Use Wireless Sensor Networks (WSNs) in Healthcare Purposes: Build Secured Trends of Monitoring

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Abstract— Wireless communication technology has been undergoing rapid advancements in recent times. Currently in Wireless Sensor Networks (WSNs) communication is done with the help of sensor nodes equipped to sense specific information. For example, enemy intrusion detection, habitat monitoring, patient monitoring and fire detection etc. So Sensor Networks are emerging as a promising technology for the future.

Here discuss the study Wireless Sensor Networks (WSNs) can be used to monitor and track patients for healthcare purposes, which can alleviate critical shortages of healthcare workers. This paper presents the healthcare purposes of the Wireless Sensor Networks and security related WSNs.

Wireless Networks continue to become an integral part of medical solutions in the healthcare sector due to cost reduction and increased healthcare benefits for patients. Another contribution due to this paper is the identification of innovative medical applications of currently developing Wireless Networks that speak to future trends.

Index Terms— Wireless Sensor Networks, Healthcare, Secured, Monitoring

I. INTRODUCTION

Wireless sensor networks (WSN) usually consist of a large number of sensor nodes. Sensor nodes monitor physical or environmental conditions such as temperature, humidity, noise, light, motion of objects, presence of certain objects, size, motion, direction, etc. Communication between nodes is done in a wireless fashion and thus WSNs employ distributed sensors to collect information on sensor network. A sensor has four operating modes: 1) transmission, 2) reception, 3) passive listening, and 4) sleep. Recently, this technology has been developed and is widely used in healthcare in daily life. Additional hardware is sometimes added to the sensor nodes depending on the application.

Because WSN nodes are typically high stability and can be easily hardware changed, so any applications ranging from healthcare and telemedicine to personal information sharing bridge the newly emerging field of cognitive radio. Data generated by wireless sensor networks is a managed and controlled by the central station. Data in Wireless Sensor Networks is collected and used from various fields. Information acquired is transmitted to the master station via wireless.

II. OBJECTIVES

1. Familiar with wireless sensor network (WSNs) principles of healthcare system.
2. Monitoring how to work the physiological signals in human life with the help of WSNs.

III. METHODOLOGY

Mixed method survey design has been used for the research work as it makes the work more efficient and accurate. A large amount of data has been collected. Data has been collected from various educational institutions of Bangladesh face to face. Both qualitative and quantitative data have been used in all cases. Random sampling and purposive sampling are used here to facilitate the work.

Data processing was done by Statistical Package for Social Sciences (SPSS) and MS Excel graphical application software.

To get cyber security is an internet-connected system, designing systems, networks and data to protect them from cybercrime related current data were collected.

IV. DATA ANALYSIS TECHNIQUE

Statistical package (SPSS) and MS Excel graphical application software were used for data processing. The analyzed solutions are presented in both tabular and graphical form. The data analysis process is processed in the following:
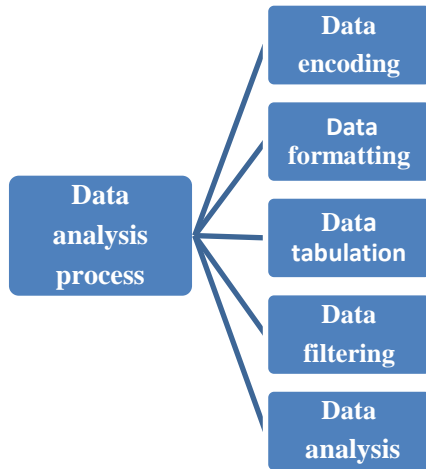
Figure: Data analysis process

Data was collected from educational institutions through mixed questionnaire survey. The data is then pre-checked and guided by feedback from the supervisor. To get the current situation of Wireless Sensor Networks (WSNs) communication, the information that is available has created awareness.

Collected data Status

| Sources of Data	Data Instrument	Data Size	Nature of Data
Diploma graduates of different Institute	Questionnaire (Mixed)	155	Qualitative & Quantitative
Teacher	Questionnaire (Mixed)	10	Qualitative & Quantitative
Staff	Questionnaire (Mixed)	20	Qualitative & Quantitative
	Total	185	

Statement of the problem

Security is an important issue for any system, especially in healthcare WSNs, where we are dealing with sensitive medical data of individuals. Security breaches are a major concern in healthcare applications of WSNs. Patient privacy is one of the biggest barriers to implementing electronic healthcare. These bottlenecks must be controlled as they affect data flow and delay data delivery. Also the integration of multiple sensing devices operating at different frequencies creates problems in interoperability.

V. DATA ANALYSIS AND FINDINGS

Firstly the sample is collected as a mixed questionnaire survey. Note that the sample is collected from different sources. Various opinions have emerged in the survey here regarding the future trends of medical applications of medical solutions in the healthcare sector of wireless networks.

This wireless sensor network to monitor patients for healthcare purposes has gathered current information on operations and security that can alleviate critical shortages of staff in the healthcare secto
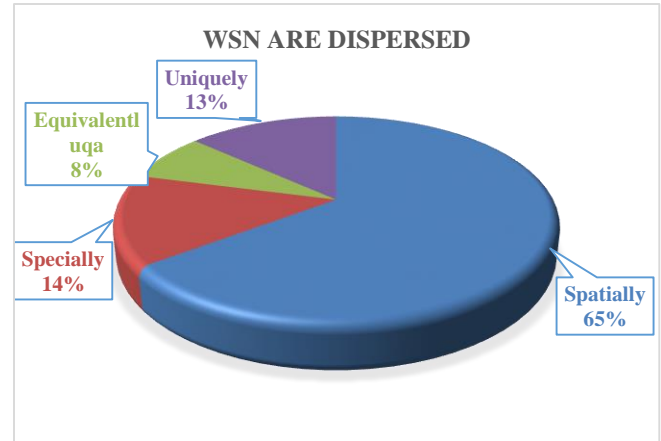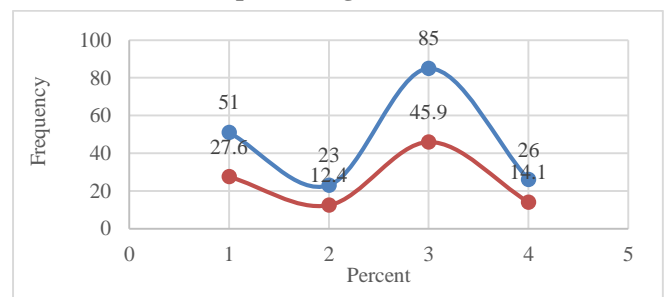

Figure 1

Against WSN are dispersed graph represents that 65% people opinions that it is Spatially, 14% people opinions that it is Specially , 13% people opinions that it is Uniquely and , 8% people opinions that it is equivalently.
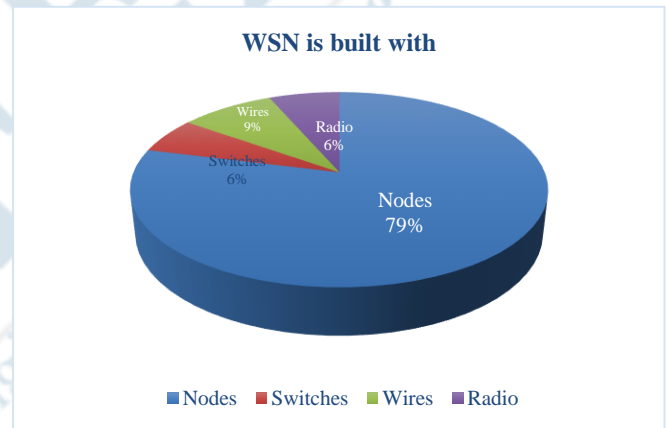
Figure 2

Against WSN is built graph represents that 79% people opinions that it is built with Nodes, 6% people opinions that it is built with Switches, 9% people opinions that it is built with Wires and , 6% people opinions that it is Radio.
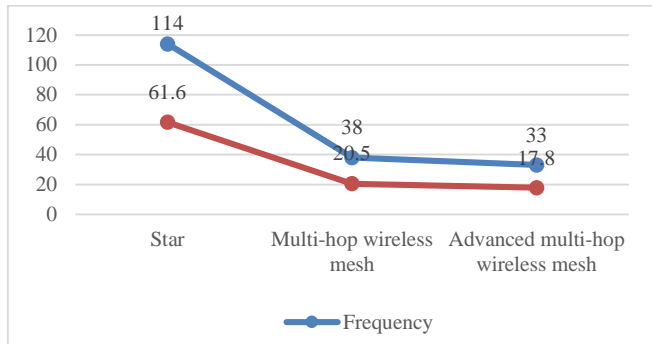
Sensor node with a processing unit

**Figure 3:** Sensor node with a processing unit

Against Sensor node with a processing unit graph represents that 46% people opinions that it is Maximum, 28% people opinions that it is Limited, 14% people opinions that it is 0 and , 12% people opinions that it is Minimum.

**Sensor node with a processing unit**

Figure 4: Sensor node with a processing unit

Against sensor node with a processing unit graph represents that 62% people opinions that it can Star, 20% people opinions that can Multi-hop wireless mesh, and 18% people opinions that it can Advance multi-hop wireless.
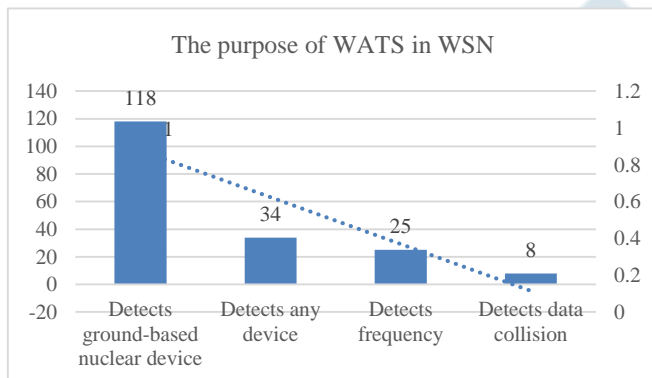

Figure 5: The purpose of WATS in WSN

Against the purpose of WATS in WSN graph represents that 64% people opinions that it can Detects ground-based nuclear device, 18% people opinions that can Detects any device,14% people opinions that it can Detects frequency and 4% people opinions that it can Detects data collision.
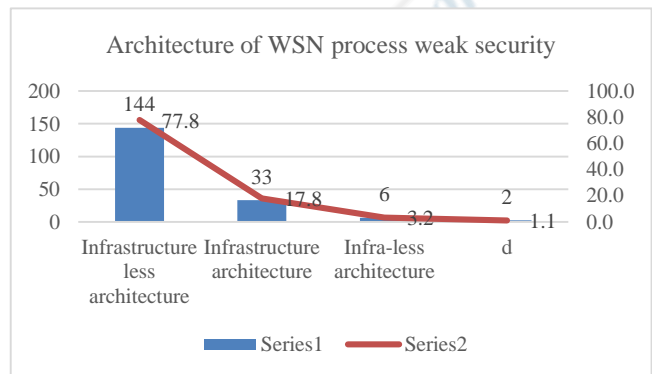

Figure 6: Architecture of WSN process weak security

Against following architecture of WSN process weak security graph represents that 78% people opinions that it can Infrastructure less architecture, 18% people opinions that can Infrastructure architecture and 4% people opinions that it can Infra-less architecture.
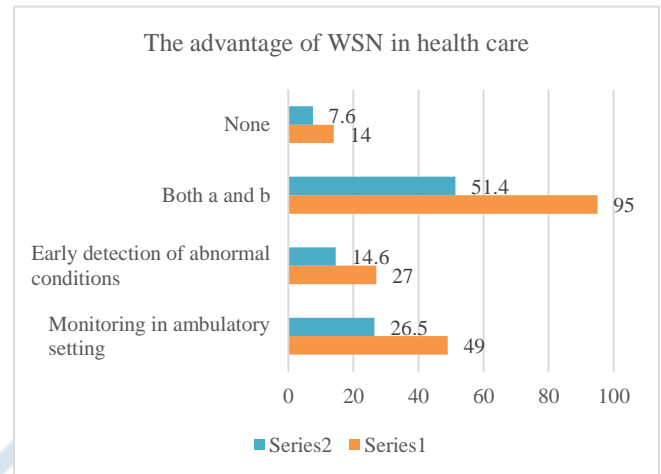
Figure 7: The advantage of WSN in health care

Against the advantage of WSN in health care graph represents that 27% people opinions that it can Monitoring in ambulatory setting, 15% people opinions that can Early detection of abnormal conditions and 51% people opinions that it can Monitoring in ambulatory setting and . Early detection of abnormal conditions both, 8% people has no opinion.
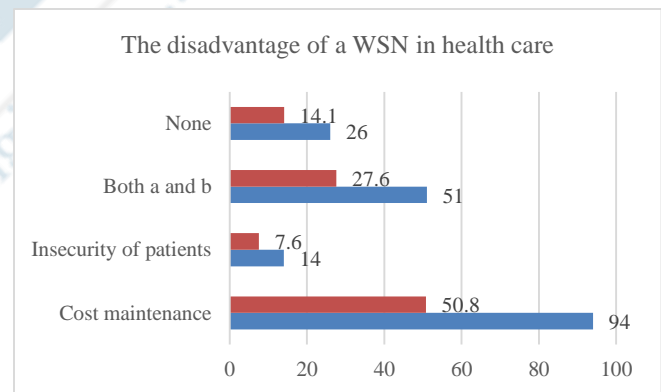
Figure 8: The disadvantage of a WSN in health care

Against the disadvantage of a WSN in health care graph represents that 51% people opinions that it is Cost maintenance, 8% people opinions that is Insecurity of patients and 27% 8people opinions that it is Cost maintenance and Insecurity of patients, 14% people has no opinion.

Opinions of participants about a WSN in health care:

- It can be accessed through centralized monitoring system.
- It gives quality of care across a wide varity of settings and segments of the population.
- It is a emerging technology that is poised to transform

health care.

- It is flyable and open to physical partitions.
- It is a emerging technology that is poised to transform health care.
- It is important for telemedicine.
- It would be improve and expand the quality of health care.
- Wireless sensor network is a collection of power.
- Conscious wireless sensors that are spatially distributed and forms an autonomous system that is independent of pre-existing infrastructure.
- WSN promise to make life more comfortable.

VI. CONCLUSION AND RECOMMENDATION

Wireless sensor networks have received considerable attention in the healthcare industry with a wide range of applications. Wireless sensor networks for high sensitivity it will serve as an important part of our healthcare. The research will contribute a lot to create a broader view of the medical field through computer networking.

1. It must be determined how our environment work by physiological signals in human life with the help of WSNs. To up our healthcare strength.
2. Explaining the importance independent of pre-existing infrastructure requires some guidance for practitioners.
3. Public awareness needs to be raised to improve and expand the quality of health care.
4. To immobilize cyber threats against telemedicine because it is important for policies properly execution.

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