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A Survey on Wireless Multimedia Sensor Network

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ABSTRACT: In this paper we going to survey the WIRELESS multimedia sensor networks (WMSNs) and various application in it .Due to rapid improvements and miniaturization in hardware, the sensor nodes of WMSNs are equipped with CMOS camera, microphone, and other kinds of sensors to ubiquitously capture the fine-grained, accurate information in a comprehensive environmental monitoring. Multimedia sensor networks (WMSNs) can support a broad variety of application-layer services, especially in the field of video surveillance and environmental monitoring. In this we are going to survey Multi view Video Coding (MVC), Particle Filter , various challenges and issues.

KEYWORDS: Particle Filter, video sensor network, multi view video coding ,Sensor network, QoS

I. INTRODUCTION

Wireless multimedia sensor Network (WMSN) may be a network of wirelessly interconnected device nodes equipped with transmission devices, such as cameras and microphones, which is capable to capture video and audio streams, still image, also as scalar sensing element knowledge. WMSNs promise a good range of potential applications in each civilian and military areas that need visual and audio data like surveillance sensor networks, law-enforcement reports, control systems, advanced health supply, machine-driven help to aged telemedicine, and process management. In these applications transmission support has the potential of enhancing the amount of data collected, enlarging the vary of coverage, and facultative multi-resolution views.

WMSNs have also further characteristics and challenges, additionally to those of WSNs, attributable to the character of the real time multimedia system data like high bandwidth demand, period delivery, acceptable end-to-end delay, and proper noise and data loss rate. Moreover, there are many various resource constraints in WMSNs involving bandwidth, delay, memory, energy and process capability attributable to the physically tiny size of the sensors and therefore the nature of the multimedia system application that's generally producing an enormous amount of information. Therefore, to fulfill the standard of service (QoS) necessities and to use the network scarce resources during a fair and economical manner, these characteristics of WMSNs in conjunction with different analysis problems like coverage and security —as shown in Figure 1—become a priority, and may be thought of most likely at the various layers of the communication protocol stack. we have a tendency to define and discuss these problems in detail within the following sections. Moreover, given the comparatively high redundancy within the visual device data, WMSNs have further requirements like in-node multimedia system process, application-specific QoS necessities, and multimedia system in-network process techniques (e.g., storage management, data fusion and aggregation). In this paper, we survey the state of Multiview Video Coding(MVC), particle filter and challenges for the development of WMSN and discuss their open research issues.

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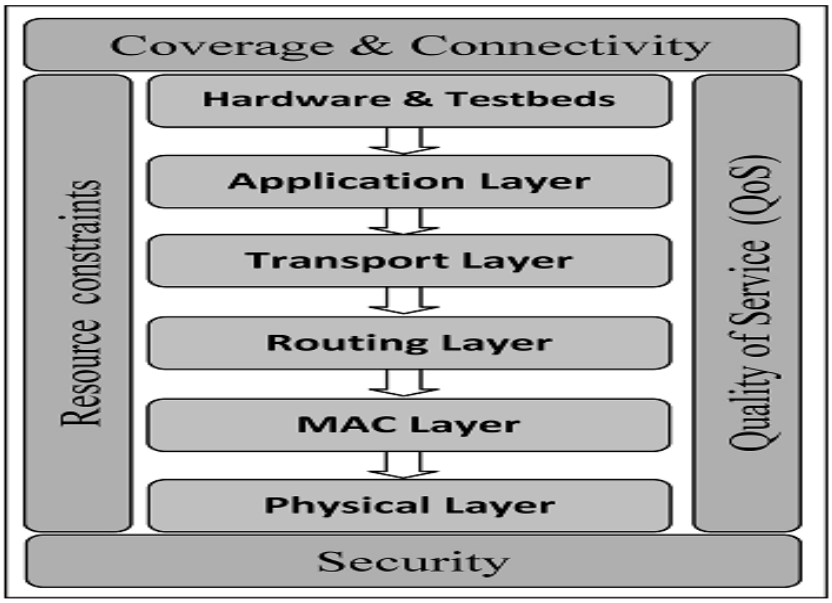

Figure 1 Challenge in WMSN

II. NETWORK ARCHITECTURE

Nowadays, most of the proposed network architectures in scalar wireless sensor networks are based on a flat architecture of distributed homogeneous nodes, where low-power scalar sensors are in charge of performing simple tasks such as detecting scalar physical measurements. But with the emerging of WMSN and its new applications, new types of sensor nodes besides scalar sensors (such as multimedia sensors, processing hubs, and storage hubs) with different capabilities and functionalities have been used. Network architectures in WMSNs can be classified into three different models: single-tier flat architecture, single-tier clustered architecture, multi-tier architecture model.

A. **Single-Tier Flat Architecture:** The network is placed with homogeneous device nodes of a similar capabilities and functionalities. during this model all the nodes will perform any function from image capturing through transmission process to knowledge relaying toward the sink in multi-hop basis.Single-tier flat architecture is easy to manage. Multimedia processing is distributed among the nodes, which defines network life time also.

B. **Single-Tier Clustered Architecture:** In this network is placed with heterogeneous sensors wherever camera, audio and scalar sensors among every cluster relay knowledge to a cluster head. The cluster head has additional resources and it's ready to perform intensive processing. The clustered head is wirelessly connected with the sink either directly or through different cluster heads in multi-hop fashion.

C. **Multi-Tier Architecture Model :** In this first tier is placed with scalar sensors performs simple tasks, like motion detection, the second tier of camera sensors may perform more complicated tasks as object detection or object recognition, and at the third tier more powerful and high resolution camera sensors are capable to perform more complex tasks, like object tracking. Each tier may have a central hub to perform more data processing and communicate with the higher tier. This Process is carried out in heterogenous network.

III. MULTI-VIEW VIDEO CODING (MVC)

Nowadays video coding techniques is specific to designed jointly for encode multi-view sequences to provide compact video representation for resource allocation efficiently. MVC could give equal or even lower compression performance than encoding every read independently. In this theoretical model dependent on several parameter could

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result useless when applied to networking problems in a WMSN, where the model parameters must be estimated at each node and periodically signalled among nodes.

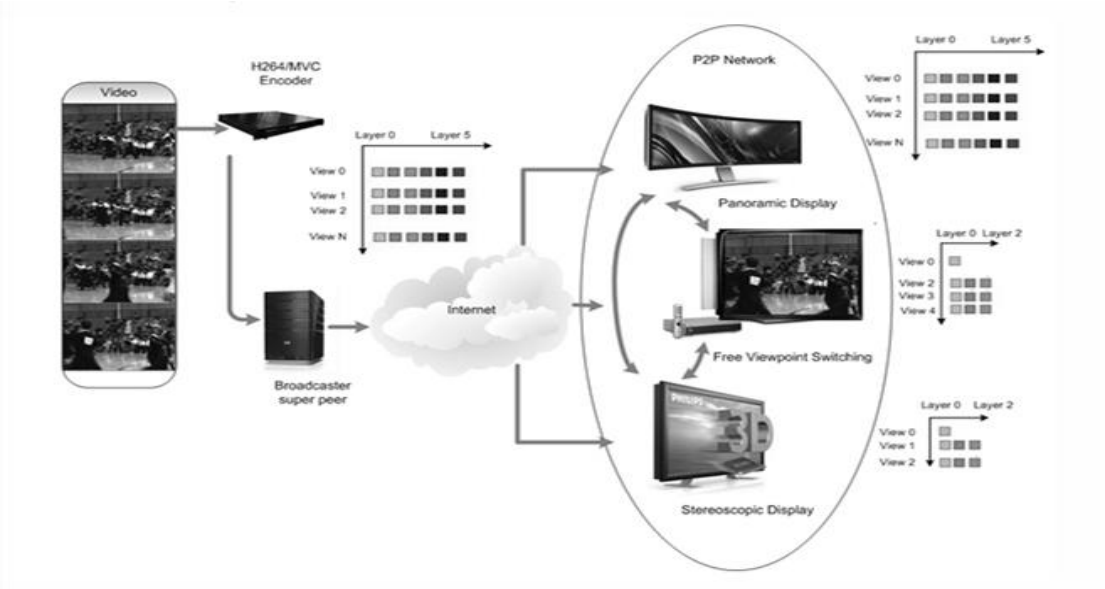

Figure .2 MVC System

The objectives of the MVC system are shown in figure defines

- Design a P2P system supporting distribution of MVC encoded video.
- Enhance the distribution performance by efficiently sharing data between video receivers.

IV. PARTICLE FILTERS

This concept implemented in application layer for consideration. The system designer needs to build an alternative regarding a way to design the physical (link) layer, i.e., the communication design, of a WSN and completely different design decisions lead to different performances for a selected application.

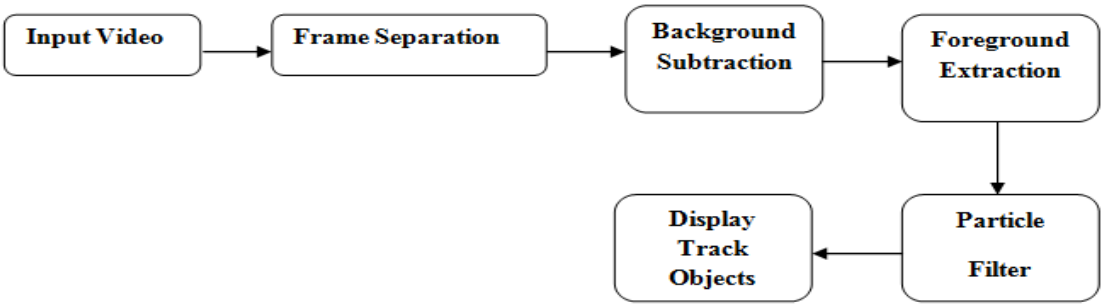

Figure 3 Particle filter

The above figure defines how the input video is converted into frames and also background substraction is carried out for particle filtering.

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The functions of the physical layer that require to be designed include modulation schemes, encoding techniques, transceiver architectures and decoding schemes at the receiver. PFs, also called sequential Monte Carlo methods, are simulation based mostly algorithms that yield estimates of the state supported a random point-mass representation of the probability measure with density.

V. CHALLENGES IN WMSN

A. Adaptive Decoding

Optimizing rich digital media for mobile information devices with limited processing power, limited battery life and varying display sizes.

B. Error Resilience

On delivering digital media over wireless networks that have high error rates and low and varying transmission speeds.

C. Network Access

Resource transmitted network is without adversely affecting the delivery of voice and data services.

D. Negotiable QoS

Negotiable QoS for IP multimedia sessions as well as for individual media component

VI. ISSUES IN WMSN

A. DESIGN ISSUES

- **Fault –tolerant Communication:** due to the preparation of sensor nodes in associate degree uncontrolled or harsh environment, it's not uncommon for the sensor nodes to become faulty and unreliable.
- **Scalability:** Scalability: A system, whose performance improves when adding hardware, proportionately to the capability added, is said to be a scalable system. the quantity of sensor nodes deployed within the sensing space is also in the order of lots or thousands, or more.
- **Transmission Media:** during a multi-hop device network, communicating nodes are coupled by a wireless medium. the standard issues related to a wireless channel (e.g., fading, high error rate) may affect the operation of the sensing network.

B. OTHER ISSUES

The major issues that affect the design and performance of a wireless multimedia sensor network are as follows:

- Network Layer
- Transport Layer
- Data Aggregation and Data Dissemination
- Frame conversion
- Deployment and etc.,

VII. APPLICATION

There are various real time application are in wireless multimedia sensor network are as follows.

- Traffic Controlling
- Military Surveillance
- Medical and Healthcare
- Video Monitoring

VIII. CONCLUSION

Wireless Multimedia Sensor Networks (WMSNs) consist of small nodes with sensing and wireless communications capabilities on network . Many routing, power management and data transmission have been specifically designed for WMSNs where energy awareness and memory is an essential design issue. From these

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survey we can overcome several issues in WMSN and its Challenges. Wireless Multimedia sensor networks represent a different solution in many real time applications.

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