
DESIGN OF SECURE AND SCALABLE MODEL FOR WIRELESS MULTIMEDIA SENSOR NETWORKS

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1.1 DEFINE : WIRELESS SENSOR NETWORKS

Wireless multimedia sensor networks (WMSNs) have the sensor nodes (motes) equipped with multimedia devices like microphones, camera and other sensors producing multimedia data content. The progress in the CMOS technology has lead to development of single chip camera modules that could be easily integrated with motes. This integration between multimedia sources and cheap communication devices motivates the researches in wireless sensor network. WMSN gives interactive edge to the existing WSN applications and enables a new large range of applications, like multimedia surveillance, traffic management, automated assistance, environmental monitoring, and industrial process control. The result of this advancement is that the WMSNs have additional features and requirements than WSN, such as high bandwidth demand, bounded delay, acceptable jitter, and low packet loss ratio; thus, imposing more resource constraints like energy, memory, bandwidth, and on-chip processing requirements (F. Akyildiz 2008). Meeting these constraints along with QoS issues is a real challenge. These characteristics, challenges, and requirements of designing WMSNs open many research issues and future research directions to develop protocols, algorithms, architectures, devices, and test beds to maximize the network lifetime while satisfying the QoS requirements of the various applications.

1. MAC 2. Routing 3. Node Localization 4. Clock Synchronization

1.2 WSN HARDWARE PLATFORMS

1. Shimmer 2. Ember EM250 3. TelosB 4. eZ430-RF2500

1.3 HARDWARE CAPABILITIES

Despite the fact that WSN innovation is basically an exploration theme and the current age of hubs are still too costly to even consider being really expendable, looking at run of the mill highlights of hub platforms is significant. Stages range from very much tried hubs produced on medium scale and utilized in test organizations throughout the last ten years, momentum arising

hub stages (Jennic), to aggressive examination dreams (Smart Dust). An overview of a portion of these hub families continues to find their fundamental highlights, similitude's and outstanding patterns in the advancement of hub equipment.

1.4 CONVENTIONAL WIRELESS DESIGN COMPARISON

A clarification of the current remote designs and their inadequacies for profoundly installed gadgets outlines the benefits of the Mica network engineering. Profoundly installed remote organizations contrast in a few vital regards from customary remote situations. In the first place, power utilization should be definitely diminished. A profoundly installed, battery worked gadget could have to work for quite a long time on a couple of AA batteries or a lithium coin cell. Power utilization should average in the micro amps range, requiring shutting down a large portion of the gadget a significant part of the time-a PDA would do well to last two or three weeks on two AA batteries. This hundredfold power utilization decrease orders uncommon changes to framework design. Second, many profoundly installed frameworks can't depend on a redeployed, strong foundation for help. Cell conventions, for instance, exploit powerful base stations to decrease power utilization in portable hubs. In a friend topeer multihop network, commonly, just the last jump will speak with a base station-a large portion of the hubs would be situated outside of the stations direct correspondence range. A benefit of a shared engineering is that it just requires little correspondence distances for every transmission. At last, while most remote gadgets do a solitary, profoundly normalized work, profoundly installed networks should be fit to a wide assortment of utilizations. This requires a more broadly useful framework configuration, yet in addition permits utilizing extremist, profoundly effective calculations.

The Mica2 and MicaZ highlight an Atmel ATmega128L 8-digit processor running at 7MHz. The measured plan permits outer sensor sheets to be connected to a principle handling and handset board, decoupling detecting and permitting application adaptability through the reconciliation of custom sensors to meet explicit situation targets. Power is provided by means of either an outer connector or installed mounting for two AA batteries, which commonly give a current limit of 2000 may, in spite of the fact that lithium particle (Li-On) batteries can give a limit of 2800mAh. The Mica hubs, with joined battery connector, and a related base station with power and network to an administration PC provided over Universal Serial Bus (USB). The Chip on CC1000 handset of the Mica2 works on the 868/915 MHz band. Its information pace of 38.4 kbps accommodates informing applications, for example, that examined in Section 2.1.1, page 28, and the decision of basic and hearty tweak methods, for example, recurrence shift keying (FSK) and

on-off keying (OOK), giving great blunder resistance and forcing minimal as far as synchronization and channel assessment requests, with ensuing power effectiveness.

Jennic Nodes, Spec Motes - Smart Dust

1.5 WIRELESS MOBILE SENSOR NETWORK APPLICATION

WMSN has a wide scope of use beginning from observation, monitoring to amusement. We have recorded here not many of them. Some of them are as per the following:

1. In observation and traffic checking, video and sound sensors are used close by the current plan of sensor organization to further develop surveillance capacity. It will in general be applied for bad behaviour and mental aggressor attack or it might be applied to defend public and private properties for example in front line it can take the photographs of the foe and besides do a recording of the activities. Video sensors can be shipped off screen the enemy zone. Base station can assemble this information through replay hubs and finally it sends the information to the controlling run to take proper decision and to manufacture methodologies. In like way, as of now daily's on road traffic has been checked to protect disasters and to move past speeding people. Mixed media sensors can record huge activities (burglaries, car accidents). Moreover, make video/sound exchanges which turn out to be a proof for taking fundamental actions. Savvy halting structure can in like manner be worked from WMSN by recognizing open spaces and coordinating driver. Additionally shrewd metropolitan networks can give traffic directing direction to avoid stop up or it could direct the driver to show up at the goal in most restricted time. To screen locales, public events, private properties and lines, tremendous extension organization of video sensors are used by guideline approval workplaces.
2. In wellbeing observing and medical care, WMSN can expect a significant part. Telemedicine sensor networks are facilitated with 3G mixed media networks for giving clinical consideration organizations. The direct of the more seasoned individual can be seen through camera and thus it can help with recognizing his/her ailment. Actually devices go probably as private assist in like manner like body district sensor with systems administration that generally oversees sensors can be implanted on body. Circulatory strain, electrocardiogram, beat activity of the patients having wearable sensors can be checked from a distance. Remote clinical canters can similarly help advanced thoughts for their patients through video and sound sensors.

3. In Gaming, diversion and modern district moreover WMSN has many exercises. The current gaming industry laid on the possibility of 3D, 4D vision and PC created reality. Increased the truth is essentially PC delivered entertainment of a three-layered image of anything or any environment that can interact with, in a clearly veritable or real way by an individual using special electronic hardware, for instance, a cap with a screen inside which gives 3D view each article or gloves fitted with sensors. Another model can be, the place where an individual is doing juggling, the incorporating of that individual seem to keep moving with others running moreover, it gives motivation to the person.
4. In Environmental observing, WMSN accepts a critical part. Climate observing tasks are circumventing the world. Shudder area, rise in ocean or sudden storm disclosure, etc falls under living space checking. Acoustic and video sensors are used and they are investigated in a period essential plan, with the objective that any disastrous event can be recognized. For example, assortments of video sensors are currently used by oceanographers to conclude the improvement of shoals through picture taking care of techniques.
5. In Industrial interaction control. A couple of mixed media content like temperature, imaging, and tension can be used for time-fundamental current association control. In state of the art's innovation, information collected from different kind of sensors can be clearly controlled and explored with the help of an expert structure to assist a gathering with cycling, for instance, those used in vehicles, semiconductor chips, drug food or items. In quality control industry moreover the nuances of the possible result is being explored by using some man-made cognizance strategy, in case noticed broken, the information is being given to make fundamental step. The wire of machine vision structures with mixed media, add versatility to systems for visual surveys and moreover develop the overall working so a layman can in like manner work on

1.6 WSN : NETWORK ARCHITECTURE

A WSN essentially gathers the data from the sensor nodes plays out some fundamental handling and communicates the data to the BS or Sink. The sensor nodes utilize either single-jump or various bounces by means of middle of the road nodes to arrive at the BS or Sink. The single-bounce networks can be utilized distinctly for tiny scope applications. In this single-jump

architecture, each hub should utilize long distance transmission to arrive at the BS straightforwardly. The Figure 1.4 shows the single hop significant distance network architecture.

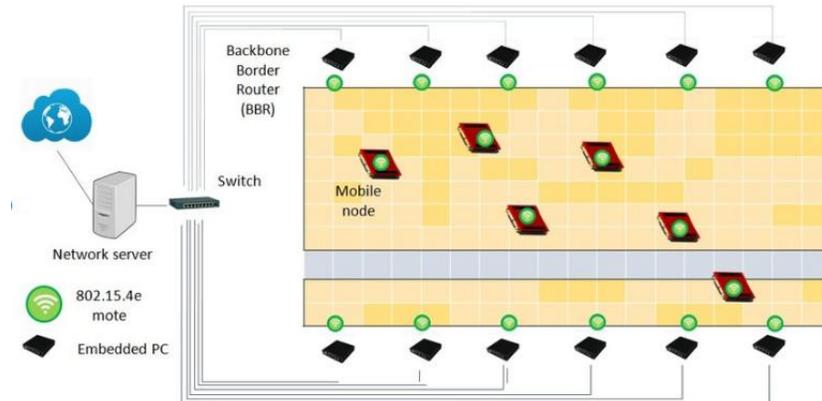


Fig. : 2D shuttle systems Single hop network structural design

This significant distance transmission consumes more energy thus the lifetime of the network will be less. To address this issue, the network utilizes multi-hop brief distance transmission to send data to BS by means of at least one middle node. This kind of transmission burns through less measure of effort to move the data utilizing brief distance communication. This multi-bounce architecture is arranged into two kinds: level and progressive architectures.

Level Architecture: In this kind of architecture, every one of the nodes in the network perform same job and the design of the nodes are likewise same. Figure 1.6 shows the exemplary architecture of a level WSN.

Hierarchical Architecture :

The nodes in this architecture are assembled into bunches in which the part nodes gather the data and communicate something very similar to the leader hub called CH that has a place with a similar group. The CH gathers the data from its members and plays out some handling if vital and sends the data to the BS or Sink. Regularly the nodes with lower energy will go about as bunch members where as the nodes with bigger energy will go about as CH. The standard architecture of a solitary jump bunched WSN is displayed in the Figure

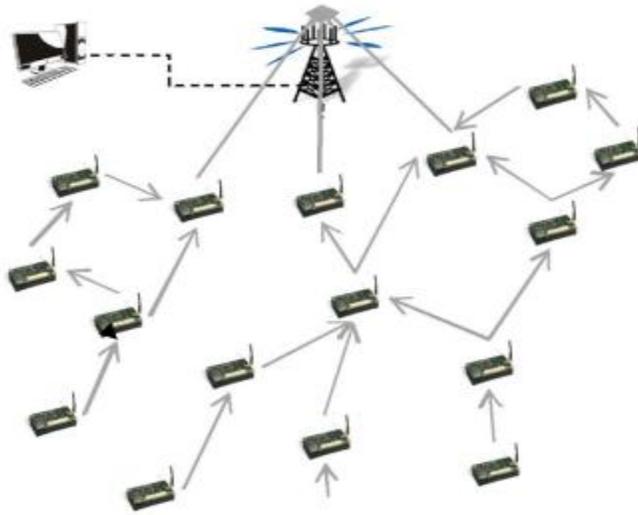


Fig. : The flat multi-hop WSN classic structural design

The fundamental benefit of the bunched architecture is its scalability. Simultaneously, the significant issue of this kind of architecture is that a couple of nodes need to go about as CH moreover. As a couple of number of nodes generally go about as CH, the energy in these nodes exhaust rapidly. To defeat this issue either the job of the CH ought to be turned frequently or the nodes that are going about as CHs ought to be exceptionally arranged with long life battery storage to broaden the existence season of the network . The previous case network is called as homogeneous network where as the later is called as heterogeneous network. The heterogeneity can be either connects heterogeneity or energy heterogeneity or handling heterogeneity or memory heterogeneity.

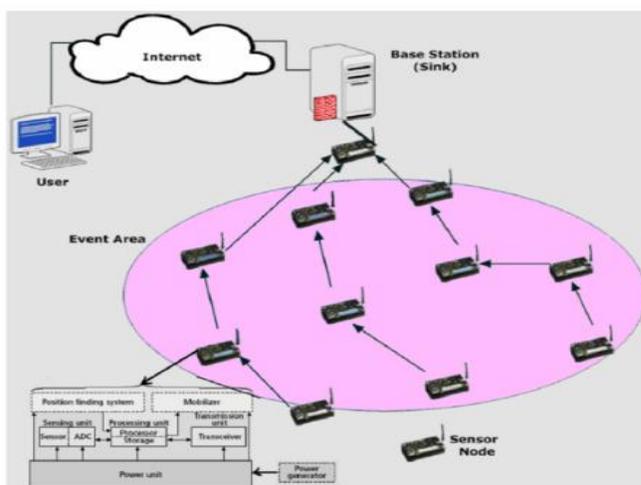


Fig. : Multi-hop communication with WSN

The principle benefit of the grouped architecture is its scalability. Simultaneously, the significant issue of this kind of architecture is that a couple of nodes need to go about as CH too. As a couple of number of nodes generally goes about as CH, the energy in these nodes drains rapidly. To conquer this issue either the job of the CH ought to be turned frequently or the nodes that are going about as CHs ought to be exceptionally arranged with long life battery storage to expand the existence season of the network. The prior case network is called as homogeneous network where as the later is called as heterogeneous network. The heterogeneity can be either interface heterogeneity or energy heterogeneity or processing heterogeneity or memory heterogeneity.

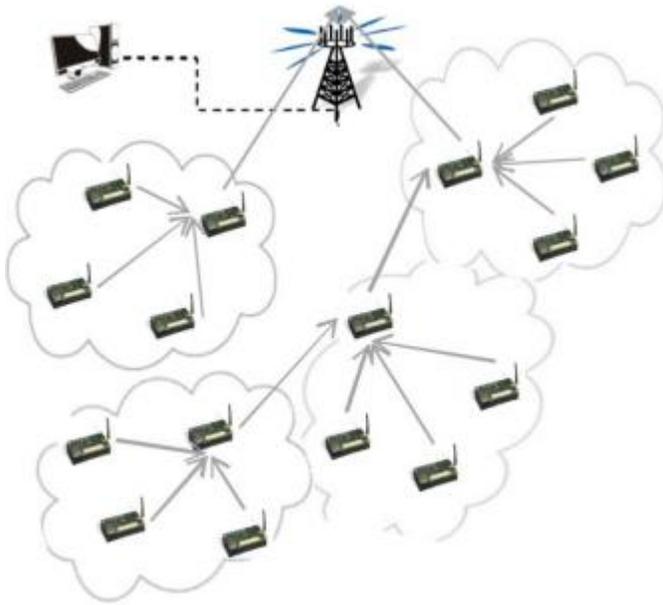


Fig. : Single-hop Clustered structural design

To additionally work on the proficiency and lifetime of the network, a multi-tiered bunched architecture with profoundly arranged nodes must be conveyed in the network. In this kind of architecture, the complicated operations or undertakings are performed by the nodes in the upper layer where as the nodes in the lower layer plays out the central operations. A multi-level architecture is displayed in the Figure

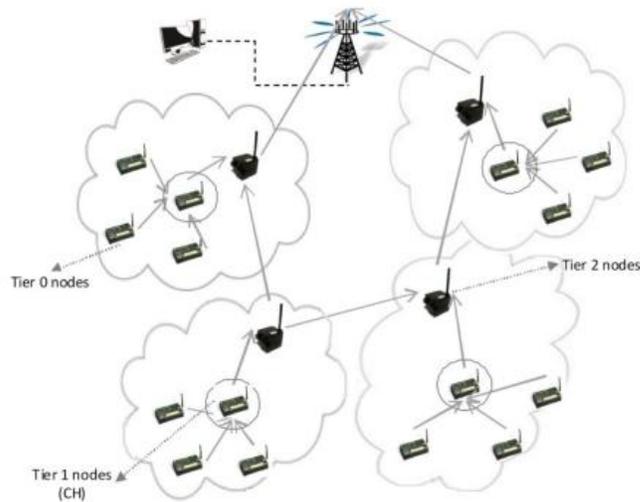


Fig.: A multi-tier WSN structural design

OBJECTIVE OF THE STUDY

The reason for this work is to foster a convention which should uphold energy productivity and ongoing traffic for conditions like territory monitoring or region observation.

This work canters towards finding out reasonable routing protocols that would be valuable for different detecting applications with decreased energy consumption. Significant objectives of the proposed convention were recorded under.

1. To consume least energy at hub level and decrease hub level processing load.
2. To decreased start to finish delay.
3. To recognize and seclude malicious nodes.
4. To convey the data in a solid way and work on the existence season of a WSN.