Brief Report
Volume 11:04, 2024

Journal of Biomedical Systems & Emerging Technologies

ISSN: 2952-8526

Open Access

Smart Healthcare System with Intelligent Fog for Wearable Physiological Parameter Identification

Elkhadragy Nervana*

Department of Artificial Intelligence, Imperial College London, South Kensington, UK

Introduction

The advent of smart healthcare systems has revolutionized the way healthcare is delivered, emphasizing the importance of real-time data collection, monitoring, and analysis to improve patient care. One of the most promising innovations in this field is the integration of intelligent fog computing in wearable devices for physiological parameter identification. The concept of fog computing, which is essentially a decentralized computing infrastructure, extends cloud computing to the edge of the network, allowing for faster processing and reducing latency. This architecture is particularly beneficial in healthcare, where timely data processing and rapid response are crucial for the monitoring of vital physiological parameters, such as heart rate, blood pressure, body temperature, and oxygen saturation. Wearable devices, which are often embedded with sensors, are an integral part of this smart healthcare system. These devices continuously monitor various physiological signals, providing real-time feedback to both patients and healthcare providers. However, the large volume of data generated by these devices can overwhelm traditional cloud-based systems. This is where fog computing comes into play. By processing data locally at the edge of the network, fog computing reduces the amount of data that needs to be sent to the cloud, minimizing bandwidth usage and decreasing latency. This enables faster and more efficient analysis, which is critical in emergency situations where every second counts [1].

Description

The combination of wearable devices and intelligent fog computing allows for continuous health monitoring in a way that was previously impossible. These devices can identify and track physiological parameters in real-time, providing valuable insights into a person's health status. For example, a wearable device could continuously measure a person's heart rate and blood pressure, transmitting this data to an edge node in the fog network. The edge node could then analyze the data locally to identify any irregularities, such as arrhythmias or sudden changes in blood pressure, and alert the patient or healthcare provider immediately. This proactive approach to healthcare can lead to earlier detection of potential health issues, allowing for timely interventions that could prevent more serious complications [2].

One of the key benefits of integrating fog computing with wearable devices is the ability to perform complex data processing tasks locally, without relying on a distant cloud server. This is particularly important for real-time monitoring applications, where the speed of data processing can be a matter of life and death. Fog computing enables the use of advanced algorithms for data analysis, such as machine learning and artificial intelligence, to be implemented directly on the edge devices. This allows for more accurate and efficient identification of physiological parameters and anomalies, as well as personalized health recommendations based on the individual's unique health data. Moreover, intelligent fog systems can enhance the scalability and flexibility of smart healthcare networks. Fog nodes can be deployed at various locations, such as hospitals, clinics, or even in the home, ensuring that healthcare services are available wherever they are needed. These nodes can also communicate with each other, sharing data and insights to create a more comprehensive view of a patient's health status. This distributed approach to healthcare enables a more seamless and integrated system, where patients can be monitored in real-time regardless of their location [3].

Privacy and security are critical concerns in any healthcare system, particularly when dealing with sensitive personal health data. The use of fog computing in smart healthcare systems offers a solution to some of these challenges by providing a more secure way to process and store data. Since data is processed locally at the edge, there is less risk of interception or unauthorized access during transmission. Additionally, sensitive health data can be encrypted before being stored or transmitted, ensuring that only authorized individuals can access the information. By leveraging the security features of fog computing, healthcare providers can offer a more secure environment for patients, improving trust and confidence in the system [4].

Furthermore, the intelligent fog healthcare system can enhance patient outcomes by enabling more personalized care. Wearable devices that monitor physiological parameters can gather a wealth of data about a patient's health status over time. By analyzing this data in real-time, healthcare providers can gain insights into the effectiveness of treatments and make adjustments as necessary. For example, if a wearable device detects that a patient's blood pressure is consistently elevated, the healthcare provider may adjust the patient's medication or recommend lifestyle changes. This personalized approach to care ensures that patients receive the most appropriate treatment based on their individual health data, leading to better overall outcomes [5].

Conclusion

The future of smart healthcare systems with intelligent fog computing looks promising, As wearable technology continues to evolve, devices will become even more capable of monitoring a broader range of physiological parameters with greater accuracy. Additionally, advancements in machine learning and artificial intelligence will further enhance the ability of these systems to identify anomalies and provide personalized recommendations. The integration of these technologies will allow for a more holistic approach to healthcare, where patients are continuously monitored, and healthcare providers can intervene as needed to improve health outcomes. However, there are challenges that need to be addressed for the widespread adoption of this system. One of the key challenges is ensuring interoperability between various wearable devices and fog computing systems. Since the healthcare industry involves many different stakeholders, including device manufacturers, healthcare providers, and patients, it is essential that these systems can communicate seamlessly with each other. Standardization efforts and collaboration among industry players will be crucial to ensuring that these systems can work together effectively.

***Address for Correspondence:** Elkhadragy Nervana, Department of Artificial Intelligence, Imperial College London, South Kensington, UK; E-mail: elkhadragyervana@hs.edu*

Received: 01 August, 2024, Manuscript No. bset-24-154927; **Editor Assigned:** 03 August, 2024, PreQC No. P-154927; **Reviewed:** 17 August, 2024, QC No. Q-154927; **Revised:** 22 August, 2024, Manuscript No. R-154927; **Published:** 29 August, 2024, DOI:10.37421/2952-8526.2024.11.216

Acknowledgement

None.

Conflict of Interest

None.

References

1. Asgari Shadnaz and Alireza Mehrnia. "A novel low-complexity digital filter design for wearable ECG devices." PloS one 12 (2017): e0175139.
2. Kumar Ashish, Harshit Tomar, Virender Kumar Mehla and Rama Komaragiri, et al. "Stationary wavelet transform based ECG signal denoising method." *trans* 114 (2021): 251-262.
3. Critcher Shelby and Todd J. Freeborn. "Localized bioimpedance measurements with the max3000x integrated circuit: Characterization and demonstration." *Sens* 21 (2021): 3013.
4. Birhane Getnet Engeda, Li Yang, Jichao Geng and Junqi Zhu. "Causes of construction injuries: A review." *Int J Occup Saf Ergon* 28 (2022): 343-353.
5. Kaciuba-Uscilko, Hanna and Ryszard Grucza. "Gender differences in thermoregulation." *Curr Opin Clin Nutr Metab Care* 4 (2001): 533-536.

How to cite this article: Nervana, Elkhadragy. "Smart Healthcare System with Intelligent Fog for Wearable Physiological Parameter Identification." *J Biomed Syst Emerg Technol* 11 (2024): 216.