Survey of network reconfiguration in WSN

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***Abstract*: In recent years implementation of wireless sensor network has been widely done by many organizations and researcher are working on independent and autonomous wireless node in order to make it usable at different environment and location where maintenance is not feasible every time. Many wireless device work on configuration stored on storage of device. The main challenge with these wireless nodes is that, it requires a physical connection in order to change its configurations or the setting. It may possible that wireless nodes are moving and working on self-generated power supply hence it become very tedious to find those device for manual configuration. Thus it aimed at designing and implementation of secure reconfiguration protocol for wireless sensor network where device will be having a provision to connect device and get the new setting and overwrite with existing configuration in device. The wireless device will be having different mode like command and action mode. While configuration device will switched to secure configuration mode and get the details from base station and reconfigure its setting for future use.**

***Keywords* – WSN, Network reconfiguration**

I. INTRODUCTION

A wireless sensor network (WSN) is a wireless network consisting of spatially distributed autonomous devices using sensors to cooperatively monitor physical or condition related environment, such as, sound, pressure, temperature, motion or pollutants, at different locations developed originally developed as a military application for battlefield surveillance, wireless sensor network has been an area of active research with many civilian application covering areas such as environment and habitat monitoring, traffic control, vehicle and vessel monitoring, fire detection, object tracking, smart building, home automation, etc few examples are [Hadim (2006)] [LEWIS (2004)] [Mainwaring et al]. Wireless sensor networks gather data from places where it is difficult for humans to reach and once they are deployed, they work on their own and serve the data for which they are deployed. When the environment changes, sensor network should change too. For an example , it is meaningless, if the sensor network is collecting data of rainfall in the months of January- March in India. However, the same network could be utilized to gather temperature data for the same period. Or at least we should stop retrieving data of rainfall. And also, the aggregation function ought to be changed from "Send the data continuously", to "Send the data if it rains". The wireless sensor network is shown in figure 1, Since bug fixes and regular code updates are common to any software development life cycle as one goes through a number of analysis design-implementation-testing iterations, there is also a need to reconfigure the nodes so that they can keep generating relevant information for us. It is not feasible to collect each and every sensor node which is deployed and reconfigure it for our needs.

Hence a set of protocols, applications and operating system support are needed to reconfigure wireless sensor networks remotely. The ability to add new functionality or replace an existing functionality with a new one in order to change the sensor behavior totally, without having to physically reach each individual node, is an important service even at the limited scale at which current sensor networks are deployed. Single-hop over-the-air reprogramming supported by tiny OS, but the need to reconfigure or reprogram sensors in a multihop network will become particularly critical as sensor a network grows and moves toward larger deployment sizes. If a centralized architecture is used in a sensor network and the entire network will collapse, if the central node fails however the sensor network reliability can be increased by using a distributed control architecture. Distributed control is used in WSNs for the following reasons:

1) Sensor nodes are prone to failure.
2) For better collection of data
3) Backup in case of failure of the central node.

Distributed Sensor Networks focuses on applied research and applications of sensor networks. It has large number of important applications depend on sensor networks interfacing with the real world applications which include medical, military, manufacturing, transportation, safety and environmental planning systems. It have been difficult to realize because of problems involved with inputting data from sensors directly in to automated systems. Sensor fusion in the context of distributed sensor networks has emerged as the method of choice for resolving these problems.

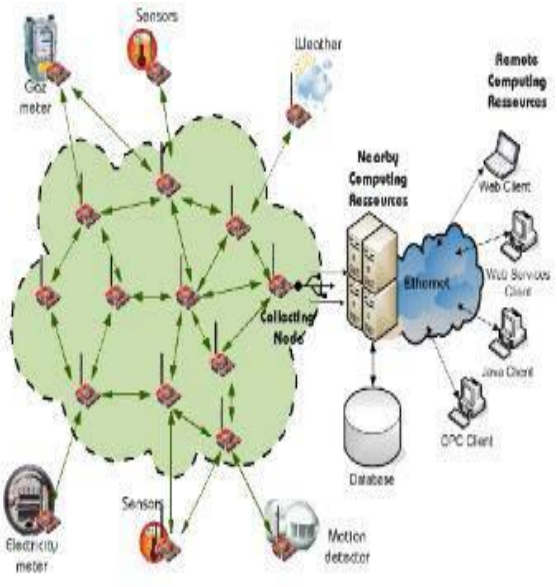

Figure 1

II. RELATED WORK

From the survey, it can be obtained that a routing protocol designed for WSN should have the ability of adapting to different applications and different network conditions. If we can change the routing protocol remotely according to the applications' requirement and the network conditions, can achieve this goal. Currently, it is very difficult, if not impossible, to change a routing service in a large scale sensor network because the service is statically pre-configured into each node, which is often unattended. So, it proposes a mobility based network reconfiguration system in WSN which can be dynamically reconfigured. This protocol will give the administrator of the WSN a powerful ability. With this great ability, the administrator can change the routing protocol remotely to adopt different applications and different network conditions. Some Authors [1] proposed the concept of node relocalization in sensor network using embedded controller. It proposes mobility based dynamic reconfiguration system in WSN. The main objective is to reduce the localization error in system. By providing access for the user to construct different virtual fields, proposed protocol accomplishes the goal of meeting the need of different applications and different network conditions. All nodes are in dynamic nature and moves randomly. Some authors [2] proposed the mobility based dynamic reconfiguration system in WSN. It uses the concept of dynamic reconfiguration routing protocol that achieves the need of various applications and also various network conditions. In this all the nodes are in dynamic nature and moves randomly. All nodes are communicating with each other as well as from head nodes. It provides a multi-hop routing based on shortest path in wireless networks. A controller is designed which is used to control the movement and location of nodes.Some Authors [3] proposed the localization is one of the most important applications for wireless sensor networks since the locations of sensor nodes are critical to both network operations and most application level tasks. It proposes mobility based dynamic reconfiguration system in WSN. By providing access for the user to construct different virtual field, proposed protocol will accomplish the goal of meeting the need for environmental monitoring and data collection. The proposed mechanism will be implemented with MATLAB. Some [4] proposed the ISO/IEC/IEEE 21451 family of standards has recently awakened its interest in the development, making easier the introduction of both characteristics in the design of wireless sensor nodes. Dynamic reconfigurability is an exciting topic that is gathering interest for development of embedded systems and smart sensor nodes. The use of dynamic reconfiguration increases the scalability and heterogeneity capabilities of the sensor network. Some [5] proposed DRRP, a routing algorithm with the ability of dynamic reconfiguration. By providing access for the user to construct different virtual potential fields, DRRP accomplishes the goal of meeting the need of different applications and different network conditions. To make the effect of our routing protocol more excellent, set a parameter, which can be changed dynamically, to influence the virtual hybrid potential field. By regulating the parameter according to the situation, can optimize the routing protocol constantly. Some [6] proposed an accurate and efficient localization method that makes use of an improved Received Signal Strength Indicator (RSSI) distance estimation model by including the antenna radiation pattern as well as nodes orientations is presented. Mathematical models for distance estimation, cost function and gradient of function that can be used in a distributed localization algorithm are developed. Authors [7] a framework to dynamically reconfigure the WSN and adopt its power consumption, transmission reliability, and data throughput to different requirements of applications. The framework makes it possible to specify, at design time, distinct network, MAC and radio protocols for each application as well as the events and policies triggering the WSN reconfigurations. At run time, the WSN automatically reconfigures itself in response to these events and according to these policies. The author proposed approach can reconfigure the whole the whole network in few hundreds of milliseconds while incurring little memory and control overhead. Some [8] introduced a session-to-mobility ratio (SMR)based mobility management scheme. The scheme enables the MC to send location update message to the gateway, uses forward chain, tunnelling and a threshold SMR value for reducing the cost of mobility management. The effect of selection of the threshold SMR on cost per handoff, cost per packet delivery and total communication cost per time unit have been investigated. Some [9] presented and evaluate different approaches for the distribution of mobility management functionalities. Initiate mobility decoupling from the most common split into data and control planes and splitting in control plane of mobility

management into location and handover management. Evaluate the distributed approaches, based on the proposed decoupling, and compare them with the most adopted fully centralized approaches. Authors [10] proposed the introduction of the dynamically reconfiguration buses, the architecture gained a popularity for its high its high performance computing with general propose processor used. It is a powerful model of computation in which communication pattern between the processors could be changed during the execution.

III. MOBILITY BASED DYNAMIC RECONFIGURABLE SYSTEM

A wireless sensor network (WSN) is a self-organized system of small, independent, low cost, low powered and wirelessly communicating nodes dispersed over an area having sink nodes taking the data from sensor nodes and may handle a variety of sensing, actuating, communicating, signal processing, computation, and communication tasks, deployed in the absence of permanent network infrastructure and in environments with limited or no human accessibility. The WSN nodes have no fixed topology, but they can configure themselves to work in such conditions.

A.) Need for Dynamic Reconfigurable System

Reconfiguration means adapting (sub)components or their arrangement within a system. Wireless sensor networks gather data from places where it is difficult for humans to reach and once they are deployed, they work on their own and serve the data for which they are deployed. When the environment changes, sensor network should change too. For an example, it is meaningless, if the sensor network is collecting data of rainfall in the months of January-March in India. However, the same network could be utilized to gather temperature data for the same period. Or at least we should stop retrieving data of rainfall.. Since bug fixes and regular code updates are common to any software development life cycle. There is also a need to reconfigure the nodes so that they can keep generating relevant information. Hence a set of protocols, applications and operating system support are needed to reconfigure wireless sensor networks remotely [10].

B.) Node Localisation Parameters of WSN

Localisation is one of the most important applications for wireless sensor networks since the locations of the sensor nodes are critical to both network operations and most application level tasks. Determining the location of nodes is one key application of Wireless Sensor Networks (WSN), for both civil and military applications. Most of the research efforts have focussed on the improvement of the localisation accuracy and complexity. The first step for determining the location of a node is to find the distances between the respective nodes, which are assumed to be mobile, and some other nodes, which are assumed to be stationary. This is the so-called ranging phase.

IV. APPLICATION OF MOBILITY BASED DYNAMIC RECONFIGURATION

The main objective of this work is to design mobility based self-network reconfiguration system in WSN. It is used in many applications such as Environmental observation and forecasting may include volcanic studies and eruption warning system, flood detection, meteorological observation, earthquake studies and warning system, cyclone and tsunami warning system, water quality monitoring etc.

A good warning system can help to avoid the damages caused by natural disasters. Sensor nodes can be used to monitor the conditions of plants and animals in wild habitat, as well as the environmental parameters of the habitat. Sensor can be deployed under water or on the ground to monitor the quality of air and water. Air quality monitoring can be used for air pollution control and water quality monitoring can be used in biochemistry field. Sensors can also be deployed to detect natural or non-natural disasters. For example, sensor nodes deployed in a forest can also detect the exact origin of the fire before the fire is spread uncontrollable. Seismic sensors can be used to detect the direction and magnitude of earthquakes

V. CONCLUSION

The proposed system reconfiguration provide additional improvement over the setting of nodes in distributed wireless sensor network and also provide different mode like command and action mode for storing and implementation of setting in nodes in distributed wireless sensor network**.** The protocol only allows authorized users to reprogram sensor nodes in a distributed manner.

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