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"WIRELESS HEALTHCARE SENSING & MONITORING SYSTEM FOR MEDICAL COMMUNICATION IN IOT"

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***Abstract*:** In this article, a new medical communication scheme, protocol wireless medical sensor networks for the efficiency of healthcare (PWMSN4EoCH), shortened by (PEH), which uses a hasty strategy and random network coding (RNC), is proposed. The new concept improves the performance of the healthcare network. It quickly analyzes the medical network description, focusing on some basic parameters for narrowband Internet of Things (NB-IoT) systems in wireless mesh networks (WMNs). This PEH effectively meets the requirements prescribed for wireless telemedicine applications in which medical sensors (MSs) share the downlink and uplink resources to its neighborhood, including wireless health hubs (WHHs) and wireless base stations (WBSs) for controlling the health of the human body. The PEH scheme substantially accelerates the implementation devices of telemedicine for patient satisfaction. In contrast, the state-of-the-art technique (SoAT) scheme, which is currently used, misses the entirety of the proposed principle. The proposed system is compared with the SoAT in terms of message size (bytes), roundtrip time (RTT) (ms), overall network capacity (ONC) (bytes/s, and delivery delay (DD) in ms. Our investigation has proved that the RTT, ONC, and DD of the proposed PEH are much better than the SoAT schemes, achieving 64%, 66%, and 71%, respectively. The simulation studies clearly indicate that the PEH introduces more than 64% performance enhancement over the SoAT scheme.

***Index Terms* -Internet of Things, random network coding (RNC), telemedicine, viral disease, wireless medical sensor networks (WMSN).**

I. INTRODUCTION:

When Coronavirus disease 2019 (COVID-19) arrived, the global insurance system was not ready to deal with this pandemic. Hundreds of provisional hospitals and facilities. worldwide are currently handling the growing number of Covid-19 patients. When the number of patients is large, medical professionals cannot provide sufficient attention to every case. The signs of critical significance must be controlled, and there is not sufficient medical staff to guide and track them. In healthcare deployments, it is predicted that IoT in healthcare will hit 534 billion by 2025; meanwhile, the MSs continue to get increased in abundance to medical networks., improving the ONC, round-trip time (RTT), and DD performances becomes a big challenge.

These three parameters automatically enhance the ability to exchange and interpret data acquired from each application. This advantage is the more critical requirement to ensure the efficient exchange of real-time data collected. The viral nature of the disease can cause a significant increase in the probability of its We consider that overall network capacity (ONC) is the resulting number, which corresponds to the maximum amount in the optimally designed wireless sensor network for medical applications, while delivery delay (DD) is the average time required for a message to be successfully delivered from the center to the remote MS.

Consequently, transmission for any medical practitioner while checking the patient's body vital signs. IoT healthcare technologies can aid and help healthcare IoT devices protect in communicating some essential private information of the patient. Self-organizing wireless mesh network (WMN) scalability can relay medical information on diseases, which facilitates the use of the wireless medical sensor network (WMSN). Patients and their families are mainly concerned with security protection and confidentiality of information about their health. The narrowband Internet of Things (NB-IoT) is a new networking protocol developed by 3GPP for the IoT with a minimum bandwidth of 180 kHz. This standard enables connected objects to communicate high amounts of information, often over long distances with very high latency.

II. Existing System Design & Implementation:

Existing System Methodology:

In the current healthcare monitoring system, two types of system architectures were suggested in the literature.

Single Patient Architecture (SPA): This includes a specific patient's processing of medical information by a manager and transmission through a distribution network (usually WSN) to a central unit to know the WBS. Each medical sensor, such as a temperature sensor or a respiratory rate sensor, is treated as an independent node in this system, each of which has its transmitting module. Consequently, each node sends information directly to the WBS with latency and data rate specifications. The architecture of the network can be divided into two parts: a) the WBAN and b) the delivery network. In this configuration, each COVID-19 patient needs different transmission links with the WHH, such as a remote data logger.

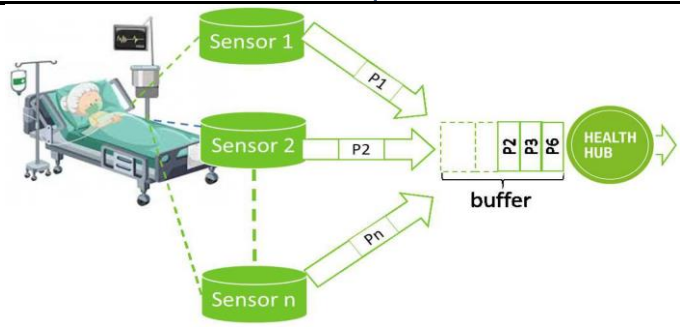

Fig:1. Performance measurement for healthcare in WMSN with a single patient scenario.

Multi-Patient Architecture (MPA): This scenario should be used as an expansion of the individual patient situation. The network of delivery is responsible for coordination between the WBAN and the WBS unit. This communication between the medical sensor and WBS via WHH can occur simultaneously in both directions using the WMN. The patient details obtained by the WBAN will be transmitted to the WBS in a timely and accurate manner to be checked by the medical staff responsible. Moreover, the prescribing practitioner may change the testing scheme based on the condition or update the medication scheme. In this scenario, the network of delivery will provide the WBAN coordinator with the latest treatment decisions, which, in effect, will forward the message to the appropriate MSs.

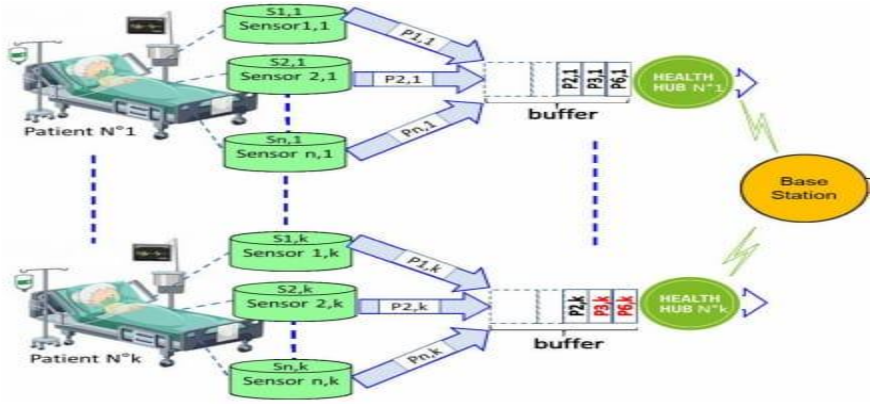

Fig:2. Illustration of the wireless health control system functions with a multi-patient scenario.

III. Proposed System Design and Implementation:

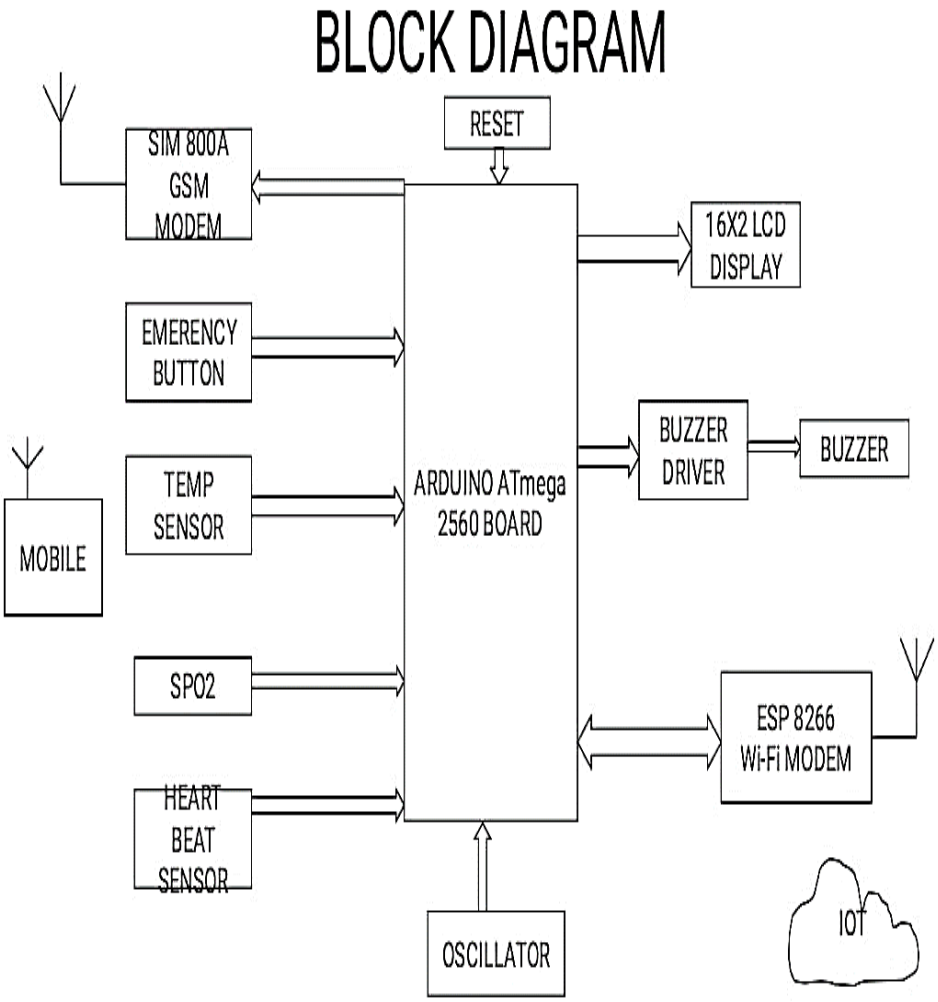

Fig:3. BlockDiagram

IV.Flowchart:

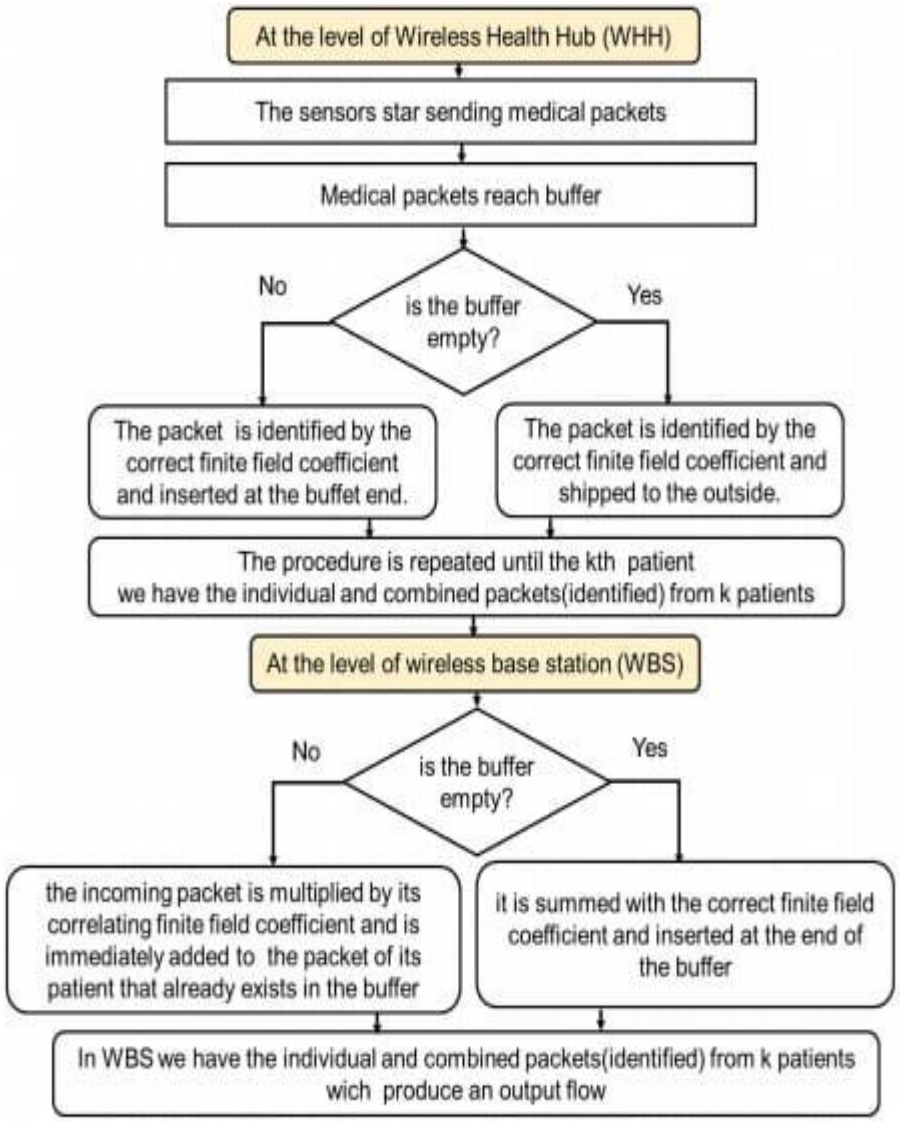

Fig:4. Flowchart

V. Results

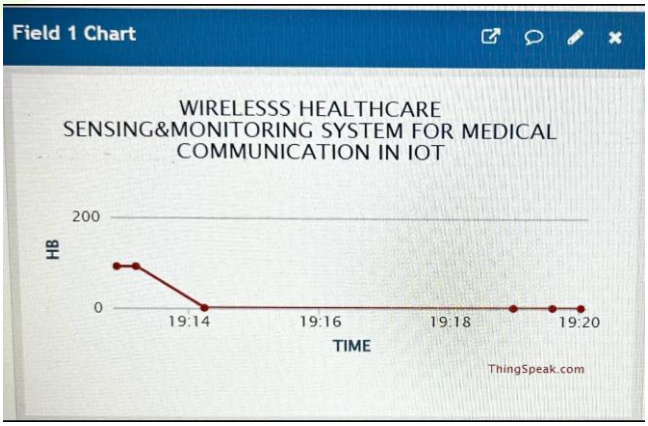

Fig:5. Heartbeat

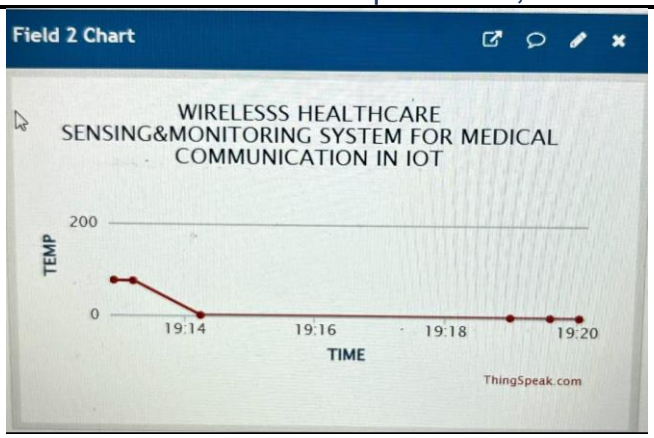

Fig:6. Temperature

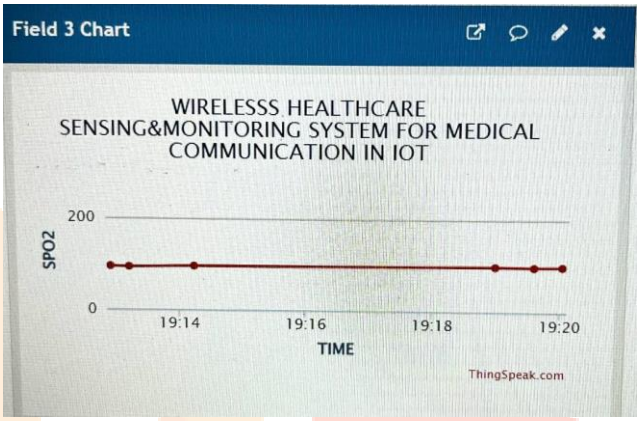

Fig:7. Spo2

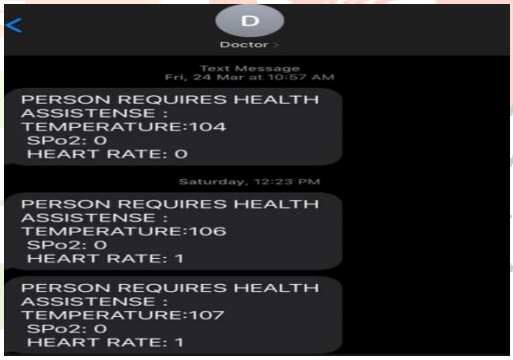

Fig:8. Message from Doctor

VI. Applications:

Implantable Glucose Monitoring Systems:

Patients who suffer from diabetes can have devices with sensors implanted in them, just below their skin. The sensors in the devices will send information to a patient's mobile phone when his or her glucose levels get too low and will record historical data for them too. This way, patients will also be able to tell when they are most likely to be at risk for low glucose levels in the future, as well as in the present.

Activity Trackers During Cancer Treatment:

Usually, the right treatment for a cancer patient relies on more than just his or her weight and age. Their lifestyles and fitness levels also play a huge role in what the proper treatment plan for them will entail. Activity trackers track a patient's movements, fatigue levels, appetite, etc. Plus, the data collected from the tracker prior to treatment and after treatment has started will tell healthcare professionals what adjustments need to be made to the recommended treatment plan.

Wireless Sensors:

Wireless sensors are being used in labs and hospital refrigerators to ensure blood samples, chilled medications, and other biomedical materials are always kept at the proper temperatures.

VII.CONCLUSION AND FUTURE SCOPE:

This article introduced a novel protocol, called PEH, to guarantee the safety of patient data with the faster implementation of telemedicine in WMSN, such as telemonitoring, tele expertise, teleconsultation, tele surveillance, and teleassistance. We presented a detailed application-specific performance analysis of NB-IoT for a healthcare monitoring system with both single-patient and multi-patient scenarios. It was confirmed that the proposed solution reduces unnecessary contact between patients and medical staff. Therefore, it immediately scans the current general condition of the patients and dramatically reduces the chance of the infection spreading. It provides quick vital signs of the human body to facilitate accurate monitoring of people in hospitals, nursing homes, and any general workplaces, and can easily circulate medical information between all the sensors, together with supporting and managing a vast number of patients in a small area. In our future work, we will exploit the reliability of this protocol (connection density) to apply it to different domains, namely, agriculture, connected clothing, suitcases connected to devices, as well as connected vehicles and houses.

VIII.REFERENCES

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Bibliography

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