Mobile Target Detection in Wireless Sensor Network Using LEACH Protocol

Sanjyot S. Ghumare[1], Rekha P. Labade[2], Sunil R. Gagare[3]

[1]ME in Microwave (E& TC), [2]Asst. Prof of Microwave (E& TC), [3] HOD of Microwave (E& TC)

Amrutvahini College of Engineering, Sangamner, Ahmadnagar, India

Abstract--In this paper Mobile target detection is explained using Low Energy Adaptive Clustering Hierarchy (LEACH), in the environment of Wireless Sensor Network. LEACH is energy saving, clustering approach to track the target. Where the target is mobile and mobility is random.

Keywords—WSN; Mobility; LEACH.

I. INTRODUCTION

Wireless Sensor Network (WSN) is popular technology [7] as it is gives reliable result comparatively to the other technologies for Environmental Monitoring and Tracking.The WSN identifies the environment data by sensing different physical properties, e.g., signal strength (for target tracking), pressure, temperature, and humidity [8]. To track the mobile target in WSN, accuracy along with real time result is important parameter [9]. Accuracy is important to know the location of the targetand real time result is necessity of some of the applications [10].

II. ROUTING IN WSN

There are many Routing challenges and design issues in WSN[1] are explained below, Node deployment strategy is of two types are random deployment or uniform deployment. According to that one have to select Routing Technique. Energy consumption without losing accuracy- As the limited power is there in each node, avoid node to get dead to maintain accuracy in the network is important part. Data Reporting Models are also there which are time- driven (continuous), event-driven, query-driven, and hybrid. One of model we have to select according to the application.Fault Tolerance is a part where when node/nodes in network get failed, the network should be able to get perform required operation without any error. Quality of Service is necessary in time driven applications, where we want data in required period only. After that the data is of no use. Operating Environment is of any kind harsh or soft. One have to select routing protocol by studying the operating environment. Production Costs is must be low is necessary as for every application in world.

III. LEACH IN WSN

LEACH is cluster based protocol, it works in hierarchical manner. Is also a scalable protocol. And also efficient communication is possible using LEACH. In LEACH protocol sensor nodes forms clusters as we set the programme. Each cluster have a cluster head(CH) which collect the data from sensor nodes of respective cluster. Only CH is communicate with the base station so as to minimize the repetition of the same data. As every node not have to communicate with Base station so, energy get saved. Also in LEACH[2] CH gets elected time to time after fixed interval this also distributes node's load among cluster and avoid node becoming dead.

LEACH protocol works in rotation. Each rotation operates as cluster get set up and then steady phase. While setting up cluster, formation and selection of cluster head takes place. In each round each sensor node selects a random number between 0 and 1 and compares random number with threshold T(n), where n is the sensor node number. T(n) is as computed as shown in Eq. 1 [3].

$$T(n) = \begin{cases} \dfrac{P}{1 - PrmodP} & \forall n \in G \\ 0 & otherwise \end{cases} \qquad (1)$$

Where G is a set of nodes that have not yet been selected to become CHs in the last rounds, r denotes current round number, and P is pre-defined value that represents CH probability and is equal to the required number of CH divided by total number of sensor nodes in the WSN [3]. In steady phase the communication and aggregation of data takes place.

IV. MOBILITY IN WSN

Self-configuration and reconfiguration [1], this is important factor in the network to self-configure or reconfigure the network. As to keep the task going even after some failure in the network [11]. Mobility is provided in sensor nodes, mobility is provided to the sink node and mobility is provided to relay nodes which actually collects data from the

sensor nodes and transmits to the sink node. The mobility for relay nodes is used in the LEACH protocol [12].

V. FUNCTIONAL SCENARIO

The Deployment of the node is specified. We are going to deploy nodes at one point and after that they are going to be on the defined location. Nodes moves towards their respective positions and forms cluster. When target comes at the defined area, nearby sensor node detect the presence of target and send the data to CH. CH sends data to base station which is received from sensor nodes in that cluster. Aggregation and filtering of repetitive data is takes place at CH.
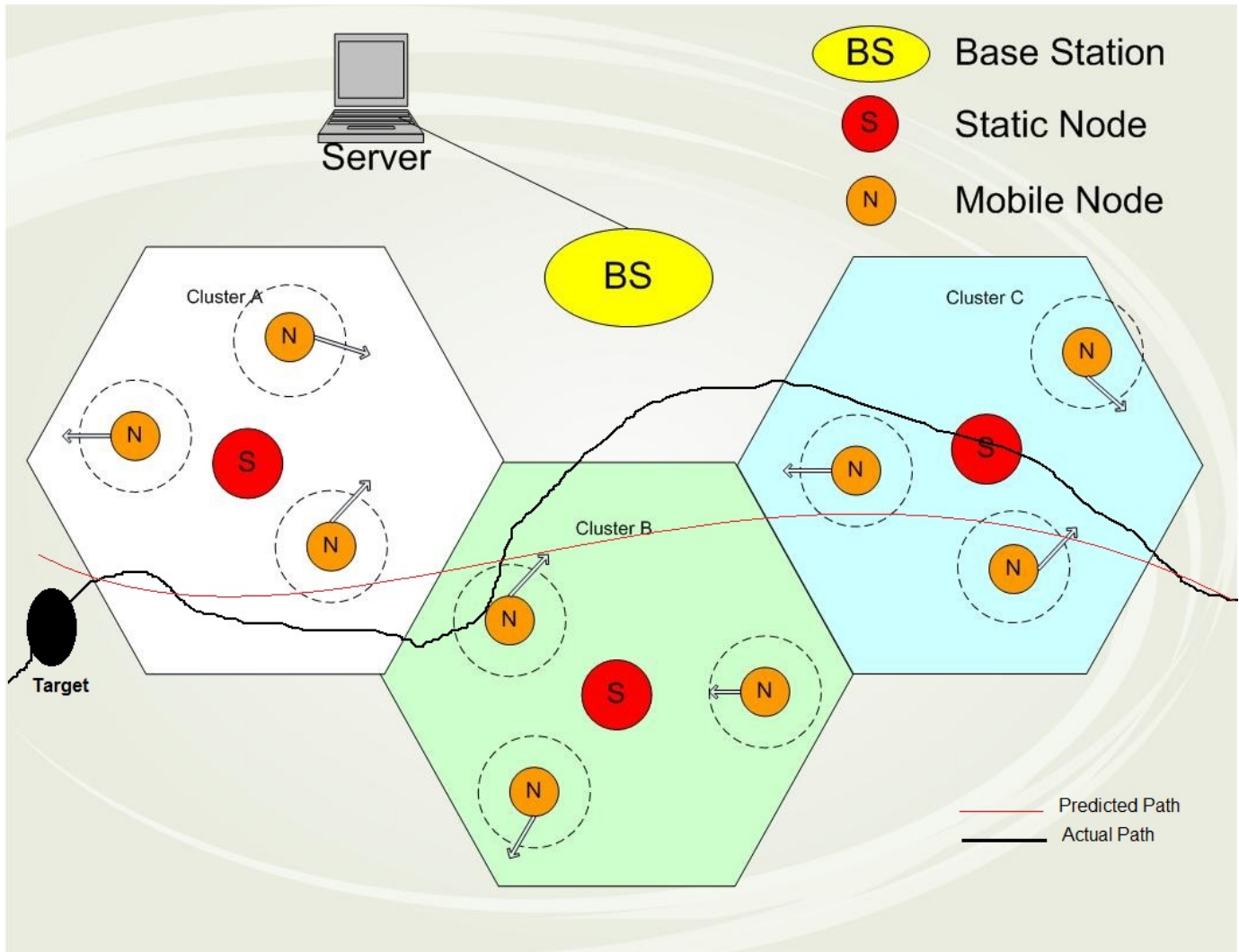

Fig. 1   Block Diagram of Tracking Mobile object

VI. CONCLUSION

We show the way track the Mobile Object efficiently with the help of LEACH protocol. With considering different parameter like energy saving in the network along with improving lifetime of that network.

VII. REFERENCES

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