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Wireless Sensor Network Node To Node Mapped On Base Station with Energy Consumption

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ABSTRACT

In this work, The field of wireless sensor systems have turned into a concentration of serious research as of late, particularly to monitor and describing of expansive physical situations, and for following different ecological or physical conditions, for example, temperature, weight, wind and dampness. Wireless Sensor systems can be utilized as a part of numerous applications, for example, untamed life observing, military target following an investigation, risky situation investigation, and tragic event alleviation. The immense measure of detected information of course ordering them turns into a basic assignment in a large portion of these applications.

Wireless Sensor Network (WSN) applications; there is a high need of secure communication among sensor nodes. There are different techniques to secure network data transmissions, but due to power constraints of WSN, group key based mechanism is the most preferred one. Mostly WSN propose base on cluster, Base Station (BS) is the crucial spot of contact to the outer world by of its breakdown; it may lead to total disconnection in the communication. Critical applications like these cannot afford to have BS failure as it is a gateway from sensor networks to the outside world. With the purpose of afford enhanced fault tolerant instant exploit, newly BS at a few other physical location will take indict. This may lead to a total change in the hierarchical network topology, which in turn leads to re-clustering the entire system and in turn configuration of new security keys.

Lastly intend is to generate new preparation of a essential WSN function that comprise important and definable energy constituent and the contact between these constituent so that it can investigate strategy in favor of minimize the overall energy conservation of the function. Our architecture focuses on energy constituents rather than network layers or physical components. Prominently, it allows the detection and mapping of energy consuming entity in a WSN function to energy constituent of the planning. Therefore, there is a need to find a suitable algorithm which clusters sensor nodes in such a way that when a BS fails and a new BS take accuse, new-fangled group gets establish with least computation with a reduction of energy utilization.

In this dissertation, we define several detailed goals which are of interest for the Wireless Sensor Network. In this work make use of MATLAB R 2014a tool for simulation.

Key Words **-** Base Station (BS), Wireless Sensor Network (WSN), Global Positioning System (GPS), Multiple-Input Multiple-Output (MIMO) etc.

I. INTRODUCTION

In such a smart world [1], people will be automatically and collaboratively served by the smart devices (e.g., watches, mobile phones, and computers), smart transportation (e.g., cars, buses, and trains), smart environments (e.g., homes, offices, and factories), etc. For example, using a global positioning system (GPS), a person's location can be continuously uploaded to a server that instantly returns the best route to the person's travel destination, keeping the person from getting stuck in traffic. In adding up, the acoustic sensor in a people's mobile handset can manually sense and send any irregularity in a people's tone of voice to server that compare the irregularity by sequence of voice-prints to verify whether the people has some complaint. Ultimately, all aspect about people's cyber, physical, communal and psychological world will be interrelated and intellectual in elegant world. As the next important stage in human history, smart world is receiving numerous attentions from academia, industry, government, etc.

Moreover, as the explosive growths of user demand in diverse wireless data services and computation power of mobile devices continue to intensify, energy consumption of wireless communication infrastructures has become a serious and vital issue, which cannot be effectively and efficiently accommodated by the current fourth generation (4G) of wireless communications technology [1]. Thus it is of great importance to develop and adopt green and energy efficient broadband transmission schemes in the framework of the upcoming fifth generation (5G) communication systems. Massive multiple-input multiple-output (MIMO) [2], which is also known as large MIMO, full-dimension MIMO, or large-scale antenna systems, is one of those green communication technologies [3] that have the potential to significantly alleviate the energy and spectrum consumption crises in the near future. Massive MIMO is currently under extensive investigations by both scientists and industrialists. It is widely considered to be a promising and critical technology to meet the requirements of unprecedented high energy efficiency and high spectral efficiency for green communications and networking envisioned in 5G systems [4] [9], along with the forthcoming Internet of Things (IoT) [10]. Specifically, massive MIMO is capable of shifting most of the signal processing and computing loads from the user terminals (UTs) to the base stations (BSs), by leveraging time division duplexing (TDD) and large antenna arrays with several hundred service antennas or more [11].

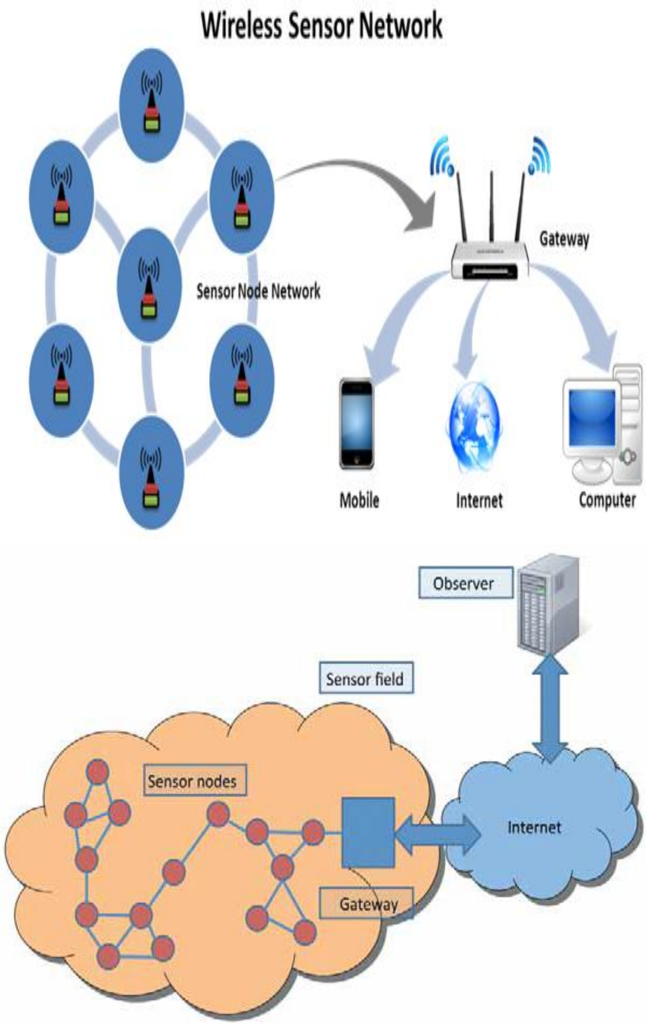


Fig. 1 Wireless Sensors over MIMO Effect

The energy consumption of battery-powered UTs can thus be significantly reduced, and the corresponding service life can be effectively prolonged. Furthermore, the exploitation of excess service antennas and law of large numbers at the BS enables the radiated energy to be extremely focused into certain intended regions in space, comparing with conventional MIMO schemes. This helps dramatically improve the signal beam forming sharpness and selectivity, which leads to much less interference between different UTs. Therefore, tens or more UTs are allowed to be simultaneously served in the same time-frequency resource block without badly interfering with each other [4] [6]. Remarkable reduction in the required radiated power is also obtained in transmitting signals on both forward and reverse links [8], [9], while maintaining a certain system throughput. In addition to enhancing energy efficiency and spectral efficiency, the much sharper and finer wave beams with better directivity and selectivity, which are sophisticatedly generated by a massive MIMO BS under either line-of-sight or cluttered channel conditions, also benefit the physical layer security during signal transmissions [12], [13]. Physical layer security exploits the inherent characteristics and independent randomness of communication channels and noise to achieve secure transmissions [14]. Due to the open nature of wireless channels and the significance of information security, it has prompted decades of studies in various aspects since pioneer work [15]. Note that physical layer security does not compete with traditional cryptographic technologies that are based on computational complexity. Along with the framework of wireless communication system evolving from single-input single output (SISO) to point-to-point MIMO, multi-user MIMO, and massive MIMO as the state-of-the-art, different physical layer security techniques [16] have emerged. At present, massive MIMO is already envisioned as a key enabling technology for 5G wireless cellular systems, due to its potential to reap and greatly strengthen all the advantages of conventional MIMO. However, while massive MIMO has attracted extensive attention, relatively few works has been done on the combination of physical layer security and massive MIMO [12]. The potential of massive MIMO to further boost the performance of physical layer security is not yet well recognized. Although the research on secrecy performance of conventional MIMO has produced considerable results, use of large antenna arrays is introducing new vitality into this area of research. Massive MIMO is not merely an extension of conventional MIMO when physical layer security is incorporated. As the number of BS antennas grows large, conventional MIMO turns into massive MIMO and becomes inherently immune to some issues [17], which can be viewed as an example of how quantitative change leads to qualitative change. Secure transmission in multi-cell multi-user massive MIMO system with maximum ratio transmission (MRT) pre-coding and artificial noise (AN) [18] at the BS is investigated in detail in [19], which shows that with massive MIMO BS, random AN shaping matrices can offer a favourable performance/complexity trade-off compared with conventional an shaping matrices.

II. ADVANCED WIRELESS SCHEME COGNITIVE RADIO SYSTEM

"A cognitive radio transmitter will research from the surroundings and adapt its internal states to statistical versions within the existing radio frequency (RF) stimulus by means of adjusting the transmission parameters (e.g., frequency band, modulation mode, and transmission energy) in real-time and online manner". A cognitive radio network includes many cellular nodes. The terminal node generally uses the battery to supply power to ensure its lengthy distance transmission characteristics.

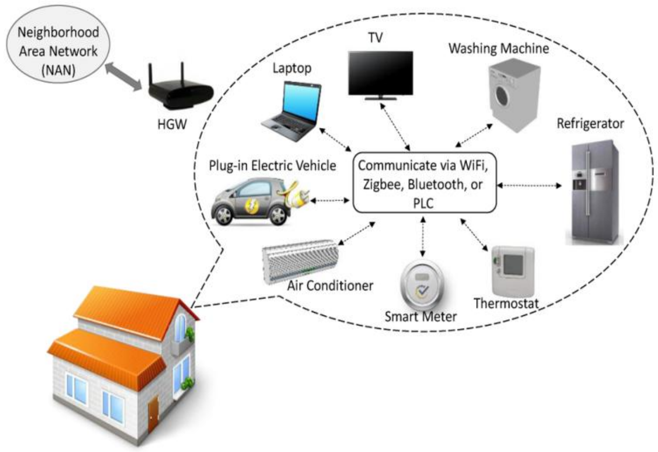


Fig 2 Wirelesses Cognitive Radio System

Consequently, energy resources are generally used as an important element in cognitive radio networks. strength depletion of 1 node in the network method that the affected node cannot in addition participate in subsequent statistics shipping, and as a consequence is known as useless node. A dead node will cause a chain of troubles which include hyperlink fault, records interrupt and immoderate electricity intake, and many others. In conventional Wi-Fi sensor networks, routing protocol is simplest worried with the performance, and the minimal hop matter as the choice criterion of the routing protocol [2]. It makes the centre function of the nodes within the network as a link forwarding node, thus its power exhaustion due to selection as the link cluster head, will bring about congestion of the statistics points, and the lack of big amounts of records and retransmission. But, it is able to be visible that a routing protocol which ignores the node energy thing incurs excessive price and excessive energy consumption [3].

These days, the electricity saving algorithm based totally on node strength consumption has attracted a great deal interest of researchers. The qualities of different routing protocols in following: a sensor community of clusters with a hierarchical routing protocol to growth network lifetime become suggested [4].

They confirmed, with many sensor nodes, reduction of energy consumption via hierarchical routing in place of flat routing. However, their paintings aren't always associated with cell CRNs.

III. MOTIVATION

The idea of internet of things (IoT) becomes evolved in parallel to WSNs. The term net of factors become devised through Kevin Ashton in 1999 [1] and refers to uniquely identifiable objects and their virtual representations in an "internet-like" shape. These objects can be something from large homes, business flowers, planes, automobiles, and machines, any form of goods, particular elements of a larger machine to human beings, animals and plant life and even unique frame elements of them.

at the same time as IoT does not count on a selected verbal exchange technology, wireless communication technologies will play a primary role, and specifically, WSNs will fee many packages and many industries. The small, rugged, less expensive and low powered WSN sensors will deliver the IoT to even the smallest items hooked up in any form of environment, at affordable charges. Integration of those items into IoT could be a main evolution of WSNs. A WSN can typically be defined as a network of nodes that cooperatively feel and might manipulate the surroundings, enabling interaction among folks or computers and the encompassing environment [2]. In reality, the activity of sensing, processing, and verbal exchange with a limited quantity of power ignites a go-layer layout technique normally requiring the joint consideration of distributed signal/statistics processing, medium get right of entry to manipulate, and conversation protocols [3].

Moreover, as the cutting-edge global shifts to this new age of WSNs in the IoT, there might be some of prison implications in order to need to be clarified over the years. One of the most pressing troubles is the possession and use of the statistics this is accumulated, consolidated, correlated and mined for added cost. Records agents can have a flourishing commercial enterprise as the pooling of records from diverse sources will result in new and unknown commercial enterprise opportunities and capability criminal liabilities. The recent US country wide security administration scandal and other indignities have shown that there is huge hobby in accumulating facts for numerous uses.

IV. LITREATURE SURVEY

As an inspiring and modern-day guidance for studies concerning clever international, this paper has discussed various technologies and issues with admire to green IoT, which plays a great function in achieving a sustainable clever international. Specifically, the assessment regarding IoT and green IoT has been finished. The technologies associated with green IoT which include warm green ICT (e.g., inexperienced RFID, inexperienced WSN, green CC, green M2M, and inexperienced DC) have been brought, with the summary of popular green ICT principles. In addition, bestowing unique attention to sensor-cloud that's a unique paradigm in green IoT, the cutting-edge traits about sensor-cloud had been shown and the destiny sensor-cloud has been expected. Ultimately, future studies guidelines and open problems regarding inexperienced IoT were supplied [1].

On this paper, we've proposed a unique at ease transmission scheme referred to as OSPR to guard towards eavesdroppers armed with massive antennas in a unmarried-cell state of affairs [2]. The proposed OSPR cozy transmission scheme has been introduced little by little. The corresponding protection overall performance has been comprehensively investigated underneath certain assumptions. Sensible simulation results with finite alphabet QPSK inputs were furnished to in addition corroborate the effectiveness of the proposed scheme. we have shown that so long as the BS is prepared with a enough quantity of antennas, the effective massive MIMO eavesdropper will now not be capable of get better most of the unique symbols (i.e., the SER is high), even though it has an countless variety of antennas, at the same time as the legitimate united states are capable to properly recover the original symbols. Therefore the safety performance of the device is assured to a large quantity. We've got also shown that the proposed OSPR scheme does not affect the high electricity efficiency of the massive MIMO BS, and it entails no jamming like method that is strength consuming. This makes the proposed OSPR scheme a good candidate for inexperienced and comfy transmissions. Word that the assumptions made on this paper is positive. The outcomes of imperfect CSI, imperfect channel estimation and multi-mobile situation have not been taken into consideration. They're left for future paintings together with an in depth information theoretic analysis [2].

The prototypes advanced have verified that BLE is a feasible and beneficial technology for WSN applications in creation noise monitoring. A key gain of the device developed is the ability for low strength intake; with a power intake of 2.9 mW at 2.8 V was performed using Node B. in addition software development and growing the records transmission window should permit the power consumption to drop to 1 mW, this would allow strength harvesting techniques for use to increase the battery life of the device. The maximum variety of the BLE nodes had been located to be 15 meters, almost half of that of the variety of the Wi-Fi node. Given the capability size of production websites, this variety is low. As such, many repeater nodes may be required to extend the range of community over a whole web page. With improvements within the PCB format or the usage of a via higher variety antenna, a number of 30 meters ought to be plausible in unfastened-area [3].

The WSN permits the Wi-Fi data logging of the environmental and sound conditions. The entire device, from sensors to facts storage and show has been designed and tested demonstrating a 'proof of concept'. Despite the fact that the WSN has been used for the unique application of production website noise tracking, there is sizeable scope for similarly applications of the system that make use of the important thing benefits of the device evolved.

The capability to apply the system for figuring out the vicinity of sounds has been shown to work in a single measurement. The accuracy and precision may be advanced by way of the usage of better sampling quotes and increasing the distance between the devices. Using more nodes would also allow for the triangulation of sounds, which will be used to assist with finding the assets of noises on creation web sites. Moreover, the capacity to locate cars using the system has been verified. The energy of BLE is the ease of connectivity and the ultralow sleep power intake and this may handiest be capitalized on if the transmission window is large.

This task has confirmed the feasibility of the aspect components of a WSN for production noise tracking in applications which includes the London Bridge Station Redevelopment project. The strategies and device presented will be used to help with the identification and location of the source of automobile noise on construction websites. With further tendencies and enhancements the device might be used with power harvesting era to provide a self-sustaining noise pollution WSN, that is a key advantages of the device as might permit it to be used for long durations with minimum human-intervention [4].

This paper has provided RASER, a singular routing protocol de- signed for MWSNs, which has been proven to offer a high degree of overall performance in very traumatic situations. Its specific use of a GTDMA MAC layer allows the keeping of a easy hop count number gradient at every node. This permits using blind for- warding to route data in the direction of the sink. Dependable packet transport is carried out thru the protocol's inherent use of route variety and resilience to link breakages. Analytical expressions have been given to symbolize the protocol's overall performance and in the end the simulated results have shown that RASER can deal with very high mobility ranges, with near best PDR and coffee end-to-cease delay instances. The equal is real beneath varying traffic loads, which highlights RASERS adaptability to different eventualities. The protocol is also scalable to large numbers of nodes. Moreover, future paintings will observe enforcing RASER on a take a look at-mattress to similarly verify its skills and suitability for various programs [5].

in this paper, it's been proposed an energy aware routing protocol for CRNs, named EARP. Further, it increases the gadget throughput, the routing success charge, the ratio of survival nodes and the community lifetime. Thus, the routing course shaped via EARP is extra dependable and strong. Future works need to cognizance on the theoretical performance analysis of the algorithm. In précis, the proposed power conscious routing scheme presents an efficient and realistic solution for records routing in cognitive radio networks [6].

Broadcasting is an essential hassle in Wi-Fi advert hoc networks. In this paper proposed broadcasting approach may be very without difficulty applied for direction discovery, sending periodic alarm alerts to all nodes within the community or maybe for real records transmissions as well as various orchestrated communal movements, e.g., clock synchronization or enforcing international obligation cycles. In future, we plan to improvise the set of rules by means of reducing the community information necessities [7].

On this paper, we analysed the answers presently to be had for the implementation of city IoTs. The discussed technologies are close to being standardized, and industry gamers are already energetic in the production of gadgets that take gain of those technologies to allow the packages of interest, such as those described in section II. In fact, while the range of layout options for IoT systems is as a substitute huge, the set of open and standardized protocols is drastically smaller. The permitting technologies, furthermore, have reached a degree of maturity that lets in for the sensible consciousness of IoT answers and services, starting from subject trials a good way to with a bit of luck help clean the uncertainty that still prevents a large adoption of the IoT paradigm. A concrete proof-of-idea implementation, deployed in collaboration with the metropolis of Padova, Italy, has additionally been described as a relevant example of application of the IoT paradigm to smart towns [8].

On this paper, According to our experiments, the computation times of four.056 ms and four.965 ms are needed for performing authentication mechanisms, respectively, on a commonplace IoT-based improvement platform, i.e. the Raspberry Pi II. Even though the computation price is consumer-suited,

The device efficiency can be in addition progressed once the followed crypto-hash-modules are substituted through the traditional SHA-2 techniques. Further, we check out the safety of the proposed authentication schemes via rigorous formal analysis. The robustness of the two schemes is proved. In brief, according to the evaluation and implementation consequences, we've got proved that the proposed schemes are suitable to be carried out on commonplace smart cell objects with sturdy safety density. Subsequently, the practicability of our proposed IoT-based healthcare gadget is guaranteed [9].

V. SYSTEM OVERVIEW

- **SENSOR HARDWARE EFFICIENCY**

There are various varieties of sensors with specific makes use of in unique environments. some of the commercially available Wi-Fi sensor nodes for health tracking one of the widest packages of WSNs include pulse oxygen saturation sensors (to evaluate the proportion of hemoglobin saturated with oxygen, and heart fee), blood strain sensors, electrocardiograms (to come across heart abnormalities with the aid of measuring its electrical pastime), electro-myo-grams for evaluating muscle activities, temperature sensors, respiratory sensors, blood waft sensors and blood oxygen level sensors (ox meters) for measuring cardiovascular exertion (misery), to call a few. However, there are some technical demanding situations in the usage of WSNs in this domain

Electricity: biosensors have a small variety of resources to provide strength (e.g., a regular alkaline battery utilized in such sensors handiest produces approximately 50 WH of power); the life of a biosensor is typically much less than one month.

- **Computation:** because of lack of reminiscence, the biosensors are not able to execute big-bit computation. protection and interference: the biosensor community need to be secure sufficient to keep away from illegal entities reporting fake records to the manage node or imparting the wrong instructions to the opposite biosensors and probably causing enormous harm to the host.
- **Mobility:** the WSN of biosensors ought to assist mobility via the development of multi-hop multi-modal and ad-hoc sensor networks a good way to offer place awareness.
- **Robustness:** in harsh environments, the failure fee of sensors is high, so routing protocols have to be designed in

this type of manner to decrease the effect of sensor failure on community performance.

- **Continuous operation:** a community calls for records from all biosensors and closely depends on continuous operation of the biosensor all through its lifecycle, which can also mean days, or every so often weeks without operator intervention.

- **NODE ARCHITECTURES**

Known WSN robustness concern initiatives makes use of a huge wide variety of remote sensors; after collecting information from the affected person's body, these scientific sensors transmit data to PDAs, mobiles, laptops and personal computer systems for in addition research.

The overall architecture is shown in Fig 3.1 the clinical sensors ship their records through a particular wireless channel; from the other facet, hand-held devices (e.g., PDA and pc) are locked to this channel providing a framework to deliver affected person information to clinical specialists. A routing element, the usage of an Adaptive Demand-Pushed Multicast Routing (ADMR) protocol, is hired to facilitate node multicast routing, mobility and minimal direction any other health monitoring device in most cases designed to reveal a patient's situations inside the domestic environment.

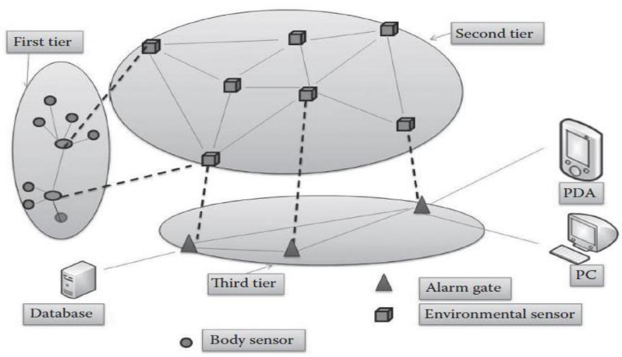


Fig. 3 Node Architecture Model

This machine includes a set of frame sensor networks and environmental sensor networks. As proven in Fig three.1 three network levels are used: within the first tier, sensor gadgets are deployed at the frame of patient, which display and gather man or woman physiological alerts; in the 2nd tier, environmental sensors (e.g., temperature, dirt, movement, and light) are placed in the living area to build up data on the environmental conditions. The records from both network ranges are aggregated into the third tier wherein a web protocol (IP)-based network, named as Alarm Gate, is used to distribute statistics amongst hand-held devices (along with PDA, cellular) or desktop computers.

VI. PROPOSED METHOD AND ALGORITHMS

- **ENERGY E-HARVESTING**

Several technologies exist to extract energy from the environment, such as solar, thermal, kinetic energy, and vibration energy, and the network lifetime may increase by using power harvesting technologies and explained the advantages of energy harvesting systems as the ability to recharge after depletion and to monitor energy consumption, which may be required for network management algorithms. Energy harvesting technologies plays an important role in applications that are expected to operate for a long duration. There are various challenges in energy harvesting management classified energy sources into four categories and corresponding challenges: uncontrolled/predictable, uncontrollable/unpredictable, fully controlled and partially controllable. They emphasized that energy management in energy harvesting systems is fundamentally different from battery operated systems because of the unpredictable available power. They showed that the power availability varies in time and for different nodes in the network. This presents some difficulties to a node when it has to make decisions based on knowledge of the residual energy of the network. Additionally, different nodes may have different harvesting opportunities, so it is important to assign the workload according to the energy availability at the harvesting nodes. To solve these problems, they proposed an analytical model for energy harvesting and performance.

There is a significant interest in energy harvesting for different wireless sensor applications to improve their sustainable lifetimes, but there is also a balanced need to guarantee performance and exploit the available energy efficiently. Most of the studies in the field of wireless sensors are based on residual battery status, while in harvesting systems the problem still is the estimation of the environmental energy availability at nodes.

- **PROPOSED METHOD AND ALGORITHM OVERVIEW**

This work proposed a fusion transmission protocol for the various environments. When a multi hop is in progress, the breakdown of one relay node leads to the detachment of other nodes from the BS.

$$E_{Tx}(L,d)=\begin{cases} L*E_{elec}+L*\varepsilon f_s*d^2, d<d_0 \\ L*E_{elec}+L*\varepsilon_{mp}*d^4, d\geq d_0 \end{cases}$$

The cluster heads D in the network and energy level E is considered as the key factor to achieve self adaption and energy efficiency in a sensor networks. In order to achieve

Signal-to-Noise Ratio (SNR) transmits L-bit message over a distance d and the energy E_{Tx} distributed via the radio is given as:

Where,

- $\mathbf{E_{elec}}$ is energy dissolute per bit which operates the sender (transmitter) and the receiver circuit;
- $\mathbf{\varepsilon f_s}$ and $\mathbf{\varepsilon_{mp}}$ depend on transmitter amplifier model;
- **D** is the distance between the sender and the receiver.

An amount of energy $\mathbf{E_{Rx}}$ expends while receiving L-bit message is given as below:

$$\mathbf{E\ L = L*E_{elec}}$$

In HTP, to approximation the reserve of the node join the adjoining cluster-head i, on node by node source, while constructing the cluster phase. The proposed algorithm thus provides better scalability, being less centralized whereas the existing methods require wide-ranging state information during cluster construction phase. The wireless sensor network is afforded with base station (BS) and “n” sensors to support a two tier model. Assume the initial node energy in a network is known, and a pseudo code is described for initial construction of the network is given below (see algorithm) and the flow of proposed algorithm is shown in Fig 3.2.

The sensor network has three tiers namely sensor tier, a relay tier and a BS tier. Here, most of it belongs to sensor tier, and are hierarchical. The node bypass link transversely the sensor level and support to communicate with every other in a transmit level.

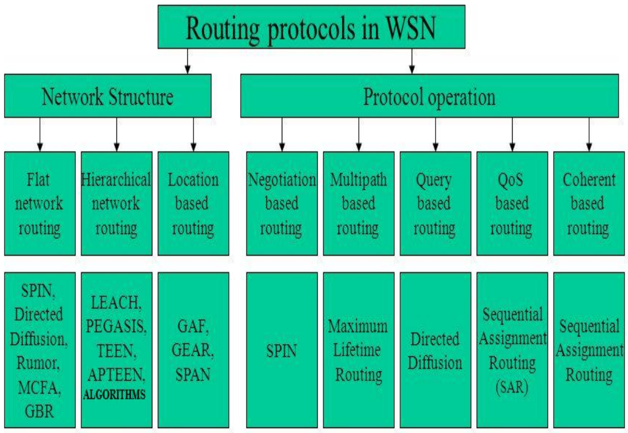
Initially, while constructing the network structure, the routing problem busted into two different phases:

1) With the global information the cluster heads are resolute and the architecture is initiated in the global planning phase

2) On a node by node basis, the cluster joining nodes are shaped with local phase. In the latter, senor nodes are assembled into cluster.

For the reason of collect sensor data, HTP using cluster head (CH) which has information of sensor state and multi hop routing locate up.

The cluster head is designated based on its location in the sensor network and its energy reservoir perception.



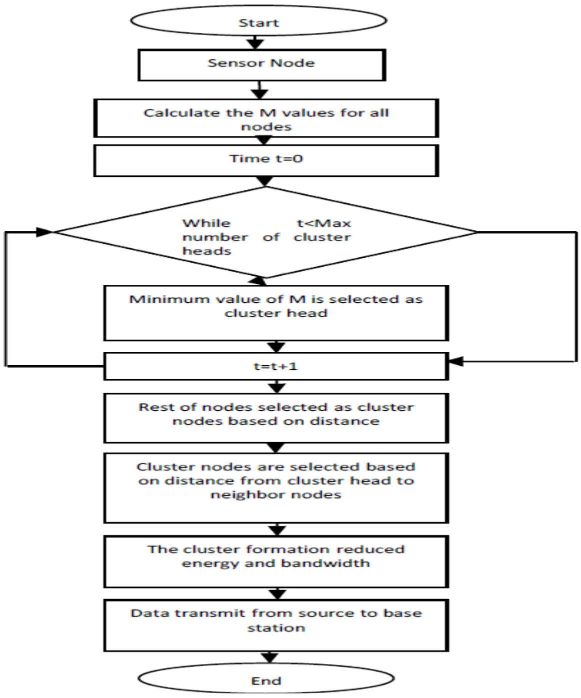


Fig 4 Proposed Algorithm and Its Model

By the hierarchical construction of the three tier model, clusters are merged and formed. For constructing the initial network, the metric value M along with the potential of the cluster head should be known for calculation.

$$\mathbf{M = K \times E + K \times D}$$

Where,

- The size is normalized so that $\mathbf{E \in (0, 1), D \in (0, 1), k_1 \in (0, 1)}$ **and** $\mathbf{k_2 \in (0, 1)}$,
- **E** is residual energy of a node,
- **D** is distance between a node (outside the network) and cluster-heads in the network,
- $\mathbf{k_1}$& $\mathbf{k_2}$ weights.

The base station broadcasts the control messages from the sink node to the source node. The sink node receives the energy metric E of nodes in the network operation at the initial round. The HTP control packet sends control messages to both the network nodes and the base station. The base station saves all the possible routes of the network in the routing table. By multi-hop routing, the base station broadcasts the control messages to the cluster heads and the normal nodes. HTP messages are transmitted from cluster heads to the base station via multi hop routes. The base station decides the routes to the nodes only after receiving the notification of the cluster head death, and rebuilt the route correspondingly.

The base station sends control message to the normal nodes and the cluster heads, to maintain the existing network for each time slots to verify whether the nodes are still alive. The energy level information and the routing table of the base station will be updated based on the received information. The cluster head and the sources are broadcasted with the updated information. The dead cluster member is deleted when the cluster head receives the control message. With response to the partitioning and the node failure, group reorganization may be performed.

Communication may be interrupted with the failure in the Tier 1of the network. The optimal path is chunked with the dynamic load imbalance in the sensor nodes due to the failure in the network nodes. The dead cluster head may be replaced by triggering the mechanism to select a new cluster-head for the complete network, thereby restoring the communication interrupt.

- **First Algorithm Tool**

Low-Energy Adaptive Clustering Hierarchy (LEACH) Low-energy adaptive clustering hierarchy (LEACH) is a routing algorithm designed to collect and deliver data to the data sink, typically a base station. The main objectives of LEACH are: Extension of the network lifetime Reduced energy consumption by each network sensor node Use of data aggregation to reduce the number of communication post to attain these subject, LEACH adopt an advanced hierarchical technique to systematize the network keen on a position of clusters. Each cluster is managed by a selected cluster head. The cluster head assumes the responsibility to carry out multiple tasks. The first task consists of periodic collection of data from the members of the cluster. Leading congregation the data, the cluster beginning aggregate it in an attempt to eliminate redundancy along with interrelated standards. The second main task of a cluster head is to transmit the aggregated data directly to the base station over single hop. The third main task of the cluster head is to create a TDMA-based schedule whereby each node of the cluster is assigned a time slot that it can use for transmission. The cluster head announces the schedule to its cluster members through broadcasting. To reduce the likelihood of collisions among sensors within and outside the cluster, LEACH nodes use a code-division multiple access–based scheme for communication. The fundamental operation of LEACH is prepared in two different phases. The primary phase, the complex phase, consists of two steps, cluster-head selection and cluster formation. The second phase, the steady-state phase, focuses on data collection, aggregation, and delivery to the base station. The period of the system is implicit to be comparatively shorter than the stable state phase to reduce the protocol transparency.

- **Second Algorithm Tool**

Threshold-sensitive Energy Efficient Protocols (TEEN) Two hierarchical routing protocols called TEEN (Threshold-sensitive Energy Efficient sensor Network protocol), and APTEEN (Adaptive Periodic Threshold-sensitive Energy Efficient sensor Network protocol). These protocols were proposed for time-critical applications. On TEEN, sensor nodes logic the average constantly, but the data broadcast is complete in frequently. A cluster head sensor sends its members a hard threshold, which is the threshold value of the sensed attribute and a soft threshold, which is a small change in the rate of the sense quality that trigger the node to control on its source and broadcast. Thus the hard threshold tries to reduce the number of transmissions by allowing the nodes to transmit only when the sensed attribute is in the range of interest. A smaller value of the soft threshold gives a more accurate picture of the network, at the expense of increased energy consumption. Therefore, the client can manage the trade-off among energy effectiveness and data accurateness. When cluster-heads are to modify, new values for the over parameters are broadcast. The main drawback of this scheme is that, if the thresholds are not received, the nodes will never communicate, and the user will not get any data from the network at all.

Two algorithms used for all simulations are carried out in the WSN based simulation framework called WSN MATLAB. It comes with various mobility models and it is well suited for simulations for wireless sensor networks. For all the communication links unit disk graph model is used, which means that if a node ‘X’ can reach node ‘Y’ then node ‘Y’ can also reach ‘X’. The energy consumption model that was proposed in [7] has been used.

VII. SIMULATION AND RESULTS

- **PARAMETERS USED**

They evaluated the performance of My LEACH and TEEN protocol implemented with NS2. 200 sensor nodes are randomly distributed in an area of 200m × 200m. BS is put at the location with x = 175, y = 50. The bandwidth of data channel is set to 2 Mbps, the length of data messages is 1028 bytes and packet header for each type of packet was 256 bytes. The number round is set to 500s. At what time node use energy losing to its energy threshold, it be able to rejection longer send data and is measured as a dead node.

Parameters	**Value**
Number of node	25, 50, 100, 150,200 nodes
Channel probability	0.1
Simulation time	120 sec
Topology size	1000×1000 m^2
Initial node power	1.2 joules
BS position Located at	200m×200m
Nodes distribution	Nodes are randomly distributed

TABLE 1 PARAMETERS VALUE

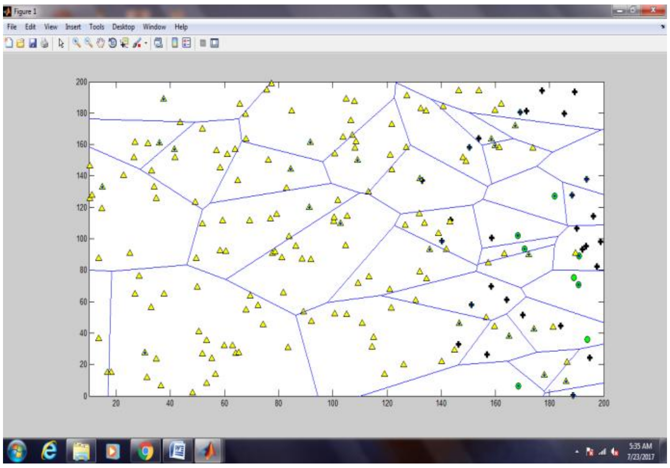


Fig 5 Number of node to be mapped BS (LEACH)

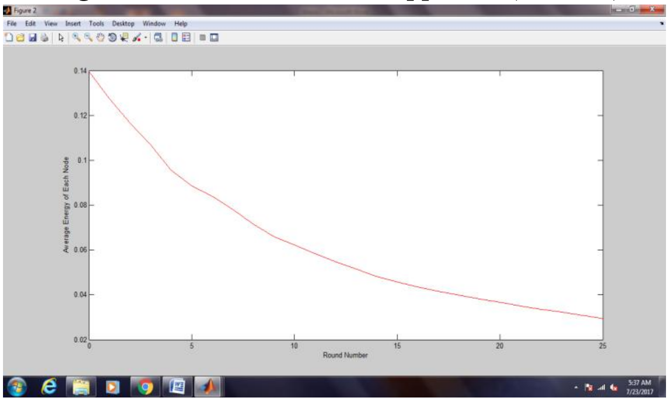


Fig. 6 Average Energy Up to 25 Nodes (LEACH)

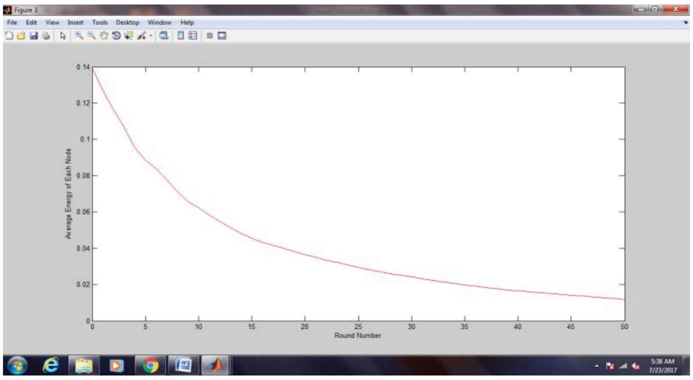


Fig7 Average Energy Next 50 Nodes (LEACH)

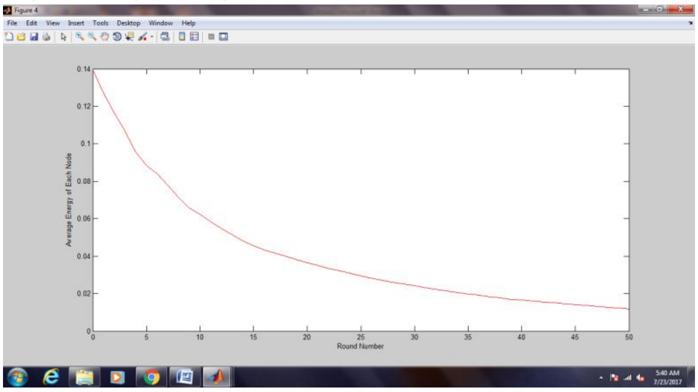


Fig. 8 Average Energy Next 50 Nodes (which is constant) (LEACH)

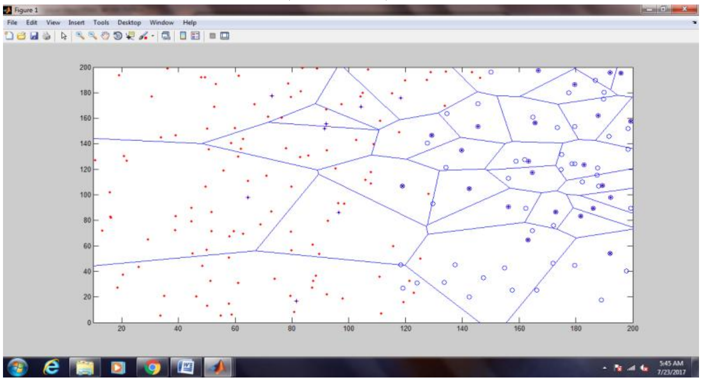


Fig 9 Number of node to be mapped BS (TEEN)

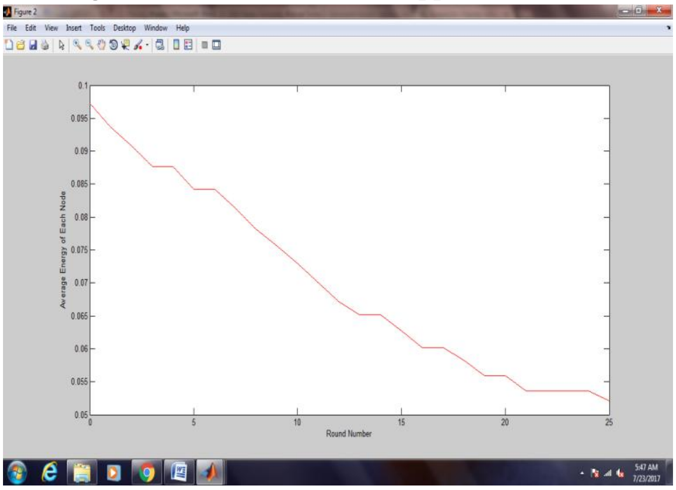


Fig. 10 Average Energy Up to 25 Nodes (TEEN)

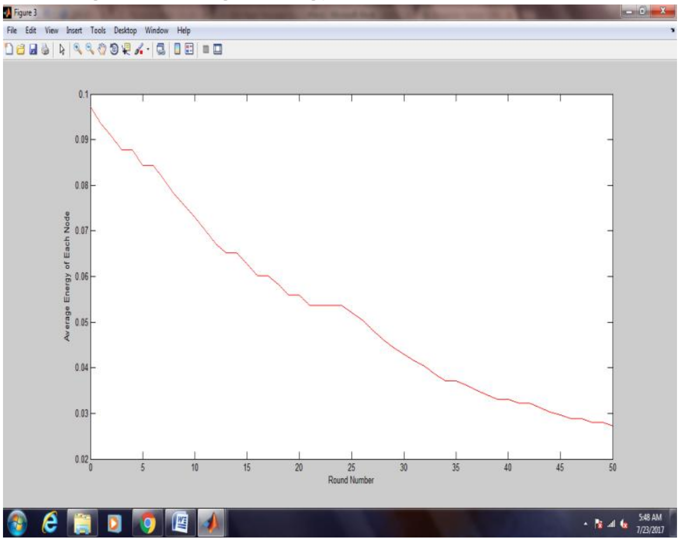


Fig 11 Average Energy Up To 50 Nodes (TEEN)

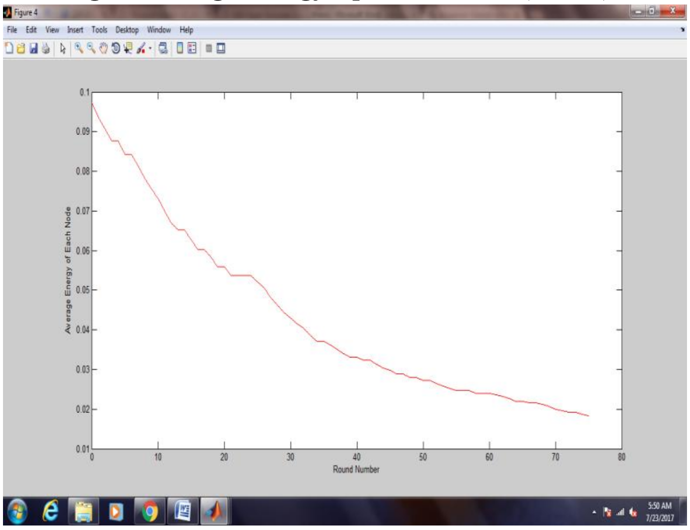


Fig. 12 Average Energy Up To 80 Nodes (TEEN)

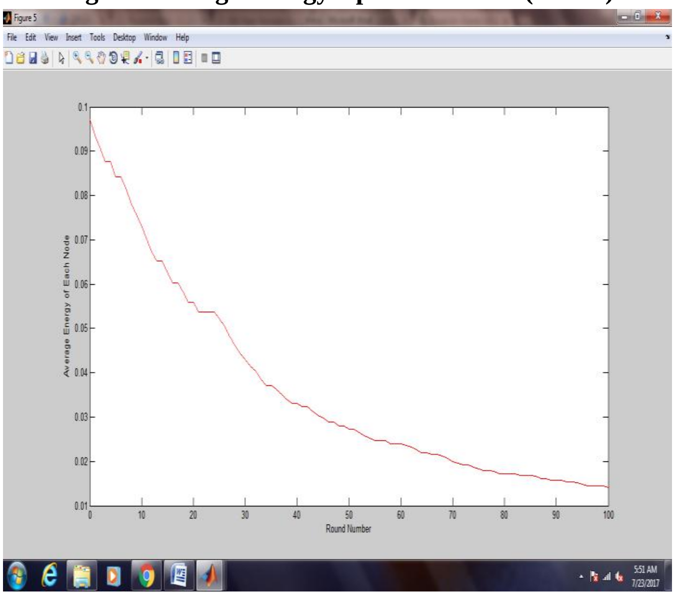
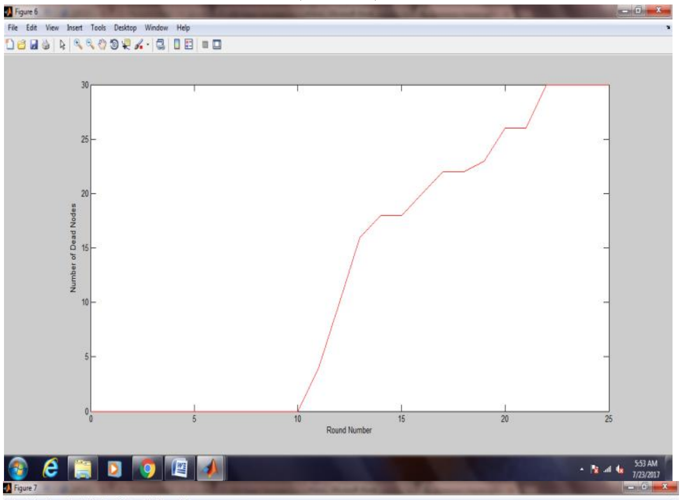
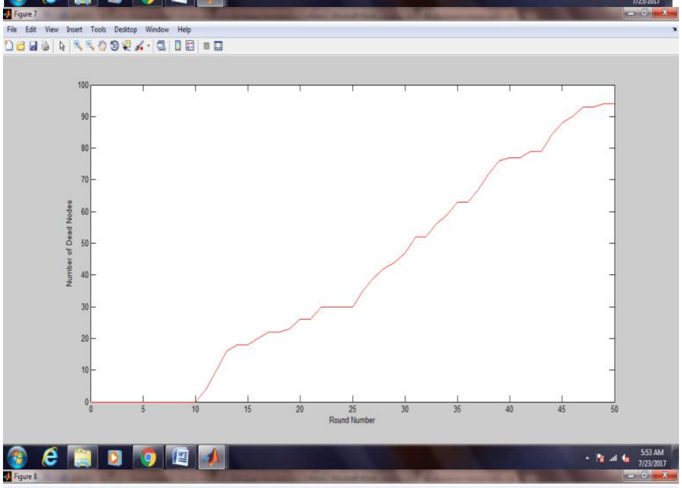


Fig. 13 Average Energy Up To 100 Nodes (TEEN)





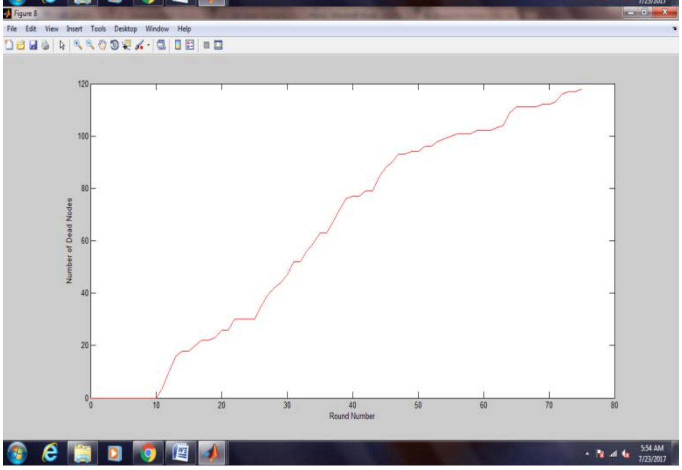


Fig. 14 Average Energy for Nodes Starts Again (TEEN)

This work proposed a new parametric topology management algorithm to manage effectively the energy consumption of sensors in wireless sensor networks. Based on a proposed Energy Driven Model (EDM), the most prevalent relevant parameters in a typical wireless sensor network were extracted to feed a parametric topology management algorithm. These parameters were the residual energy of nodes, the number of neighbours, the number of neighbours a node acts as their relay, the number of hops, the transmission radius and the distance between nodes. Separate parameters were considered in one or other previous research efforts. Taking all previous researches together, all parameters were covered but not in one particular work. More importantly, our work is significant in that it exposed the interplays between dominant parameters that affect the overall energy consumption and this opens the door for new energy optimization methods. After generating a time-variant connection cost function between nodes in the network based on these parameters, the algorithm employs LEACH and TEEN to search for shortest paths from nodes to their sink with least energy consumption.

Compared with the standard LEACH and TEEN algorithm used in most networking communication algorithms and through extensive simulation, our parametric topology management algorithm showed superior improvement in terms of the number of successfully delivered packets, number of packets lost (in different network topology and network density), and energy consumption of the entire network.

The LEACH and TEEN algorithm was applied to a typical mesh topology WSN; however, the algorithm can be used in similar sensor applications with similar characteristics such as agricultural fields, or rainforest sensor applications. The selected parameters may be different depending on the characteristics of the application. As a result of our study, taking into account the prevalent parameters and the interplay between them will result in better performance in terms of more work done and longer lifetime through an effective energy consumption strategy.

VIII. CONCLUSION AND FUTURE SCOPE

- **CONCLUSION**

By all the simulation results it can be accomplished that energy efficient, robust and resilient alongside packet loss, and deliver high packet delivery ratio with respect to moderate to high mobility of nodes. Original Map is parallel in nature. This penalization reduces the time of clustering the sensor network. Also it helps to reduce the packets drop.

Which all shows less energy consumption and animated node-node mapped communication.

The transitional results formed by Map protocol are specified as enter to the Reducer i.e. list of original set of k cluster heads as key2 and list of all extra nodes with their cluster heads known to them as value2. The Reduce phase would construct ending clusters with their cluster heads and further nodes in that cluster as value3.

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Common parameters in a typical wireless sensor network were applied to create a new parametric topology management algorithm aiming at reducing energy consumption of sensors in the network. After using these parameters to generate a time-variant connection cost function between sensors in the graphs, energy-efficient paths between sensors and their associated sinks were observed by employing a LEACH and TEEN algorithm. While the idea of employing LEACH and TEEN in routing of packets in networks is not new, in this chapter we proposed a new complex function of energy-related communication costs taking into account the prevalent parameters. Through extensive simulation, the algorithm with new costs showed superior improvement in terms of the number of successfully delivered packets, number of packets lost (in various different network topologies and network densities), and energy consumption of the entire network compared to the standard LEACH and TEEN algorithm.

- **FUTURE WORK**

In future WSNs node-node mapped communication and LEACH and TEEN on Internet of Things (IoTs), various sensing applications over one physical network in order to reduce the deployment cost. These applications would produce heterogeneous data traffic patterns with different physical resource demands. For instance, event-tracking applications require more bandwidth but fewer CPU cycles compared with data-fusion applications. The traffic flows of multiple coexisting applications compete with each other for limited physical resources, causing both overall system efficiency and multi resource fairness to become non-trivial issues. On one hand, current distributed heuristic solutions such as the Multi-Topology Routing (MTR) used by the emerging IETF routing protocol RPL, would perform poorly in practical IoTs, due to the lack of network optimization. On the other hand, existing theoretical-optimal approaches such as Dominant Resource Allocation (DRF) are centralized and too heavy for wireless sensor nodes. Therefore, lightweight and distributed optimization solutions are highly desired to bridge the gap between theory and practice.

For instance, important real-time sensor data could be sent through 5G cellular radios, while normal delay-tolerant environmental monitoring data could be transmitted through opportunistic mobile relays over short-range wireless radios such Transmitting a huge volume of raw data produced by numerous sensors to the Internet is expensive. Fortunately, sensor data processing techniques such as compressive sensing and in-network data fusion can significantly reduce the data traffic load and improve the sensing performance. Consequently, it is promising to extend the distributed optimization approaches presented in this thesis to future WSNs and IoTs for joint sensing, wireless networking, and network processing.

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