

## An Efficient Stochastic Gradient Diffusion Search For Wsn Using Parallel Computing Technique

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### ABSTRACT

The past few years have witnessed increased interest within the potential use of wireless sensor networks (WSNs) during a wide selection of applications and it's become a hot research area. Based on network structure, routing protocols in WSNs are often divided into two categories: Flat routing and hierarchical or clustering routing. Owing to aspread of benefits, clustering is becoming alively branch of routing technology in WSNs. Since WSN protocols are application specific, the focus has been given to the routing protocols that might differ depending on the application and network architecture. In this paper, we addressed an efficient optimize technique using deep learning model i.e. Stochastic Gradient Diffusion (SGD). We compared with few exiting algorithms for betterment of our own result

**Key words:** Parallel Computing, SGD, wireless sensor networks, routing protocol

### I INTRODUCTION

Owing to the wide area of wireless communication the substantial research has grown and gained advancement in networks. WSN can be effectively deployed even in human in accessible areas without any physical medium and consists of numerous interconnected nodes. WSN is considered as popular emergency network and has foot in all major applications. Sensing and processing of other nodes are done by help of sensor nodes. The common goal is achieved by orchestrated fashion. The life time of the network is indirectly proportional to the energy consumption of network. The shortest lifetime of network is due to less energy consumption. The serious threat is short lived network. Radio optimization, data reduction, sleep cycle scheduling are some of the way to overcome short lived network as it address won't die. To resolve the constraints many protocol has been proposed which contribute major contribution to maximize the network life time. This is often possible by prediction or replacement. The Ant colony optimization provides the result as it minimizes communication load and maximizes energy.

To elect the cluster head the cluster which accumulate maximum nodes with high capability is chosen. All the operations of constituent are monitored by cluster head so that overall energy consumption is reduced. In order to compress the communication overhead the cluster head allocate charge to cluster member. This helps to gain scalability, stability and through put. Small cluster leads to overcrowds and large sized cluster leads to depletion so wise choice of cluster formation is necessary to adopt the network changes. The trust score is taken into account.

The ant colony optimization uses a colony of artificial antsto find path between sending nodes and receiving nodes using sensor nodes at a short life span of time. The quality and function of nodes is determined with probability to travel all along the path way of network to reduce the energy consumption. After some iteration the ant again route backward through the trail constructed and update the amount of trail on the run way and checks for quality control. EEABR *protocol is* in a position to create a routing tree with optimized energy branches

In this division, the most idea is that each sensor node within a WSN is grouped together with another of its neighboring nodes so as to constitute a selected cluster. Clustering provides an efficient method for prolonging the lifetime of a WSN. Data, collected by the sensor nodes belonging to a cluster, don't seem to be directly transmitted to the bottom Station (BS). Instead, a node of the cluster, called CH, collects these data and forwards them to the BS after possibly having performed appropriate data aggregation. During

this way, the quantity of transmitted messages to the BS is reduced and considerable power conservation is achieved. In multi hop networking the recent spot problem is rarely consider.

The captain node is considered as most eligible node which controls misbehavior and computes trust score for all of its constituent nodes. If poor trust is associated then the captain node blocks the particular path and node. Trust starts relying on single node in order to compute trust on captain node the nearest neighbor and base station of the network and it is calculated based on the performance.

## II LITERATURE SURVEY

Tiago Camilo et al [1] presented paper on the innovative communication protocol for WSNs called energy efficient ant-based routing algorithm (EEABR), which relies on the Ant Colony Optimization (ACO) metaheuristic. sensor nodes and destination nodes are present between the out path ways of the corresponding nodes which seeks nomadic by travel through WSN that are identical. The nodes involved in sending packets are having a long term to maximize the life time of WSN. The networks which sensing agent is identical have a shortest and clear route. Once the first node is identified by the ant, the next visit is determined by probability of that's a function of the node and energy amount of pheromone trail present between the connection of nodes. More number of trails is done in the same manner to determine the correct path between the source and destination. Finally once its reach the destination node through the trail path it travels backwards through the constructed and updated pheromone trail the supported energy quality and through this backward trail logic the energy is saved along with time. After a defined amount of time the packets are allowed for iteration and as a result the routing tree along with efficient branches is viewed.

Xuxun Liu et al [2] proposed about six clustering algorithm which based on the performance parameter, along with the conservation of energy, aggregation of data, scalability, security etc., The CH is responsible for cluster routing scheme and sensor nodes are divided into various clusters with unique assignment levels. This method produce better result than the earlier version. In the process of saving energy WSN has to eliminate the redundant node and provide fused data to multiple hop nodes which remains effectual terminology. At sensor nodes routing table is setup in order to reduce the size of the data clustering. Less energy consumption is accomplishing by intra and inter clustering methods. latency is attain by collision control mechanism

S.GANESH et al [3] presented his view as a node which is connected to a private Computer (PC) has been selected as a sink node. Once the sensor nodes were deployed, the sink node logically segregates the opposite nodes in an exceedingly cluster structure and subsequently creates a WSN. This centralized cluster formation method is employed to cut back the node level processing burden and avoid multiple communications. iv so as to confirm reliable data delivery, various safety features are incorporated within the proposed protocol like Modified Zero-Knowledge Protocol (MZKP), Promiscuous hearing method, Trapping of adversaries and Mine detection. One in all the unique features of this ESRP is that it can dynamically decide about the choice of those security methods, supported the residual energy of nodes. Simulation of ESRP is meted out together with routing protocols, namely Lightweight Dependable Trust System (LDTS) for clustered WSN, Low Energy Adaptive Clustering Hierarchy (LEACH) based protocol referred to as Specification-based intrusion detection mechanism for LEACH (SLEACH), Security and Energy Efficient Disjoint Route (SEDR) for WSN, Secure and Energy-Efficient Routing Protocol (SERP) for WSN, to search out out the evaluation performance like energy consumption and network lifetime. From the performance metrics, it's consummated that ESRP is safer and energy efficient Guihai Chen et al [4] demonstrated a life time of wireless sensor network is prolonged by an efficient method which utilizes two methodology namely opt for cluster heads and revolving cluster heads provides energy consumption between nodes with the time interval and extend life time of network. The main issue to address is network partition where the multi hop network rarely rely on new spot problem and the data was tried to send to the bottom of base station are likely to die fast than other nodes, the uncovered area which receives the data without any security cause the packet to loss the data or redundancy of data will be seen. to overcome this issue the author provided with unequal cluster based routing (UCR) protocol.

Unequal groups of clustering is formed by different nodes .inter cluster data forwarding preserves energy for forwarding data where it chooses smaller cluster for bottom of the base station and provides larger one for the upper cluster in order to save some of the energy .Relying energy level on each cluster is attain by trade off energy cost and paths that rely on the energy aware protocol this greedy approaches helps to show result using UCR and resolves the recent hotspot issue by increasing the life time of network.

Ali Abdul-hussian Hassan et al [5] demonstrated about the main aim of wireless sensor network is to reach all space and provide secure communication .these facilitates the sensor nodes to spread along a larger path way and suitable for environment. Wireless sensor network paved way that it can independently reach the specified set of constrains and deeply root through harsh or risk place where humans appearance is impossible or nevertheless. Batteries are associated with sensors life span of replacing or recharging. Consuming or consumption of energy are consider as vital task for sensor networks. To increase the scalability clustering approaches are changed for each cluster classification like distributed, centralized, hierarchical or hybrid. The combined logical way of approaches is specifically used for larger network area and wider network area.

Mohd. Fadlee A. Rasid et al [6] presented a tremendous paper how to consume energy efficiently particularly in packet delivery on mobility of sensor based networks. A whole mobile sensor means all the action are happening in sequential manner within the same network, fixed mobile node sensor tends to do only specific or particular action that is mentioned. Some of them needed combined a[application of fixed one and whole network type. parallel computing technology helps to reduce packet loss in mobility network as demands for acknowledgement increases the ratio of packets delivered should equal to packets sent to the network this is one of the biggest challenge in mobility wireless sensor networks. In order to attain this challenge we use cross layer control between network layer and medium access control (MAC). Cluster based sensor for mobile networks is accomplished to hit the source and target, this traffic adaptive protocol helps to reduce the traffic flow and congestion control. The incoming sensor nodes are diverted to the clusters that are re assigned other than that the busy sensor nodes are divided to send packets within the cluster region. To gaze at the traffic adaptively two simple databases are used along with the protocol. The signal strength should be up to the maximum level so that the cluster heads can do its work on time. The network must be registered to schedule the time slot and are accustomed to send the info message while contention timeslot support mobility of the network.

### III Implementation

Now a days, data is the fuel for any kind of Industries and it leads the difficult for modelling. Deep learning is the optimum solution for modelling, classifying and decision making. A bid data set is consisting with many samples and attributes. Furthermore, there are certain other types of samples that are identified in a big dataset. For the learning of the features along with their representations for larger amounts of data, there may be certain models of deep learning which are introduced

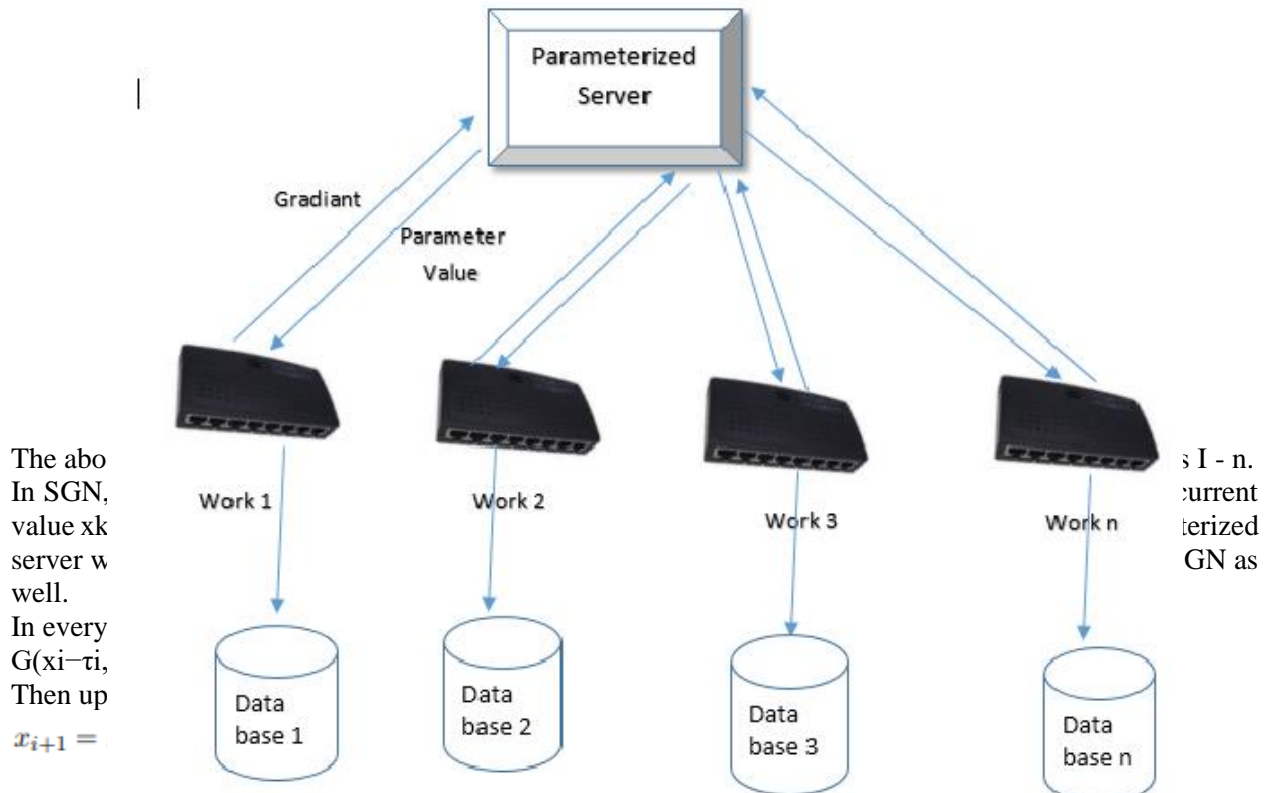
A Stochastic Diffusion Search (SDS) has an extremely strong framework in order to compare with the other nature-inspired algorithms. The framework is generally used for delineating the behaviour by looking into the allocation of resources, linear time complexity, minimal convergence criteria, and global optimum convergence and so on. For the purpose of this work, both deep learning with the SDS has been used to optimize artificial intelligence.

Deep Neural Networks include a large number of layers and hidden units. Hence the level of complexity makes optimization a tedious process. SDS has further introduced yet another approach which was probabilistic solving the pattern recognition along with the matching problems. SDS is the new multi-agent algorithm used for optimization and its global search. In order to improve the parallel computing we analysed the following to phases

1. Test phase
2. Diffusion Phase

In the test phase, availability of object or hypothesis and diffusion phase must be included with information about the congregation with exchange. For the former, the SDS [8] will check whether the agent hypotheses were successful. Once this is done, it will perform a hypotheses evaluation and return a Boolean value which is independent. There is a diffuse of successful hypotheses across the entire population to ensure information on sound solutions is made. For the test phase, each agent performs a new partial function evaluation the pFE, and this will be the agent’s function of hypothesis which is  $pFE=f(h)$ . In the phase of diffusion, each agent recruits a new agent for interacting and also making a potential hypothesis communication. The algorithm shown below depicts a pseudo-code belonging to the SDS algorithm.

*Initializing agents ()*  
*While (stopping condition is not met)*  
*Testing hypotheses ()*  
*Determining agents ' activities (active / inactive)*  
*Diffusing hypotheses ()*  
*Exchanging of information*  
*End While*



The above  
 In SGN,  
 value  $x_k$   
 server w  
 well.  
 In every  
 $G(x_i - \tau_i,$   
 Then up  
 $x_{i+1} =$

In the other side,  
 Retrieve the current scenario of parameter  $x$  from the server  
 Randomly select the samples  
 Compute the SGD  $G(x; \xi)$

**IV RESULT AND DISCUSSION**

Table 4.1 and figure 4.1 shows the classification accuracy of neural network, random forest classifier and deep learning network with proposed SDS respectively. Figure 5.2 shows the Classification Accuracy for Processing in seconds.

Accuracy %	NN	Random Forest Classifier	Stochastic Diffusion Search
10k events /second	94.21	97.05	98.91
50k events/second	95.05	97.75	99.23
100k events / second	95.88	98.15	99.22
200k events/ second	94.12	98.12	99.03

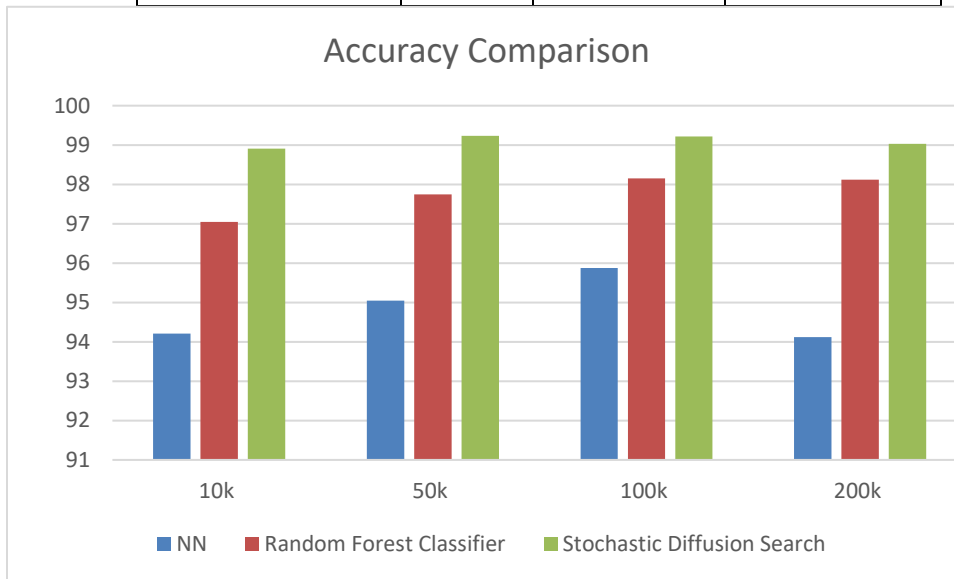


Fig 4.1 Accuracy comparison

It is seen from table 5.2 and figure 5.2 that the classification accuracy for processing in seconds of NN performs better by 21.1% and no change than random forest classifier and SDS like 10Kevents. The classifier’s accuracy is estimated by simply measuring the number of correct decisions to the total number of test samples. It can play yet another important role in the various data solutions where it can harvest some more valuable knowledge. The SGD [9] has today been proven to be a very effective and efficient method in many machine learning success stories. This work has further proposed one more network of Deep learning for the optimization of artificial intelligence.

**V CONCLUSION**

Today, deep learning has been making plenty of advances in the solving of problems which have for a long time resisted many attempts made by the community of artificial intelligence. The performances of the proposed approach have been analyzed for incrementally increasing the number of hidden layers constructed in the random forest Classification for activity classification. The proposed approach proves that it provides better performance in terms of both accuracy and timeliness as compared to the existing implementation. Deep Learning enables the training model and feature extraction can be selected from the large scale data and constructs the model as its own

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