have been proposed in the literature to conserve energy in sensor nodes so that the focus can be on extending the network lifetime [6]. However, the sensor nodes' limited energy, memory, computation time, and computational capabilities create critical concerns that harm the network's performance. Furthermore, the network's lifespan is solely determined by the number of resources available and the use of an effective clustering technique in the network.An acceptable clustering routing protocol is separated into three parts as an effective technique to reduce WSN energy consumption: cluster setup phase, cluster heads (CHs) election phase, and data transmission phase. The sensor node groups in the detection region form clusters of various sizes during the cluster setup phase.In the CHs election phase, some nodes are selected as CHs while the remaining nodes act as member nodes based on a certain electoral method. Finally, the member nodes are in charge of gathering environmental data and transmitting it to the CHS during the data transmission phase. The CHs deliver the data to base stations (BS) of various sizes after aggregation and data transformation.

Clustering, which organises closely situated sensor nodes into groups called clusters, is useful for attaining effective and efficient cluster management in this setting. A designated sensor node is known as the cluster head (CH) exists in each cluster and serves as an anchor in establishing connections between individual cluster members and cluster members with the base station. In other words, clustering is a grouping mechanism in which the cluster head nodes are solely responsible for delivering the aggregated data from the sensor nodes to the base station [7].This clustering method is thought to be used to assign extra roles to sensor nodes at the highest level of network architecture. WSN's clustering approach increases the likelihood of increasing efficiency and performing energy consumption optimization.

Wireless sensor networks (WSNs) have become active fields of research due to their integration with sensor technology, distributed information processing, embedded technology, wireless communication, and microelectronic method, among other things. WSNs are widely employed in domains such as target tracking, environmental monitoring, and national security, and underwater detection because of their benefits in low energy consumption and dispersed self-organization ability.Coverage is an important issue in WSN because of its connection to energy conservation, connectivity, and network reconfiguration. It primarily focuses on how to distribute the sensors to ensure enough coverage of the service area, with at least one sensor monitoring each position in the service area. For WSN to be effective, it must have adequate coverage. The network's configuration and communication consumption will be reduced, and resource management will be improved if sensors are deployed efficiently. In the field of robotics, path planning is a critical subject. It is a method for finding a collision-free path from a starting point to a destination point in the presence of barriers. Depending on the situation, the path should be optimized using some plausible algorithm, with the optimization criterion being time, distance, or energy. Wherepath planning can be done in either a familiar or unfamiliar setting. Obtaining a path in an unfamiliar environment is a tough undertaking because the environment's map is unknown [8]. Even though robots are equipped with sensors and a global positioning system, having a precise plan in advance is not viable owing to uncertainty. Classical approaches and intelligent approaches are two types of path planning methodologies [9].The artificial bee colony algorithm was introduced [10] for robot path planning. The proposed algorithm goal was to reduce the amount of time and space spent traveling. For efficient path planning of mobile robots, [11] presented an artificial bee colony method. The algorithm is divided into two parts: Creating a collision-free path from the beginning point to the goal place and then optimising it with the bee colony method. This was accomplished by the use of the exclusive technique. [12] suggested a global convergence algorithm based on an artificial bee colony and hybridised with chaos.In this research, the round-based network lifespan is used to examine a routing technique based on the Artificial Bee Colony (ABC) algorithm, whose preliminary performance findings were published in [13].Similarly, the ABC algorithm is extended by replacing the simple ABC algorithm selection [14] and introducing a probabilistic selection scheme that assigns probability values to feasible solutions based on their fitness values and infeasible individuals based on their violations [15].To address this issue,Honey Bee Optimization was proposed (HBO) to reduce energy consumption by searching for the most efficient approach at the lowest cost and performs better in terms of energy efficiency metrics such as scalability and link quality [16].Where, energy-efficient routing method, a competent optimization technique known as Lion (FLION) clustering algorithm was created. Consequently, the energy and lifetime of network nodes can be developed by this clustering approach using a quick collection of CHs[17].As a result, the energy clusters are built using the biologically inspired searching features of the ABC approach.The model's complexity is also investigated with this test. The ABC algorithm is used to build the proposed routing strategy for time-based WSNs that send data regularly.

The contribution of this paper is as follows,

- To implement ABC(Artificial Bee Colony) algorithm using the dynamic technique.
- To pick a food source, follow the general scheme of the ABC algorithm (i.e., employee bees, onlooker bees, and Scout bees phase).
- Remember the finest solution attained so far.
- For searching data, implement the employee and onlooker phase in the dynamic technique.

The reminder of the paper has been organized as follows: section 2 presents the recent literatures; section 3 depicts the detail description of the proposed methodology; section 4 discusses the implementation results; finally, section 5 concludes the paper.

2. Literature Survey:

Behzad Nozohour-leilabady, et al.[18] proposed the use of a new advancement process called the artificial bee colony, which was tested for selecting the best well locations. Under basically comparable settings, the ABC execution as compared to the results of the molecular swarm enhancement calculation. In addition, the issue of an increased number of enhancement limits was addressed by taking into account scenarios involving distinct injectors and maker wells, as well as cases including straying wells in a genuine supply model. Hence, the typical results reveal that ABC dominates PSO after very short development cycles, demonstrating the compelling case for ABC method to be used for well-being.

Ilango, et al. [19] One of the significant difficulties mentioned is that the time it takes to perform a standard calculation is longer and that preparing a large amount of data is exceedingly difficult. For the calculation, the dataset size is shifted and correct timings are planned. Consequently, the outcome is observed for various wellness and likelihood esteems, which are derived from the used and spectator periods of the ABC calculation, from which the additional adjustments of the grouping error rate are made. The proposed ABC Algorithm is implemented using mapper and reducer programming in a Hadoop environment.

Aghdam, et al. [20]Programming testing was given as a cycle for determining the nature of a product framework. Physical trials are available for a variety of small and medium-sized programming enterprises. Testing will be extremely time-consuming and costly due to the product broad proliferation in large-scale projects. As a result, automated programming testing is seen as a solution for easing and rearranging the substantial and cumbersome tasks associated with programming testing.

Okdem et al. [19] The impact of the Artificial Bee Colony Algorithm on the direction of activity in WSNs is investigated. They obtained an execution result that suggests that the pre-owned convention provides a longer organisation lifetime by conserving energy.

Yue, et al. [21] The collection of provided data is a key activity in a variety of remote sensor network applications. Traditional data collection techniques only focus on increasing the amount of data collected or decreasing overall organisation energy usage, designed the proposed heuristic calculation to take into account bunch head selection, the steering path from normal hubs to the group head hub, and flexible Sink way arranging advancement. Hence, the proposed computation can successfully reduce data transfer, conserve energy, increase network data collection proficiency and consistency, and extend the organization's lifetime.

Yu, et al. [22]Sensor deployment is one of the primary themes in wireless sensor networks (WSN) for increasing sensor coverage rates. A sensor deployment technique based on the modified ABC algorithm is proposed in this study by altering the update equation of the spectator bee and scout bee of the original artificial bee colony (ABC) algorithm. For increasing convergence speed, new parameters such as forgetting and neighbor factor, as well as the likelihood of mutation for optimizing coverage rate, are introduced. In comparison to the deployment technique based on the original ABC and particle swarm optimization (PSO) algorithm, simulation results revealed that the proposed methodology can achieve a better performance in coverages.

Vijayashree, et al. [23] indicated that the hub leftover energy is used in the group political race. Where, the proposed calculation can successfully reduce information transmission, conserve energy, increase network information assortment proficiency and dependability, and extend the organisation lifetime when compared to other calculations such as Random walk and Ant Colony Optimization.

Beg, et al. [24] proposed Artificial Bee Colony features a strong hunt capability combined with Particle Swarm Optimization to find the greatest administrators, and molecular search takes the shortest jump out of nearby favorable conditions to achieve the organization better route. The advancement of ABC calculations, the development of subroutine swarms, and faster molecule identification all contribute to better organisation execution and more exact route selection.

Famila, et al. [25] They present an Improved Artificial Bee province streamlining based Clustering computation employing the benefits of the Grenade Explosion Method and the Cauchy Operator to encourage the perfect determination of Cluster Heads. The Artificial Bee Colony calculation is prevented from becoming stuck in neighborhood optimal by this consolidation of GEM and Cauchy administrators, which enhances the combination rate.

Panda, et al. [26] The goal of the ebb and flow research centre is to plan energy efficient calculations for WSNs to extend the life of the organisation. Consequently, to boost the organization's energy ability, they offer an artificial bee colony computation with a grouping model. The reenactment findings illustrate the prevalence of the ABC calculation while considering various calculations in increasing the organization's energy proficiency and life span.

Ozturk, et al. [27]The dynamic arrangement, as proposed, is one of the most important factors that directly influence the exhibition of remote sensor organisations. Where the artificial bee colony computation is used to improve the dynamic arrangement of permanent and portable sensor organisations by attempting to enlarge the organization inclusion zone. The results reveal that artificial bee colony calculation is the best option for dynamic sensor organisation transmitting.

Hussain, et al. [28] The Artificial Bee Colony (ABC) optimization-based approach for co-clustering of high-dimensional data is presented. We propose using higher-order correlations to construct similarity between rows and columns, each based on the other, rather than a linear metric like the Euclidean distance. Hence, this metric employs co-evolving similarities, which, when incorporated into the objective function, results in the co-clusters being optimized.

Karaboga, et al. [29]The Artificial Bee Colony (ABC) Algorithm is an optimization algorithm based on honey bee swarm intelligence. The ABC algorithm is utilized to optimize multivariable functions in this study, and the results of ABC, Genetic Algorithm (GA), Particle Swarm Algorithm (PSO), and Particle Swarm Inspired Evolutionary Algorithm (PS-EA) are compared. ABC algorithms, according to the data.

Brajevic,et al.[30]Feature selection is a basic pre-processing activity that involves analysing intricate interactions among characteristics in a feature set to eliminate irrelevant or redundant features.This research proposed a binary artificial bee colony (ABC) algorithm for feature selection issues, which is created by incorporating evolutionary-based similarity search processes into a binary ABC variation.

Deng, et al. [31] To optimize the bitcoin investment portfolio, the artificial bee colony (ABC) algorithm is used. Because the traditional ABC method can only address single-objective optimization problems, an external population is created to help it improve. The findings show that the modified ABC algorithm can maximize many aspects in an investment portfolio at the same time, reduce investor decision-making error, and improve the balance between investment returns and risks. This study proposes a binary artificial bee colony (ABC) algorithm for feature selection problems, which is created by combining evolutionary-based similarity search mechanisms with an existing feature selection technique.

From the survey,[18] the issue of an increased number of enhancement limits was addressed by taking into account scenarios involving distinct injectors and maker wells. [19] significant difficulties mentioned are that the time it takes to perform a standard calculation is longer and that preparing a large amount of data is exceedingly difficult.[20] time-consuming and costly due to the product broad proliferation in large-scale projects.[21] decreasing overall organization energy usage, designed the proposed heuristic calculation. [25]Artificial Bee Colony calculation is prevented from becoming stuck in neighborhood optimal [28] utilized to optimize multivariablefunctions.[30] created by incorporating evolutionary-based similarity search processes into a binary ABC variation.As a result, there is a need to develop ABC algorithm with intelligent techniques.

3. Artificial Bee Colony Algorithm with dynamic technique:

Honey bee foraging behavior is the motivation for ABC Algorithm. One of the swarms found in nature is the honey bee swarm, which searches for food in a collective cognitive manner. The honey bee swarm has several characteristics, including the ability to convey information, memorize the environment, retain and share information, and make decisions based on that information. Consequently,the initial population construction is relatively sensitive to the Artificial Bee Colony algorithm, and it has a limited search range. This is one of the main reasons for the population of potential solutions to migrate the search space to a better-fitting part.The network's lifetime is the most important issue in WSN. As a result, in order to sustain versatility, hubs are frequently gathered in groups led by a pioneer, commonly referred to as a bunch head.Thus to cope up with the aforementioned issues, a novel **ABC algorithm with dynamic technique** has been proposed in this work for transmitting data to the base station and assisting the overall hubs in sending detected data to target hubs. Hence, the use of energy by cluster head (CH) is more prominent than that of general hubs with improved network performance which is illustrated in fig.1.

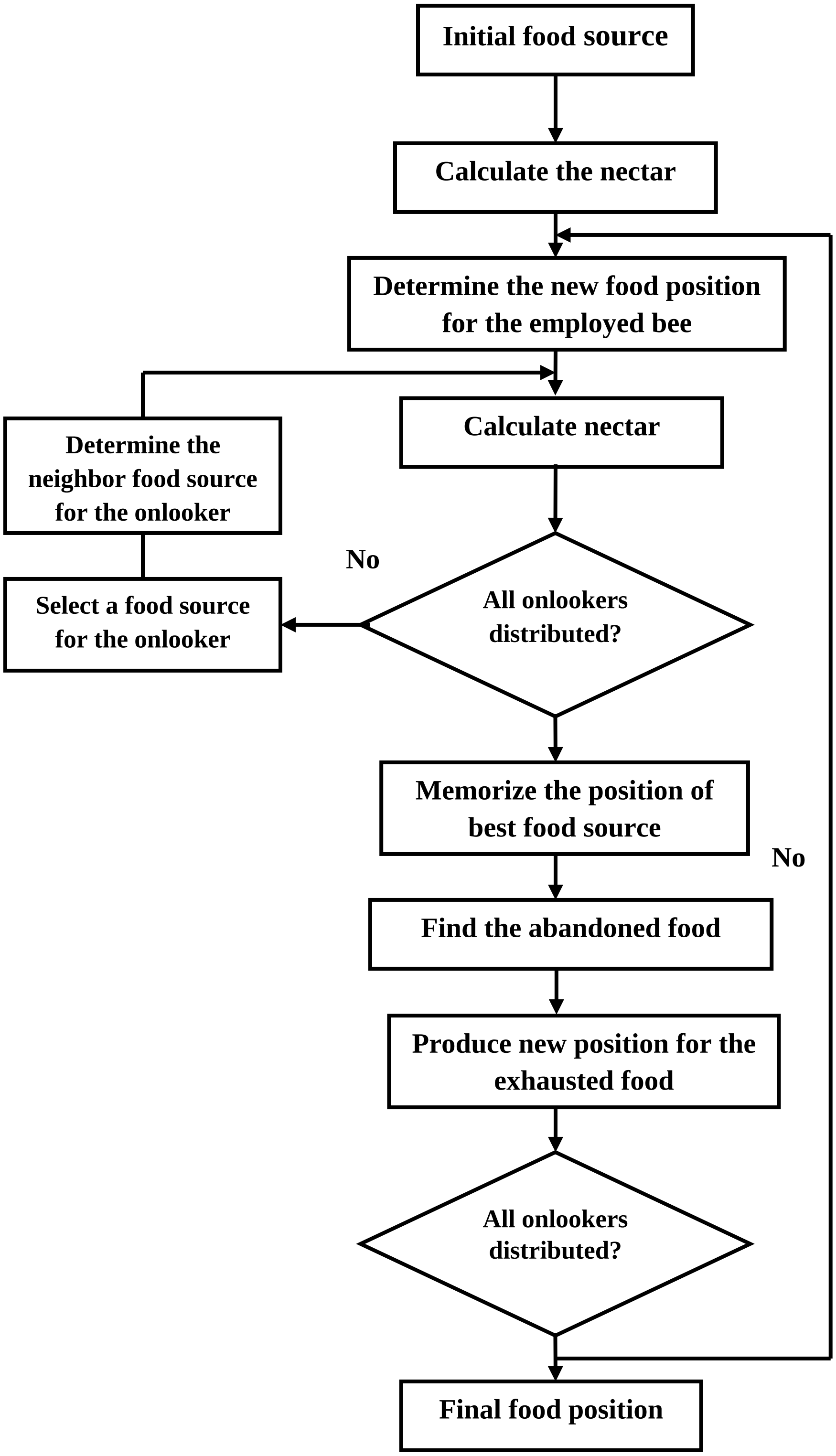
Initial food source
Calculate the nectar
Determine the new food position for the employed bee
Calculate nectar
Determine the neighbor food source for the onlooker
Select a food source for the onlooker
No
All onlookers distributed?
Memorize the position of best food source
No
Find the abandoned food
Produce new position for the exhausted food
All onlookers distributed?
Final food position

Fig.1. Flowchart of the Artificial Bee Colony algorithm.

A novel ABC algorithm using dynamic Technique was created which has **Employee bees** associated with explicit food sources, **onlooker bees** watching the movement of employee bees inside the hive to pick a food source, and **scout bees** looking for food sources randomly make up the condition of artificial bees in the ABC algorithm. Both onlookers and scouts are also known as "jobless bees." Initially, scout honey bees locate all food sources. Where, utilized honey bees and onlooker bees begin to abuse the nectar of food sources from that point forward, and this repeated abuse will eventually deplete them. At that time, the employee bee who was exploiting the exhausted food supply transforms into a scout bee on the lookout for new food sources. As a result, the scout honey bee transforms into an employee bee whose food supply has been depleted. In ABC, a food source's situation refers to the quality of the linked arrangement, and a food source nectar measure relates to the quality (wellness) of the related arrangement. Because each employee bee is solely associated with one and only one food source, the number of used honey bees is equal to the number of food sources (arrangements).For data searching, the dynamic technique employs the employee and onlooker phases. The proposed approaches are described in the subsequent subsections.

3.1.Population Initializationof data optimization using ABC Algorithm:

ABC generates a population of SN solutions that are uniformly distributed, with each solution y_j(j = 1, 2..., SN) being a D-dimensional vector. The number of variables in the optimization problem is D, where y_j denotes the population's j^{th}food source. The following is how each food source is created:

$$y_j^i = y_{min}^i + rand(0,1)(y_{max}^i\text{-}y_{min}^i) \text{ , } \forall_i = 1,2, \ldots . D \qquad \text{-------(1)}$$

Where y_{min}^i and y_{max}^i are the boundaries of y_j in i^{th} direction.

The ABC algorithm does not regard the initial population to be viable because initialization with feasible solutions is a time-consuming procedure, and in some circumstances it is impossible to construct a feasible solution randomly. For the parameters of solutions, random values between the lower and upper boundaries of the parameters are assigned during the initialization steps are shown in Algorithm 1.

Algorithm1.Population Initialization procedure for ABC Algorithm.

for **j=1 to**$\frac{S_n}{2}$do
for **i=1 to D**
do
Generate y_j **solution**
$y_j^i = y_{min}^i + rand(0,1)(y_{max}^i\text{-}y_{min}^i)$
Where y^i_{min} **and** y^i_{max} **are the parameters lower and upper bound respectively.**
endfor
$failure_j$**=0**
endfor

After initialization, the population is evaluated and exposed to repeated cycles of employed bees, onlooker bees, and scout bees searching for food. Algorithm 2 shows the Employed bee operation of the ABC algorithm.

3.2 Employee Bees phase of ABC algorithm:

Employee bees adjust the present solution depending on individual experiences and the fitness value (nectar amount) of the new solution during this phase. If the new food source fitness value is higher than the old food source's, the bee replaces the old one with the new one and discards the old. In this phase, the position update equation for the j^{th}dimension of the i^{th}candidate is as follows:

$$w_{ji} = y_{ji} + \phi_{ji}(y_{ji} - y_{ki}) \quad \text{---------(2)}$$

Where $\phi_{ji}(y_{ji} - y_{ki})$ is the step size $k \in \{1,2 \ldots . S_n\}$ *and* $i \in \{1,2 \ldots . D\}$ are two indices that were chosen at random.

Algorithm.2.Employee Bees phase

for **j=1 to**$\frac{S_n}{2}$
do
for **i=1 to D do**
Produce a new food source

$$w_{ji} = y_{ji} + \phi_{ji}(y_{ji} - y_{ki})$$

where k is a uniformly distributed random real number in the range [-1,1], S_n **is a randomly chosen index that must be different from** Φ_{ij} **is a uniformly distributed random real number in the range [0,1].**
endfor
Evaluate the quality of w_j
Apply the selection process betweeny_j **and** w_j
If solution y_j **doesn't improve** $failure_j = failure_{j+1}$ **otherwise** $failure_j = 0$
endfor

Based on the local information, and employee bee modifies (3) to the position of the food source (solution) in her memory and evaluates the nectar amount (fitness value, quality) of the new source (new solution). As can be observed from Eq. (3), the perturbation on the position y_{ji} diminishes as the difference between the parameters of the $y_{ji}$and y_{ki}decreases. As the search gets closer to the best solution in the search space, the step length gradually decreases. Therefore,the ABC algorithm chooses by creating a new food source. Consequently, the modification of the ABC method to address limited optimization issues using a dynamic technique, where the structure of the algorithm steers the solutions to a feasible region in the running process. After all the employed bees have completed the search procedure, they calculate probability values and share the nectar information of the food sources, as well as their position information with the onlooker bees on the dance area,which are described in the below Algorithm.

3.3. Onlooker Bees phase of ABC algorithm:

The onlooker bees phase begins once the employed bees phase is completed. During this phase, all employed bees in the hive share their fitness information (nectar) as well as their position information with the onlooker bees in the hive. Onlooker bees examine the available data and choose a solution with a probability P_j, that is proportional to its fitness. The probability P_j can be computed using the given equations.

$$P_j = \frac{fit_j}{\sum_{1=1}^{S_n} fit_j} \qquad \text{--------(3)}$$

Where fit_i is the i^{th} solution fitness value. As with the employed bee, the onlooker bee modifies the position in her memory and evaluates the candidate source suitability. If one's fitness level is higher than the previous one,the new position is remembered by the bee, whereas the old one is forgotten. Hence,the value of the parameter that exceeds its border is assigned to its boundaries in this method. The pseudo-code block of Algorithm 3 is in charge of the onlooker stage.

Algorithm.3. Onlooker Bees phase

e=0,j=1
repeat
if random < p then
e=e+1
for **i=1 to D** do
Produce a new food source for the onlooker bee
endfor
Apply the selection process between w_j **and** y_j.
If solution y_j **doesn't improve** $failure_j = failure_{j+1}$ **otherwise** $failure_j = 0$
endif
j=j+1
j=jmod($\left(\frac{S_n}{2}\right) + 1)$
until e=$\frac{S_n}{2}$

Following the distribution of all onlookers, food sources that are no longer worth exploiting are determined. If a solution cannot be improved after a certain number of cycles ("limit"), it is abandoned. The scouts discover a new food source to replace the one that the bees abandoned. This is done by creating a random position and then replacing it with the abandoned one.Hence,the algorithm scout bee phase provides a diversity mechanism that allows new and likely infeasible individuals to enter the population are shown in Algorithm 4.

3.4. Scout Bees phase of ABC algorithm:

If the position of a food source is not updated for a preset period of cycles, it is presumed that the food source has been abandoned, and the scout bees phase begins. During this phase, the abandoned food source bee transforms into a scout bee, and the abandoned food source is replaced with a randomly picked food source within the search space. Therefore, the predetermined number of cycles, known as the limit for abandonment in ABC, is a critical control parameter. Assuming that the abandoned food source is y_j, the scout bee will replace it with fresh y_j, as follows:

$$y_j^i = y_{min}^i + rand(0,1)(y_{max}^i\text{-}y_{min}^i)\ ,\ \forall_i = 1,2, \ldots .D \qquad \text{-------(4)}$$

Where y_{min}^i and y_{max}^i are the boundaries of y_j in i^{th} direction.

Algorithm.4.Scout bees phase

if **cyclemod SPP=0**
then
if **max(**$failure_i$) $> limit$
Replace y_j **with a new randomly produced solution**
endif
endif

Overall, the ABC algorithm adds two new control parameters to increase its convergence capabilities for limited optimization problems. These are the MR (Modification rate) and SPP(Scout production period) parameters, respectively. Another change is to replace the dynamic technique with a selection method. The performance of the proposed method ABC algorithm with dynamic technique decreases execution time,increases the throughput,and increases the network performance. In terms of time efficiency, the results reveal that the suggested ABC scheme outperforms the existing technique [33]such as Flying Adhoc Network-Glowworm optimization (FANET-GSO), Integrated Glowworm Swarm Optimization (IGSO), Unequal clustering and routing- Glowworm optimization (UCRA-GSO), and Integrated Glowworm Swarm Optimization technique of Ant Colony Optimization(ACI-GSO) which are shown in below section.

4. Results and Discussion:

This section provides a detailed description of the implementation results as well as the performance of our proposed framework, also the comparison analysis to ensure that our proposed framework outperforms the existing techniques in network performance.

4.1 System Specifications:

The proposed framework has been implemented in the MATLAB platform with the system specifications are listed below.

Platform : MATLAB

OS : Windows 8

Processor : Intel Core i5

RAM : 8GB RAM

4.2 Simulation Outputs and Performance Evaluation:

In this section, the simulation outputs of the proposed framework as well as the performance evaluation metrics are presented. The performance of the proposed framework has been evaluated with the related evaluation metrics such as Cost,Throughput,Reliability,Execution time, and energy consumption.

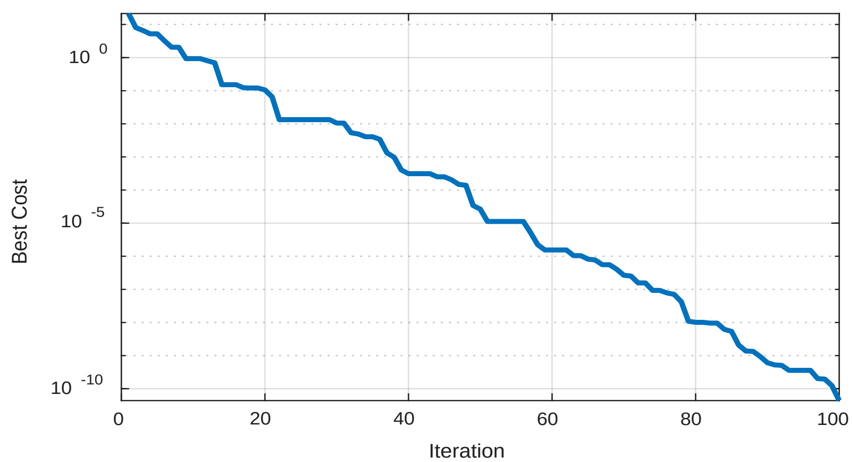

Fig.2.Iteration Vs Best cost

A best-cost artificial bee colony algorithm utilising a dynamic technique to improve wireless network performance is shown in Figure 2. The proposed technique decreases as the number of iterations rises, with the best cost of 10^{-3},10^{-6} and 10^{-10}achieved at the 20th iteration, 60th iteration, and 100th iteration, respectively.

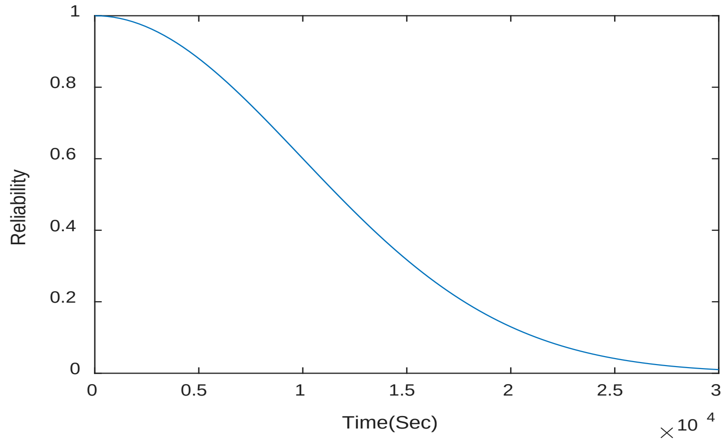

Fig.3.Reliability

While increasing the time (sec), the reliability value gets decreases. The value of reliability reduces from 1 to 0.05 when time increases from 0 to $3x10^4$ sec. Hence,robustness and accuracy of ABC-based reliability analysis are verified are shown in fig.3.

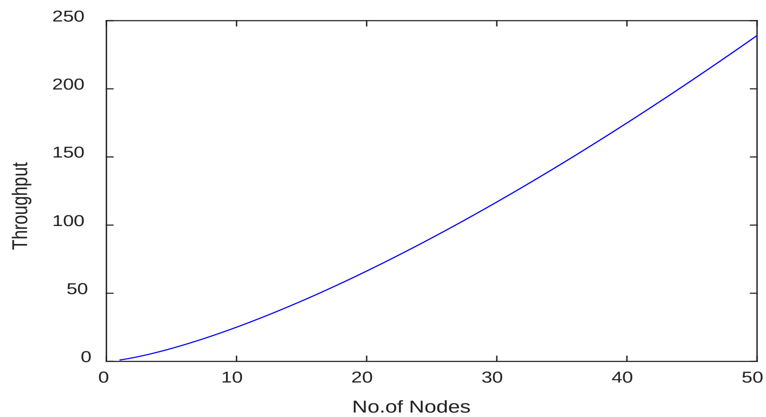

Fig.4.Throughput

A network's throughput is an important statistic for measuring protocol performance. It refers to the total number of packets sent from the network to the BS. Where, the cluster member nodes send packets containing information perceived by themselves to the cluster head (CH), which the CH combines with information sensed by itself and sends to the BS in packet form. The protocol achieves a good improvement in network throughput due to the dynamic technique, while increasing the number of nodes are shown in fig.4.

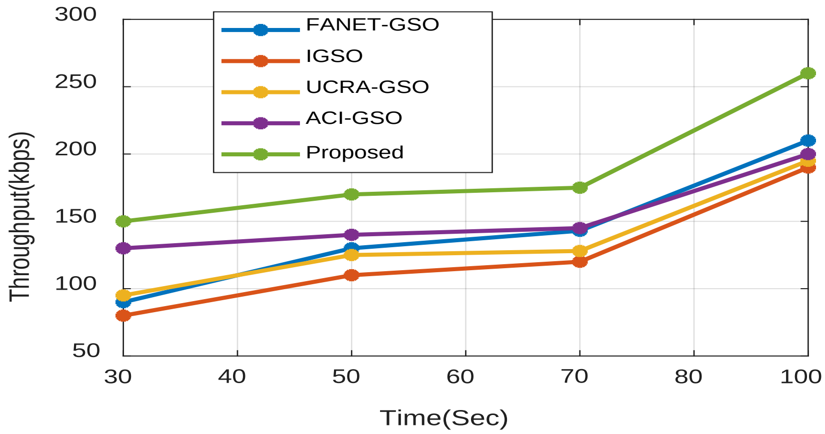

Fig.5.Throughput comparison

In comparison to existing techniques [33] such as Flying Adhoc network-Glowworm optimization (FANET-GSO), Integrated Glowworm Swarm Optimization (IGSO), Unequal clustering and routing-Glowworm optimization (UCRA-GSO), and Integrated Glowworm Swarm Optimization technique of Ant Colony Optimization(ACI-GSO), Fig. 5 presents a throughput of the artificial bee colony algorithm with dynamic technique to give improved network performance in wireless communication. At different times (sec), the proposed technique accomplishes 260(kbps), which is 50kbps lower than FANET-GSO, which is 20kbps lower than ACI-GSO, which is 10kbps lower than IGSO are shown in fig.5.

5. Conclusion:

The artificial bee colony algorithm was introduced for data optimization issues, and its performance was compared to that of state-of-the-art algorithms. In comparison to other methods, the novel technique is effective. Where the performance improves as the number of nodes increases. Other protocols must re-initiate route discovery when a link fails. With this functionality, the ABC algorithm with dynamic technique would be able to repair itself around the failure area and scale up to larger networks. However, it has a greater overhead for smaller networks. The experimental findings reveal that the suggested framework outperforms the others in terms of the high reliability, best cost, and 260 kbps of increased throughput respectively.

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