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Research Article

EMERGENCY MEDICAL NETWORKS USING HETEROGENEOUS SENSOR NODES WITH NEEDFUL ASSIGNMENT IN DISASTER AREA WITH HIGH SECURITY

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Abstract

Objectives: A natural calamity is un-prevented one. During that disaster most of the wired frameworks are disconnected due to physical intervention. To avoid this kind of risky condition, speed deploying and networking is of great importance.

Methods/Statistical Analysis: We propose an Emergency Medical Networks with enhanced qualities to achieve the optimality of heterogeneous sensor centre point assignment. To enhance security, we apply polynomial reduction algorithm of estimations for key management. To get the required extension, framework planners at initially need to demonstrate what number of sensor centre points should be passed on in the disaster zone. **Findings:** Apply the extension process speculation into the errand of remote sensor frameworks to upgrade the degree extent in the midst of a conferred time points. Further, there enactment data show that the sensible assignment could get the exact extent of the degree extent, which reflects the validity of this undertaking.

Application/Improvements: The purpose of the emergency medical data transaction is data reached at safe mode. In this model less data is loss.

Keywords: Heterogeneous Sensor Nodes, Polynomial Reduction Algorithm (PRA),

1. Introduction:

With the development of wireless correspondence innovation, Emergency Medical Networks (EMN) can be stretched out to the open air environment as assistant therapeutic administrations amid crisis restorative administrations required places, for example, hazardous situation[1] Fit as a fiddle of the link system being destroyed effortlessly by calamities, for example, a quake, essential signs watched and gathered by sensor hubs are passed on through the remote transmission innovation. Convenient and exact estimations of human basic signs, for example, the body temperature, the heart rate and the circulatory strain, are critical for infections determination, administration and anticipation in crisis therapeutic treatment situations[2] All things considered, the conventional estimation strategy is inadequate in proficiency and every so often even prompts innate mistakes. Consequently, it is vital to build up a wise and computerized gear to gauge these indispensable signs[3-7] The above issues can be understood by the WSN innovation because of its adaptable element and low cost[8-12]. In this report, we research the hub task in the crisis medicinal treatment situations, in which the sensor hubs assignment in a hazardous situation for remote well being checking constitute remote sensor systems (WSNs). As we by and large perceive, when common calamities happen in remote districts, for example, WenChuan seismic tremor, it is earnest to apply crisis salvage and debacle reinforcement. Under these circumstances, quick hubs, organization and systems administration in a hazardous situation are imperative to bring the information of this nation. In parliamentary law to accomplish the required scope[8-9], the system architects, creators, firstly need to figure what number of sensor hubs ought to be appointed to the hazardous situation. An excess of or excessively couple of hubs limit the productivity of information accumulation and system upkeep. From the previously stated works, we see that the proportion of sensor hubs and sink hubs is significant to study to accomplish the required scope. In the present piece, we assess as far as possible number of sensor hubs in one group, and an optimality outline of heterogeneous sensor hub task in EMNHNS. To a limited extent II, we present a design of Emergency Medical Networks utilizing Heterogeneous Sensor Nodes as a part of the hazardous situation and a vitality model of HWSN[4,10]. At that point, we use the scope hypothesis in EMNHNS to locate the required hub densities for beginning reporting and last scope to a limited extent III[11-17]. Further, on the supposition of accomplishing the wanted scope, we figure the ideal estimation of every sort of hubs, which is produced as the whole number programming issue to minimize the net expense in segment IV. Besides, to decide the optimality, we perform different re-enactments and dissect the outcomes to a limited extent V. Finally, we resolve the paper to some degree VI.

1. System Model

The system architecture is some combination of emergency network is enhanced with some key management facility using a polynomial reduction algorithm. The figure-1 explains the architecture of Emergency Medical Networks in the plaza which was touched on by a natural calamity. The figure-2 depicts the polynomial reduction algorithm implemented in this architecture. It actually has three clusters and a controller. The controller accepts the central management task. All cluster ready to transfer the data which are controlled by controller by means of a key. There are two kinds of key of these modules, one is authentication key and another one is verification key for each data transaction.

All keys are controlled by the controller. The figure-3 explains how this data is received by heterogeneous sensor devices like phone, laptop and PDA. The data will be processed on the side of the data process. The energy for each and data transaction is correctly calculated according to that the system is designed[4] methods.

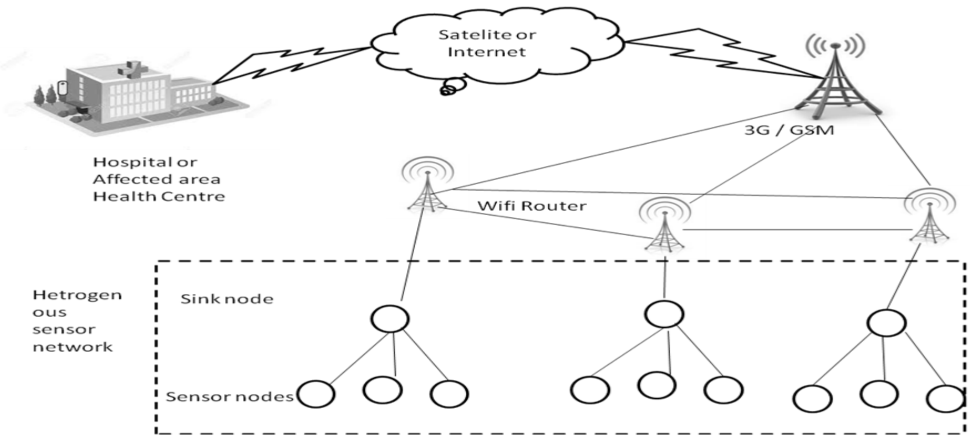

Figure-1- Architecture of Medical Networks.

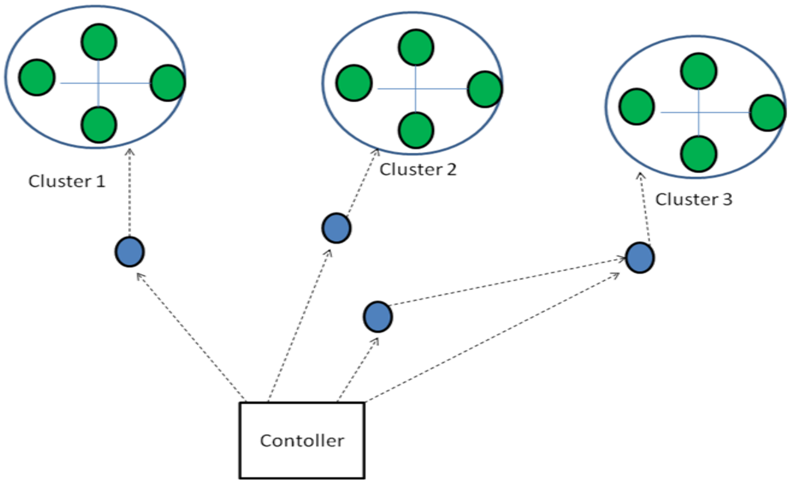

Figure-2 – Implementation of Polynomial Reduction Algorithm.

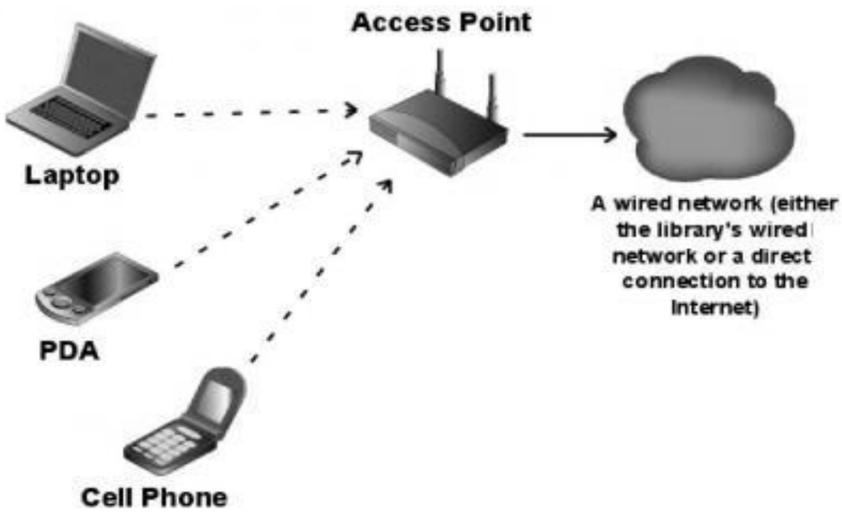

Figure-3- Receiving Nodes.

2. Polynomial Reduction Algorithm

Step 1. authui (y,z)=αfi(u,y,z) // authentication polynomial of cluster Ci for u.

Step 2. verfu j (x,z)=βfj(x,u,z) // For each cluster j(j = i), the designer computes the check polynomial verfu j (x,z) with a probability P, and stores these check polynomials in node u.

Step 3. KCi = FC(KC|CHi) // the cluster key of cluster Ci stored in u1 is

Step 4. CHi −→ u :(CHi|u|cji) // Cluster-head CHi sends the local ID assignment message to every nodes u in its cluster,

Step 5. u −→ CHi :(u|cji) // After receiving the message, node u stores the local ID and sends the following response message.

Step 6. z = H((E)KCi) // For example, node u first computes the report z by applying the hash function to the encrypted measurement, which has been encrypted by the key KCi.

Step 7. MAP = authui (y,z)=αfi(u,y,H((E)KCi)) // H(·) is the hash function stored in node u and KCi is the cluster key for the cluster, to which u belongs. Then node u generates MAP for the measurement.

Step 8. r =((E)KCi|u|cji|MAP) // generating the sensing report r, every sensing node sends the report to the cluster-head CHi. The report r is.

Step 9. R =((E)KCi|Ci|u1|···|uT|cj1 i |···|cjTi |authu1 i (y,H((E)KCi))|···|authuTi (y,H((E)KCi))|Time)

Subsequent to getting all detecting reports created by the detecting hubs, the group head arbitrarily picks T reports v from them and unions these T estimation reports to an incorporated estimation report R and sends it to the controller. The estimation report R is framed by

Step 10. A^{um},vi = authumi (v,H(E)KCi)= αfi(um,v,H(E)KCi)) // the intermediate node first calculates the values of Aum,vi and Vv,^{um}i with the value of z calculated by

Step 11. $V^{v,um}{}_{i}$ = verfvi (um,z)=βfi(um,v,z) = βfi(um,v,H(E)KCi)).

3. System implementation and Results:

3.1 Implementation:

4.1.1 Initial phase

i. We take (20) 30 increases nodes for simulation. (Constant)
ii. All nodes are randomly grouped as three cluster according to their position
iii. Each cluster has one cluster head. (randomly selected which has minimum movement weight)
iv. All nodes get key from base station for data communication

v. Each node has unique ip address.

vi. For movement, they can select any one mobility model(Set prediction for each mobility model, according to nodes, and cluster condition it choose the mobility model)
Choose any mobility.

4.1.2 Steady Phase

i. Randomly selected source and destination in the network environment.

ii. (Which routing protocols going to use?) (AODV) (Ad hoc On-Demand Distance Vector) more than one protocols to be considered for omparison.

iii. Find the shortest path from source to destination.

iv. Then send the data from source to destination as hop by hop.

v. Randomly six node act as impersonate attacker.

vi. By using polynomial reduction algorithm, we find the attackers (formula).

Results:

The figure-4 presented about the implementation of the proposed system. This screen shot explains key authentication during a data transaction. Green colours nodes explain to get the clear authentication and ready for data transaction. All other figures explain the operation of the polynomial reduction algorithms. The charts which suffixed as ‘a’ (figure-5(a) – figure-7(a) are performance analysis graph before applying polynomial reduction algorithms and the charts which suffixed as ‘b’ figure-7(b) are performance analysis graph after applying polynomial reduction algorithm. For measuring performance, we use the parameters as data delay, data loss and throughput. After applying the proposed algorithm we clearly know that the data delay increased simultaneously the throughput and data loss reduced slightly. Because some of the time taken for key verification during data transaction. Because of clear authentication the data loss, reduced so the throughput increased.

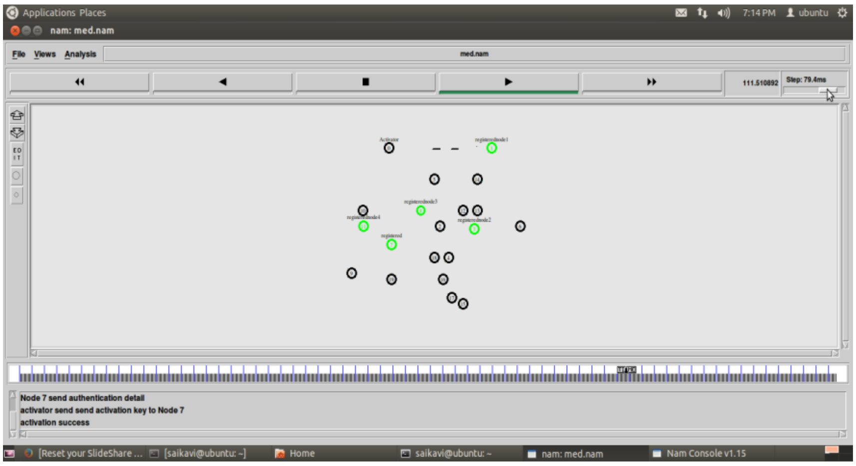

Figure-4- Implementation of Proposed System.

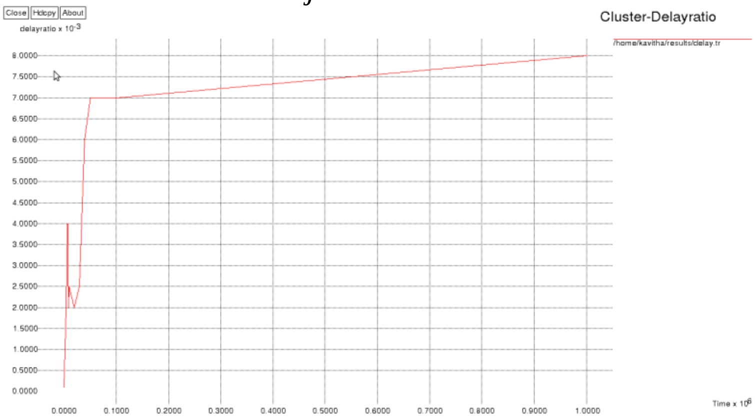

Figure-5(a) – Cluster Delayratio.

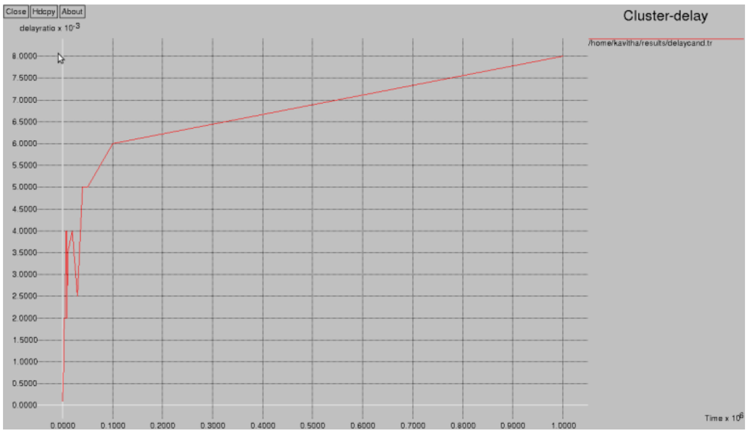

Figure-5 (b) – Cluster Delay.

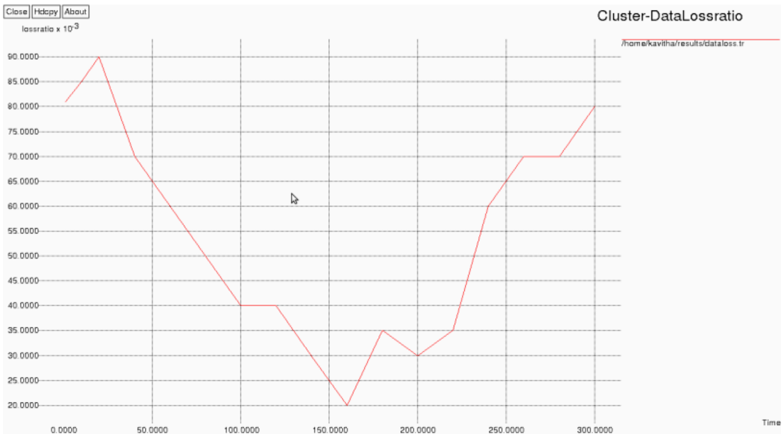

Figure-6 (a) – Cluster-DataLossratio.

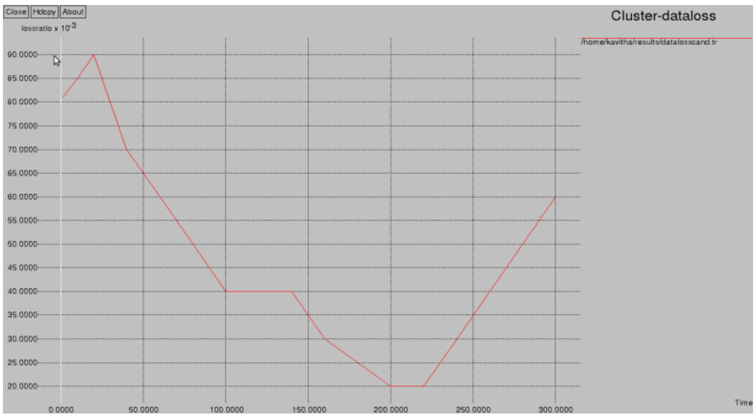

Figure-6 (b) – Cluster-DataLoss.

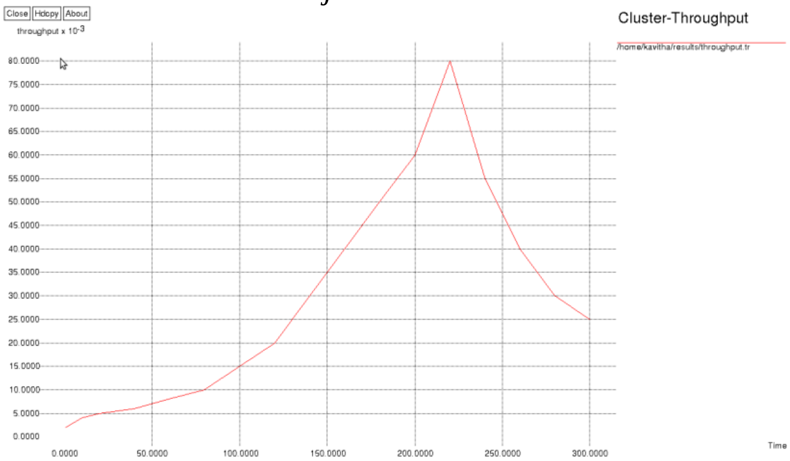

Figure-7 (a) – Cluster-Throughput.

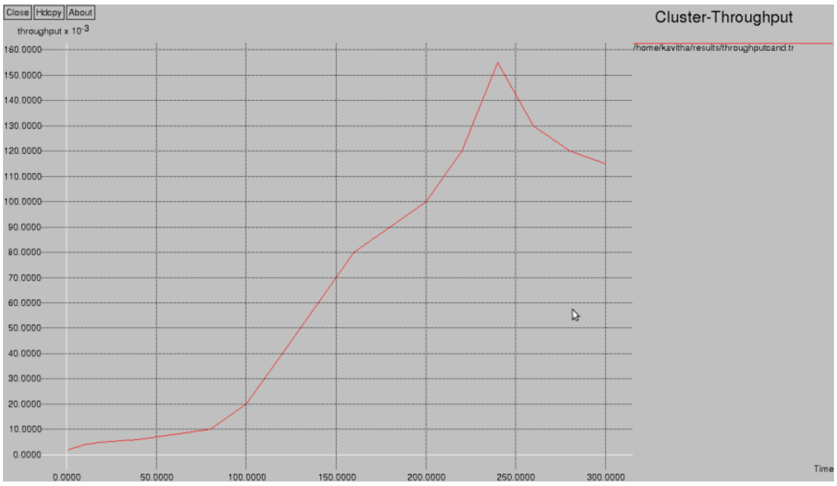

Figure-7 (b) – Cluster-Throughput.

5. Conclusion:

The proposed system clearly explains that within the short range environment the algorithm works very perfectly. For long period some of the key management problem and range complexities are also interfering to achieve better performance than the previous existing network environment. Even we will implement heterogeneous sensor nodes in the implementation part. The authentication will take more time for different types of sensor nodes. Another big problem is the channel in which we send the data. Different type of sensor nodes follows different types of data flow and channel. Then it makes some kind of data delay. Even the data reached in the safe hands due to polynomial reduction algorithm the implemented environment will raise the questions of delay. Because it is implemented for the purpose of the emergency medical data transaction. So delay will make very big bottleneck problem. For resolving this problem in future work we will follow uniform channel to heterogeneous sensor node data transaction.

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