An Adaptive Parameter Analysis Approach for Effective WSN Localization

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Abstract: Dynamic network localization is required to achieve architecture level improvement of the network. It provides the network reconfiguration to achieve the communication improvement with behavior and the architectural analysis. In this work, a three-stage model is presented to achieve network reconfiguration. In the first stage, the critical point analysis is provided. This analysis is applied under maximum flow algorithm. In the second stage, neighboring point analysis is provided for load analysis. At the final stage, reconfiguration is applied to improve communication. The results obtained show that the work has improved network communication and network life.

Keywords: Localization, Reconfiguration, Dynamic, Zone, Architectural.

Introduction

A sensor network is an architecture specific network defined by energy constraints and communication optimization. The network is defined in real time communication constraints and restricted resource specification is defined under constraint specification. The network is provided under the sensing range, energy and the architectural specification. The sensing range and energy must achieve the advancement of network and provide cluster formulation so that improved communication under restricted resource network will be achieved. The paper provides architecture specific communication and the controller specification improvement is suggested. The cooperative communication is provided at node level by observing the coverage aspect. The resource level improvement is under the architectural specification. Localization requires adapting the network with some integrated structure. One such structure is clustered network architecture. In this architecture, complete network is divided into smaller sub networksand each sub network is controlled by the cluster head. The aggregative communication between the controllers is performed to deliver the information to the base station. The aggregative communication model is shown in figure 1.

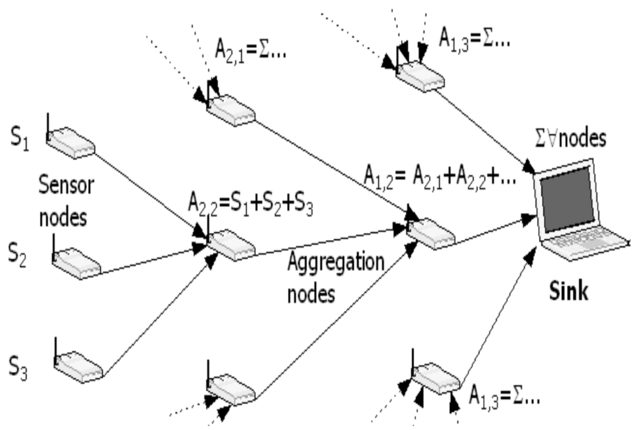

Figure 1 : Network Architecture

The communication formed network is provided with location specification modeling so the congestion free architecture will be obtained.The path formulation I s done in this modifiedadaptive network.The network formulation is attained so that the network architectural communication is here derived to achieve the network improvement, and the intermediate network communication is provided by the network. The network suffers from the effective communication constraints, criticality constraints and the loss level observation is provided. Author provided combined communication architecture so that the improved communication will be formed within the network.

The communication level improvement and the reliable aggregative communication are provided so that the network improvement and the aggregative improvement to the network are formed. This network improvement and the cluster specific network architecture change are provided by the observers. Aggregation is basically defined to reduce the network communication, reduce network paths and save the energy communication over the network. Here, aggregation is defined on multiple vectors such as topology, network type, aggregation type etc. The aggregative path based communication is defined to collect the data on parent node using tree based architecture. These parent nodes will perform the aggregative communication and transmit it to the base station. There are a number of existing protocols that provides aggregative communication over the network. PEGASSIS is the protocol defined to perform aggregative communication.

In this paper, a three-stage network model is provided to furnish reconfiguration over the network. The improved network model is provided at the node level and architecture level. In this section, the network architecture and significance of this architectural formulation with network localization is provided. In section II, work defined by the earlier researchers on the network localization is provided. In section III, proposed work model is presented. In section IV, results obtained from the work are presented. In section V, conclusion obtained from the work is discussed.

Existing Work

In this section, the contribution of the earlier researchers is discussed in network formulation and network reconfiguration. Ohara et. al.[1] has provided a work as an alternative routing algorithm. He provided generation of multipath, and provided improvement to the network under performance vectors, the fault-tolerant communication under max flow algorithm. He reduced the computation time and provides the process specific communication delivery to achieve the multipath communication over the network. Soner et. al.[2] has provided a maximum flow algorithm to achieve parallel multi threaded network. Author provided sequential version specification with concurrency problem analysis so that the analogous algorithmic computation and test driven communication is derived. Babenko et. al.[3] provided a work on the experimental evaluation and provided the max flow algorithm so the capacity driven communication and the push driven algorithmic formulation is done. The parameter specific communication with classical maximization flow is provided. Author contributed the balancing algorithm for communication under structural map and applied the experimentation accordingly.Danek et. al.[4] has provided a topology driven analysis of the graph cut image segmentation model. Author provided the image level improvement with the algorithmic formulation so that enhanced communication over the network is achieved. Imafuji et. al.[5] has provided a work on web community driven workflow analysis so that the capacity driven communication is formed. Author provided an edge specific communication derivation with the maximum flow algorithms so that capacity goaded optimization will be done.

Boykov et. al.[10] provided the experimental comparison and maximum flow algorithm based on energy consumption mimimization.Author provided the optimization at the lower-level improvement, so that the restoration of the network is achieved at low level formulation. Andrew et. al.[11] has provided the flow specific analysis along with tree structure formulation so that the shortest path driven communication is formed. Jere et. al. [12] provided a maximum flow problem and shortest path formulation with network level optimization. Author provided the route formulation and the network construction with relative network parameters.

Research Methodology

A wireless network is one of the dynamic networks where the associated nodes frequently changes their charateristics because of which the positional changes occurr over the network. To achieve the network effectiveness, the configuration of the network is required. Another capability of this dynamic network is the inclusion of a new node in the network at any instance of time. When the size of the network increases, the number of nodes to the network, its vigorous behavior and the relative challenges become more critical. The presented work is about to define an intelligent auto configuration in the wireless network based on workflow analysis so that the network reliability and efficiency will be improved. The presented work is represented as the three-stage model to identify the need of reconfiguration and to perform the effective topological reconfiguration. In the first stage, the network will be analyzed for the critical points. The criticality will be identified as the connectivity, load analysis and communication with network nodes. Here maximum flow algorithm will identify the overload condition. A node having the weak bonding with neighboring points or having the overload condition will be identified as the critical point. Once the critical points are identified, in the second stage, the monitor agent nodes will be placed on that censorious point to identify the most communicating nodes to the critical points. The communication bonding will be analyzed on these grave points. These maximum bonding nodes will be considered as the effective reconfiguration nodes. In the third stage, the optimum topology detection over these nodes will be identified. This identification will be done by using the balancing ratio analysis under node connectivity analysis. After analyzing different configuration, the best configuration will be applied to that network segment, and the network analysis will be performed to identify the communication gain over the network. The basic system model adapted for this work is shown in figure 2.

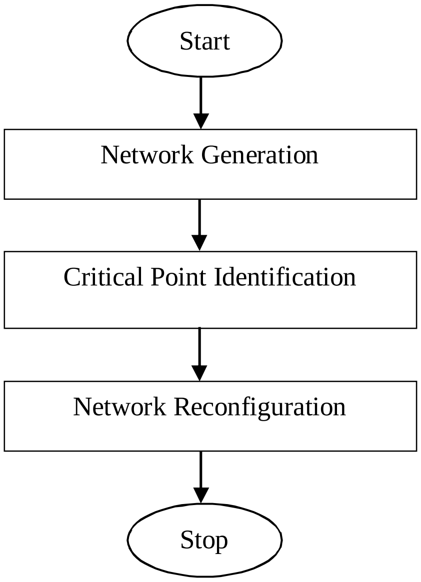

Figure 2 : System Model

The figure 2 shows that the system model is divided into three main stages. On the first stage, the network formulation is done, which is called the network setup. In this stage, the network analysis is done under different parameters. Based on these parameters the critical point identification over the network is done. The algorithmic model for critical point identification is shown in figure 3.

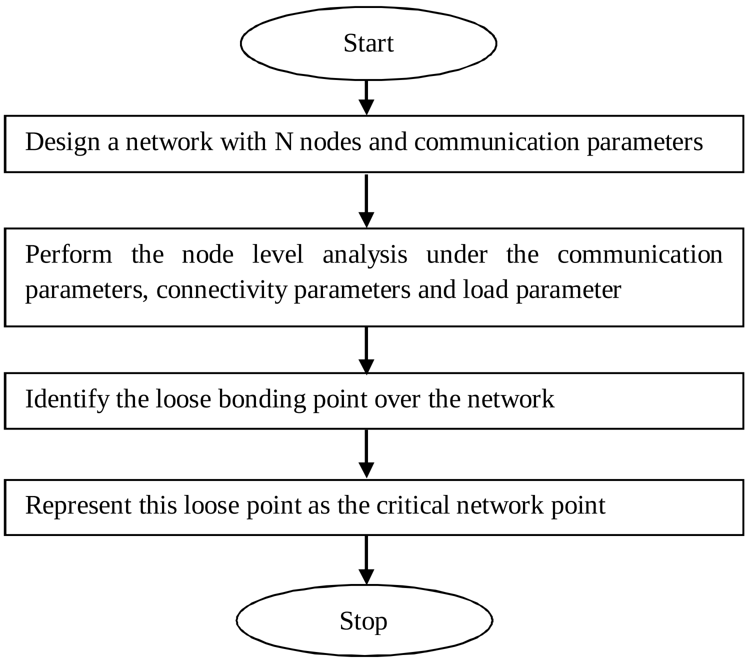

Figure 3 : Critical Point Identification

This critical point identification is done based on the network analysis under different parameters. These parameters include the distance, energy and the node criticality. Once the parameters are defined the critical point bonding node identification is done. The algorithmic model of this stage is shown in figure 4.

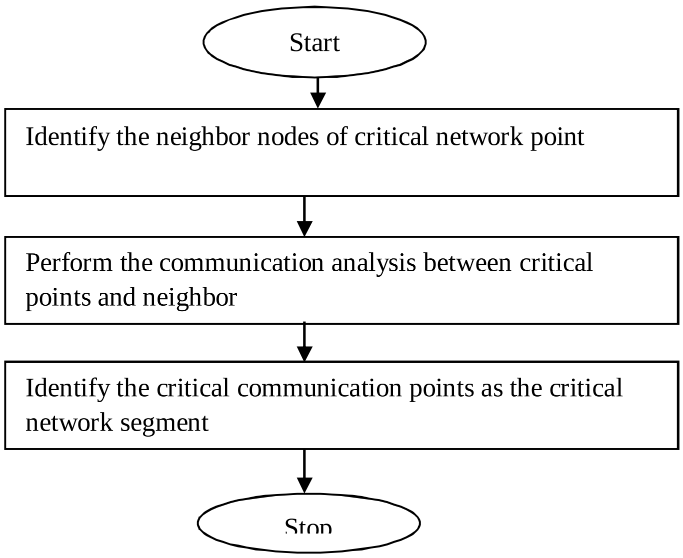

Figure 4 : Bonding Node identification

On the final stage, the architectural reconfiguration is done to optimize the network communication. At this stage, the network level improvement is obtained and the communication reformation is achieved. The communication is established for a specific session and the statistical observations are taken. The algorithmic formulation of work is shown in table 1.

Table 1 : Reconfiguration Algorithm

```
Algorithm(SensorN, N)
/*Define the network with N SensorN with random node position and relative communication and energy parameters*/
{
1.      Define the architectural optimization constraints in terms of communication and architectural limits including
a.      Load Vector
b.      Energy Vector
c.      Connectivity Strength
2.      Define the Distance Matrix over the network SensorN
3.      For round=1 to RoundMax
        [Perform the communication for Defined number of Communication Rounds]
{
4.      For i=1 to N
        [Perform the localization analysis process on all the network SensorN]
{
5.      Count=GetConnectivityCount(SensorN(i))
        [Perform the localization analysis based on connectivity vector]
6.      Coun1=Density(SensorN,Controller)
        [Check for the controller distribution over the network]
7.      If (Adaptive(count,Threshold)=True  And Adaptve(Count,Threshold)=True)
        [Check for the connectivity strength and density based acceptability for zone specification]
{
8.      If(SensorN(i).Energy > Threshold And SensorN(i).Criticalty=Low)
        [Check for validity to set as observer node]
{
9.      Set LocalizationController(SensorN(i))
        [Set the Node as localization controller]
}
}
```

10. For i=1 to N
[Perform the analysis on sensor node for reconfiguration]
{
11. If(Coverage(SensorN(i),Controllers)=Fail)
[If no controller is defined for the node
{
12. Perform Reconfiguration for SensorN(i)
}
13. Perform Communication over the network
}
}

Table 1 shows that stage specific process to configure the network based on parametric evaluation. At first level the localization analysis is obtained in terms of connectivity, density and load parameters. Based on the connectivity strength and zone specific evaluation, the reconfiguration is provided. Based on the zone driven analysis, the placement of nodes is done. The results obtained from the work are discussed in the next section.

Results & Discussion

In this section, the results obtained from the work are presented and discussed. The aggregative communication is here applied in the simulation environment with specification of network parameters. The work is simulated in Matlab environment. The parameters considered in this work are shown in table 2.

Table 2 : Network Parameters

Parameter	**Value**
Number of Nodes	100
Probability of Selection	.1
Energy (In Joule)	0.5J
Transmission Energy (In Joule)	50*0.000000001J
Receiving Energy (In Joule)	50*0.000000001J
Forwarding Energy (In Joule)	10*0.000000001J
Topology	Random

After specification of these parameters, the aggregative communication is performed using defined approach. The analysis of the work is here performed in terms of network life. The results obtained from the work are shown here below.

Here in figure5, the dead nodes are shown over the network. Here figure shows that inexisting model energy and distance specific architectural formation is done. The proposed work model has defined the layered load specific observation to improve the architectural constraint. The result shows that the work has improved the network life. The blue line here shows the number of dead nodes in case of existing approaches and the red line is showing the number of dead nodes in the case of the proposed approach. As the number of dead nodes in existing approach are higher than proposed approach, it signifies that the proposed model improved the network life.

Here figure 6 shows the analysis of proposed work in terms of alive nodes. The figure shows that after 3000 rounds there are about 2 nodes alive and 8 nodes are alive in case of proposed work. The blue line shows that network live in case of existing approaches and the red line shows the network life in the case of the proposed approach. The figure shows that the number of alive nodes in case of the proposed approach is much higher than existing approaches and it signify that the method has improved the network life.

Here figure 7 showing the reconfiguration results in terms of network energy. The comparative results show that the remaining energy to the network is higher in the case of the proposed approach. The results show that the presented work has improved the network performance and network reliability. These results show that the proposed work has improved the network life.

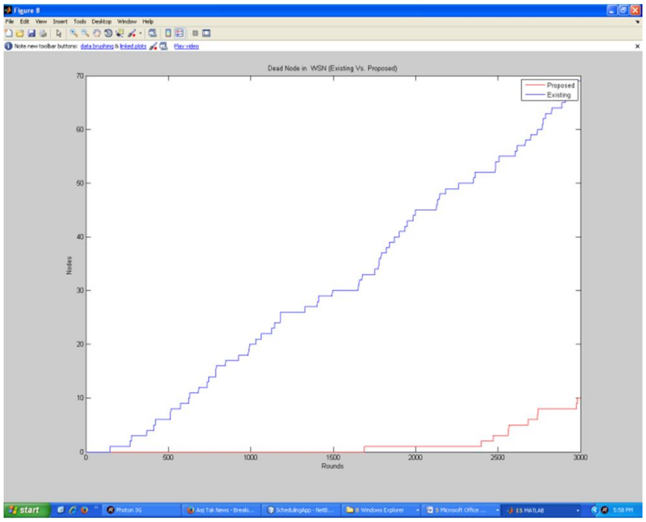

Figure 5 : Dead Node Analysis (Existing Vs. Proposed)

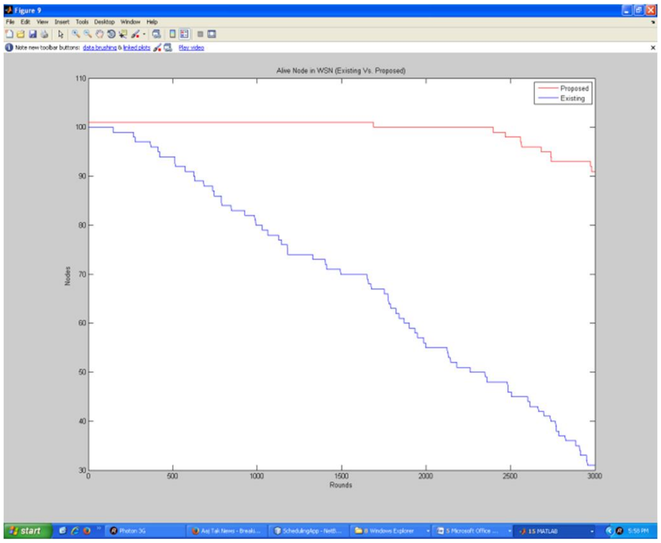

Figure 6 : Alive Node Analysis (Existing Vs. Proposed)

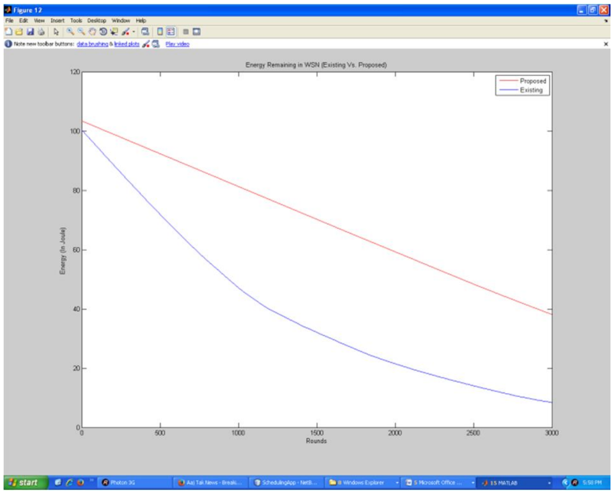

Figure 7 : Energy Based Analysis (Existing Vs. Proposed)

Conclusion

In this present work a zone adaptive three stage model is proposed to improve the network communication. The proposed model is applied under the critical node identification and architectural formation so that the improved communication will be formed over the network. The results show that the work model has improved the network life and network communication.

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