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EXPLORING A HEALTHCARE MONITORING SYSTEM FOR ADVANCED DIGITAL HEALTH BY USING I0T

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ABSTRACT

The mix of Internet of Things (IoT) tech has pushed big progress in digital health. This study aims to look at and judge different IoT health monitoring systems in electronic health monitoring, trying to make digital health infrastructure work better, thus improving patient care and well-being with new methods. Starting with a full review of IoT-based digital health systems, this research shows the necessity for new solutions to fix the problems of old health care ways. Another, different IoT health monitoring setups, like linked healthcare systems, smart sensors, and wearable devices, are found and studied for their functions, data collection methods, and connectivity choices. This article looks at several new methods to make sure electronic health monitoring works well. It explores machine learning and deep learning to allow exact data study, timely health monitoring, and early spotting of health problems. The research also looks at fog computing and edge computing methods, which aim to make it better data processing, cut down delay, and improve how health monitoring systems based on IoT perform. This research method includes full review of case studies, past studies and checks of current IoT health monitoring setups. By comparing different IoT health monitoring setups, this study aims to find the best practices, uncover problems, and spot areas to improve. The results of this research are expected to drive new ways for IoT-based digital health monitoring, pushing the wide use of advanced tech in healthcare systems. These findings are expected to guide healthcare providers, researchers, and policymakers in setting up IoT health monitoring systems, improving patient outcomes, and allowing more personal healthcare services.

KEYWORDS: *IoT Internet of Things, Health monitoring, Machine learning, Wearable technology, Fog computing, Intelligent sensors, Data security, Edge computing.*

1. INTRODUCTION

The Internet of Things (IoT) is a cutting-edge technology that enables seamless data exchange regardless of time or location. Its widespread adoption is transforming control systems, facilitating efficient, convenient, and intelligent monitoring across several sectors. In industries such as small-scale manufacturing and urban surveillance, IoT coordinates intricate and systems. Because of a global rise in the population of elder people, there are increasing demand for expert medical attention and keep eye on continuous health monitoring. IoT emerges as a pivotal tool in meeting these needs, offering personalized and operative healthcare results for this vulnerable demographic. It facilitates continuous and immediate gathering of vital health data relevant to seniors, enhancing treatment quality by sharing this information among healthcare professionals in diverse locations. Given that many elderly individuals face common chronic conditions requiring regular medical assessments, IoT solutions promise efficient time management and lucrative delivery of accurate results [3-5]. By enabling the transmission and reception of health-related data, IoT empowers detection and monitoring of critical health issues among seniors, including conditions like hyperlipidemia,

hypertension, and diabetes [2]. Additionally, many elderly people struggle with regular visits to healthcare facilities, posing significant challenges to effective health management [6]. However, IoT advancements offer a self-monitoring solution at any place either home or somewhere.

1.1 Health Monitoring Imperative

A Compelling Case for Health Monitoring Systems:

1. Timely lookup of Health's problem: Daily monitor health allows us for the early identification of health abnormalities, pre-empting the onset of symptoms. Through monitoring continuously vital metrics such as heart beats, pressure of blood inside body, and sugar level of blood, critical health problems can be found at their earliest stages. Swift can find timely interventions and treatments, improving number of healthy persons and save lives.

2. Chronic Disease Management: Many individuals grapple with persistent conditions such as diabetes, hypertension, or cardiovascular issues. Remote patient monitoring facilitates continuous tracking of essential health metrics associated with these ailments. This capability allows healthcare providers to observe patterns, identify instabilities, and adjust treatment plans consequently [9].

3. Remote Patient Monitoring: Health monitoring systems provide distinct advantages for individuals encountering difficulties accessing healthcare services, particularly residents of remote zones. Remote patient surveillance enables healthcare professionals to remotely monitor patients' health status, collect pertinent data, and deliver timely interventions or guidance. This approach enhances hospital visits, healthcare accessibility, and improves patient convenience.

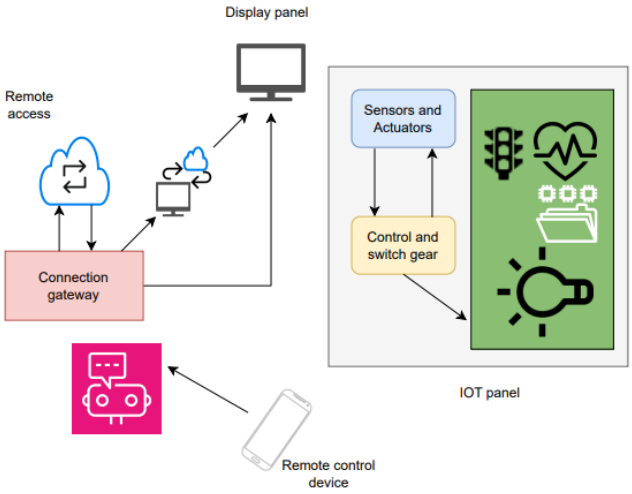

Figure 1. Development of an I0T system that monitor health

4. Personalized Medicine: Health monitoring systems enable continuous collection of longitudinal health data. Utilizing this data allows for the analysis of patterns and the provision of personalized insights and recommendations. Healthcare providers can use this information to predict health risks and tailor treatments accordingly.

1.2 Electronic Health System's Design and Development

Designing and implementing an electronic health monitoring system is crucial in modern healthcare, where connectivity and remote monitoring are vital components. Our system architecture utilizes wireless sensor networks (WSN) and specialized customized smart devices for electronic healthcare monitoring. Launching a reliable network that connects physicians, patients, and caregivers is essential for accurate health assessment. Environmental and device that sense medical data continuously monitors both patient health metrics and surrounding conditions.

The collected data of sensor is conveyed to end-users via a devoted transmitter, enabling remote monitoring by doctors and caregivers without requiring physical presence. Additionally, users can conveniently access this data and to a secure web based service provider from any location at any time. This seamless process has proven highly beneficial for both patients and healthcare providers, enabling insightful analysis of patient well-being regardless of their location, whether it be a private residence or a healthcare facility. Importantly, this approach also contributes significantly to cost-saving efforts.

Moreover, our system offers additional features such as parental control and on-time health and movement advice, with a particular focus on retina health. These supplementary services enhance the capabilities of our system, improving its usefulness and effectiveness in healthcare monitoring..

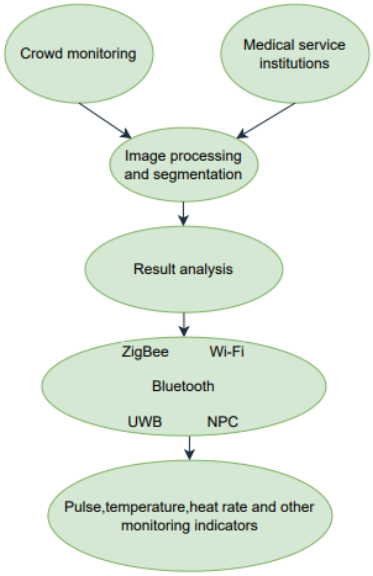

Figure 2. The framework of medical information system and health monitoring based on the I0T

1.3 Medical Parameters Assessment

Evaluating medical parameters involves the systematic examination and interpretation of various physiological and clinical indicators to gain a comprehensive understanding of the state of a patient. These parameters include blood flow, lungs health. Outcomes from laboratory tests such as tests by taking samples of blood or imaging studies provide additional insights into the specific medical condition of the patient.

Assessing the process of medical parameters includes comparing and identifying these metrics against norms for diagnosis, treatment, or ongoing health of a person.

The assessment of medical parameters is crucial for disease diagnosis, monitoring the progress of treatment, and assessing the patient's overall well-being. It enables healthcare benefactors to make informed decisions based on evidence, develop effective treatment strategies, and evaluate the outcomes of interventions. Ensuring the accuracy and timeliness of medical parameter assessment.

2. LITERATURE REVIEW

After conducting an extensive review of literature from various sources, a comprehensive summary has been compiled below.

The introduction of this system represents a significant advancement, integrating ML and I0T to address challenges. This system, as proposed by Malik et al. [11], utilizes collect data by integrating sensors communication, and processing methods facilitated by I0T technology. Machine learning algorithms are utilized to examine the gathered data, facilitating precise predictive analytics and

customized healthcare solutions. Earlier studies have shown notable improvements in patient monitoring, accurate health status prediction, delivery of personalized advice, and optimization of resource utilization. The mixture of I0T and cloud computing in healthcare monitoring systems, as highlighted in Alazzam's research, tackles challenges related to managing large volumes of data. One identified challenge underscores the need for proficient data science techniques to effectively handle the significant influx of data.This research endeavors to address these challenges and contribute to the advancement of intelligent health monitoring system capabilities, thereby improving healthcare delivery and patient outcomes.

1. Overview of I0T in Healthcare:

I0T devices have revolutionized various industries, including healthcare. In healthcare settings, I0T devices generate vast amounts of data that can be utilized to improve patient care and operational efficiency.

2. Data Processing and Machine Learning:

The article discusses the use of data processing, selection of common features, and ML algorithms to find out meaningful information from the data which is collected by I0T devices. These techniques allow for precise health status predictions, early anomaly detection, and tailored healthcare recommendations. [12]

3. Role of Cloud Computing:

Cloud computing plays a crucial role in facilitating efficient storage, processing, and retrieval of healthcare data. By leveraging cloud infrastructure, healthcare organizations can effectively implement health monitoring systems with the support of I0T devices. The scalability and accessibility of cloud platforms enhance the overall effectiveness of healthcare systems.

4. Mixture of RFID Technology:

The article introduces the mixture of Radio-Frequency Identification (RFID) technology to enhance healthcare monitoring. Future RFID sensors offer promising solutions to improve healthcare monitoring by enabling on-time data collection. Studies on RFID-based sensor technology highlight its advantages, including simplicity, cost-effectiveness, and precise tracking of patient vital signs and medication compliance. [13]

5. Advantages of RFID Sensors:

RFID sensors offer several advantages, including their uncomplicated type, low cost, and ability to understand the sign language, compliance, and management of things. These sensors hold promise of enhancing patient monitoring, improving persons safety, and boosting the running efficiency.

6. Addressing Challenges in Healthcare Systems:

The document identifies need a secure system that provide, privacy, and mobility. Integrating I0T and RFID technologies offers a solution to this challenge by enabling a good health of a person.

7. On-time Data Accessibility:

The mixture of I0T and RFID technology enables us to get information in real time, empowering healthcare professionals to take correct decisions on the correct time. This on-time accessibility enhances the quality of patient care and contributes to better health outcomes.

8. Compatibility with Mobile Devices:

The light nature of the proposed system we can also use it from our mobile phones, allowing for simple and easy health monitoring. Healthcare professionals can conveniently access patient data and monitor health parameters on-the-go, leading to improved patient engagement and adherence to treatment plans.

9. Findings:

In findings, the mixture of I0T and RFID tech holds their promise for transforming healthcare systems. By leveraging data processing, machine learning, cloud computing, and RFID technology, healthcare organizations can enhance monitoring, improve patient safety, ensure data security, and boost operational efficiency. Moving forward, continued research and implementation of these technologies are essential for advancement. [15]

2.1 Healthcare Delivery And Improving Patient Outcomes.

The emergence of I0T technology has transformed numerous sectors, healthcare included, by facilitating the smooth mixture of devices and data to enhance patient care and health monitoring [16]. However, the transmission and storage of sensitive healthcare data via I0T devices raise notable security concerns, calling for the creation of robust and dependable models to protect patient information. This essay delves into the incorporation of cryptographic frameworks, deep learning technologies, and advanced encryption methods to bolster security and health monitoring in I0T healthcare systems.

2.2 Enhancing Protection In I0T Systems:

The susceptibility to security breaches and unauthorized access poses a major challenge in I0T , primarily due to the nature of data transmission. To tackle this issue, the proposed approach integrates deep learning technology with advanced encryption techniques [17]. By employing a decentralized and robust framework, alongside secure encryption methods, the model guarantees the privacy, integrity, and accessibility of health information. Findings from the study demonstrate noteworthy enhancements in security and privacy, facilitating secure data transfer, storage, and access control [18]. Additionally, the implementation of smart contracts and decentralized consensus algorithms further strengthens system reliability, offering a secure foundation for I0T healthcare systems.

2.3 Ensuring Data Integrity And Confidentiality:

Deep learning technology is vital for maintaining data integrity [19]. The combination of machine learning and deep learning allows for timely data analysis, promoting early identification of health issues and customized healthcare advice. By analyzing collected data and producing valuable insights, the system improves health monitoring capabilities, resulting in better patient outcomes.

2.4 Challenges and Solutions In Health Monitoring:

An existing challenge in I0T healthcare systems revolves around the necessity for efficient and accurate health monitoring capable of collecting on-time data from biosensors. Zhao's method aims to address this challenge by leveraging I0T biosensor networks and data analysis techniques [20]. Through the use of ML and DL algorithms, the system offers timely analysis and prediction of health conditions, facilitating early detection of health problems. The outcomes showcase enhanced health monitoring capabilities and personalized healthcare recommendations based on on-time data analysis.

In summary, the mixture of cryptographic frameworks, deep learning technologies, and advanced encryption methods presents a comprehensive solution to enhance security and health monitoring in I0T healthcare systems. By addressing vulnerabilities in data transmission and storage, the proposed model ensures integrity, and privacy accessibility of health information. Moreover, the incorporation of machine learning and deep learning techniques enhances health monitoring capabilities, facilitating early detection of health issues and personalized healthcare recommendations. Overall, these advancements contribute to improving patient care and outcomes in I0T healthcare systems, leading to a more secure and efficient healthcare landscape.

2.5 Presents an Android Smartphone As A Versatile Tool In Modern Healthcare, Providing Convenient Access To Healthcare Solutions.

With the mixture of wireless mobile technology, Android devices serve as effective monitoring terminals for Electrocardiography (ECG) waveforms within wireless sensor networks [21]. This wireless approach simplifies healthcare delivery by eliminating the constraints of wired systems,

ensuring healthcare services can be accessed and delivered seamlessly, anytime and anywhere. Furthermore, smartphones expand their utility beyond surveillance, serving as barcode decoders in healthcare settings. This facilitates improved healthcare services, including outpatient medication verification and barcode-assisted assistance.

2.6 Explores The interconnection And Secure Aspects Of Health Systems.

With the increase in the development of sensor technology radio technologies has enabled the development of flexible remote health systems, akin to the Internet of Things (I0T) landscape [22]. However, implementing such systems poses new challenges and requirements in terms of communication reliability and security. Ensuring seamless communication between sensorsl. Additionally, prioritizing a high level of security, despite some functionalities not being directly required, is essential. The article provides an in-depth survey of current monitoring protocols and safety concerns associated with health surveillance deployments, highlighting limitations, challenges, and potential solutions. Furthermore, it presents a range of common protocols and designs aimed at addressing various communication needs to achieve interoperability among similar low-power wireless body systems.

2.7 The Process of Monitoring And Analyzing Physiological Signals Falls Under The Purview Of Medical Devices.

This paper presents a suite of healthcare devices tailored to monitor, visualize, and analyze physiological signals [FIGURE 3]. These systems consist of wirelessly connected smartphones that communicate with groups of non-invasive sensors [23]. Our system includes various health devices designed to monitor, visualize, and analyze physiological signals. It features a wirelessly connected smartphone that interfaces with subsequently, the smartphone presents the processed data in the user-friendly format.

The healthcare device integrates a set of non-hostile sensors specifically designed to monitor the person's blood sugar level and pulse. Besides gathering sensor data, We utilize two separate algorithms to automatically detect instances of sleep apnea. Also, how good this system works was checked by a sleep study.

In this study, we want to show how good and reliable the system is at watching body signals during sleep and finding sleep apnea [24]. Using healthcare tools, non-invasive sensors, and smart algorithms together gives a full way to watch and study sleep.

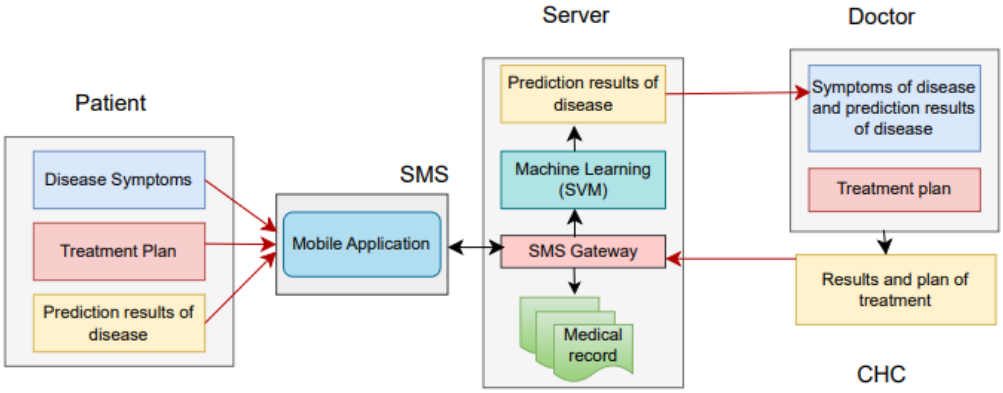

Figure 3. Design and Development of Digital-Healthcare system

2.8 System Offerings

Based on the research and the system design for electronic health monitoring, the following data points are recommended for collection and analysis:

1. **Patient Vital Signs**: Monitor heart rate, blood pressure, breathing rate, and temperature to provide crucial insights into the patient's health [25].

2. **Environmental Insights**: Gather data on temperature, humidity, and air quality to understand how environmental factors impact the patient's health.
3. **Medication Compliance**: Track adherence to prescribed medications to ensure proper dosage and timely intake.
4. **Physical Activity and Mobility**: Record activity levels, step count, exercise duration, and posture to assess physical health and behavior patterns.
5. **Sleep Analysis**: Analyze sleep patterns, quality, and disturbances to evaluate sleep health and comfort.
6. **Health Records Management**: Maintain comprehensive medical records including diagnoses, treatment history, and lab results for a thorough understanding of the patient's medical background.
7. **Remote Consultation Documentation**: Document data from remote consultations, including audio and video, to support telemedicine and maintain comprehensive healthcare records.
8. **Caregiver Input**: Incorporate feedback from caregivers regarding observations, comments, and concerns to gain additional insights into the patient's well-being.
9. **Health Education and Resources**: Provide access to educational materials and track patient engagement with health information to enhance health literacy and support informed decision-making.
10. **System Performance Evaluation**: Monitor system performance metrics such as data delivery reliability, response time, and uptime to ensure effective operation and identify areas for improvement.

By collecting and analyzing these data points, digital health systems can enable comprehensive monitoring, personalized care, and timely interventions. This approach empowers healthcare providers to make informed decisions, enhance patient outcomes, and elevate the quality of care delivered.

3. CONCLUSION

This article provides a concise overview of Digital-Health Monitoring Systems, focusing primarily on IoT-based technologies and their applications. It discusses the setup, uses, and methodologies employed in IoT-based Health Monitoring Systems, emphasizing that each technology has its specific limitations and benefits. The content offers high-level insights, methodologies, and best practices aimed at enhancing IoT-based health monitoring systems. The integration of IoT and deep learning technologies is poised to revolutionize the healthcare industry by aiding in disease prevention, remote monitoring, and early detection of health issues.

REFERENCES

[1] A. Kislay,P. Singh,A. Shankar,S.R. Nayak,and A.K. Bhoi,“A Review on Internet of Things in Healthcare Applications. In Cognitive Informatics and Soft Computing; Springer Nature Singapore: Singapore, 2022”.
[2] V. Naresh andN. Lee,“A Review on Biosensors and Recent Development of Nanostructured Materials-Enabled Biosensors”. Sensors. 2021;21:1109. doi: 10.3390/s21041109. - DOI - PMC - PubMed.
[3] M. Elhoseny, G. Rez, OM Abu-Elnasr, S.A. Shawkat, N. Arunkumar, A. Farouk, “Secure medical data transmission model for I0T-based healthcare systems”, Special Section on Information Security Solutions for Telemedicine Applications. *IEEE Access*. 2018; **6**:2018, pp.20596-20608,2018.
[4] Mathew, Arul & Mani, and Prasanna , “Strength of Deep Learning-based Solutions to Secure Healthcare I0T: A Critical Review.The Open Biomedical Engineering Journal”. 17. 10.2174/18741207-v17-e230505-2022-HT28-4371-2,2023.
[5] W. Zhou, Y. Jia, A. Peng, Y. Zhang, and P. Liu, "The effect of I0T new features on security and privacy: New threats, existing solutions, and challenges yet to be solved", *IEEE Internet Things J.*, vol. 6, no. 2, pp. 1606-1616, 2019.

[6] R. Kolandaisamy, K. Subaramaniam, and A.B. Jalil, "A study on comprehensive risk level analysis of I0T attacks", *2021 International Conference on Artificial Intelligence and Smart Systems (ICAIS),* pp. 1391-1396, 2021.
[7] S.Secinaro, D. Calandra, A. Secinaro, V. Muthurangu, and P. Biancone,"The role of artificial intelligence in healthcare: A structured literature review. BMC Med. Inform. Decis. Mak".;21:1–23. doi: 10.1186/s12911-021-01488-9. - DOI - PMC - PubMed,2021.
[8] K. Prem, Y. Liu, T. W. Russell, and N. Davies, "The effect of control strategies to reduce social mixing on outcomes of the covid19 epidemic in Wuhan, China: a modeling study," *The Lancet Public Health*, vol. 5, 2020.
[9] N. Kahale, "On the economic impact of social distancing measures," *SSRN Electronic Journal*, 2020.
[10] G. Simi Margarat, G. Hemalatha, A. Mishra, H. Shaheen, K. Maheswari, S. Tamijeselvan, U. Pavan Kumar, V. Banupriya, and A. W. Ferede, "Early Diagnosis of Tuberculosis Using Deep Learning Approach for I0T Based Healthcare Applications", Computational Intelligence and Neuroscience, vol. 2022, Article ID 3357508, 9 pages, 2022.
[11] S. K. Sonbhadra, S. Agarwal, and P. Nagabhushan, "Target specific mining of covid-19 scholarly articles using the one-class approach," *Chaos, Solitons & Fractals*, vol. 140, 2020.
[12] Mathew, Arul & Mani, and Prasanna,"Strength of Deep Learning-based Solutions to Secure Healthcare I0T: A Critical Review. The Open Biomedical Engineering Journal". 17. 10.2174/18741207-v17-e230505-2022-HT28-4371-2,2023.
[13] J. Xiang, A. Zhao, G. Y. Tian, W. Woo, L. Liu, and H. Li, "Prospective RFID Sensors for the I0T Healthcare System", Journal of Sensors, vol. 2022, Article ID 8787275, 19 pages, 2022.
[14] S. N. Vankamamidi, S. Reddi, N. V. E. S. Murthy, "Secure Lightweight I0T Integrated RFID Mobile Healthcare System", Wireless Communications and Mobile Computing, vol. 2020, Article ID 1468281, 13 pages, 2020.
[15] S. Zhang, S. Huang, H. Wu, Z. Yang, and Y. Chen, "Intelligent Data Analytics for Diagnosing Melanoma Skin Lesions via Deep Learning in I0T System", Mobile Information Systems, vol. 2021, Article ID 8700506, 12 pages, 2021.
[16] S. Kumar, P. Tiwari, and M. Zymbler, "Internet of Things is a revolutionary approach for future technology enhancement: a review," Journal of Big Data., vol. 6, no. 1, 2019.
[17] A. Raghuvanshi, U. Singh, and G. Sajja, "Intrusion detection using machine learning for risk mitigation in I0T-enabled smart irrigation in smart farming," Journal of Food Quality, vol. 2022, Article ID 3955514, 8 pages, 2022.
[18] K. B. Raju, S. Dara, A. Vidyarthi, V. M. Gupta, and B. Khan, "Smart Heart Disease Prediction System with I0T and Fog Computing Sectors Enabled by Cascaded Deep Learning Model", Computational Intelligence and Neuroscience, vol. 2022, Article ID 1070697, 22 pages, 2022.
[19] S. Khan, Y. V. Singh, P. Singh, and R. S. Singh, "An Optimized Artificial Intelligence System Using I0T Biosensors Networking for Healthcare Problems", Computational Intelligence and Neuroscience, vol. 2022, Article ID 2206573, 14 pages, 2022.
[20] Z.-Q. Zhao, P. Zheng, S.-T. Xu, and X. Wu, "Object detection with deep learning: a review," *IEEE Transactions on Neural Networks and Learning Systems*, vol. 30, no. 11, pp. 3212–3232, 2019.
[21] D. Bordoloi, V. Singh, S. Sanober, S. M. Buhari, J. A. Ujjan, and R. Boddu, "Deep Learning in Healthcare System for Quality of Service", Journal of Healthcare Engineering, vol. 2022, Article ID 8169203, 11 pages, 2022.
[22] M. Rahimi, N.J. Navimipour, M. Hosseinzadeh, M.H. Moattar, and A. Darwesh,"Cloud healthcare services: A comprehensive and systematic literature review". Trans. Emerg. Telecommun. Technol. 2022;33:e4473. doi: 10.1002/ett.4473. - DOI, 2022.
[23] R. Singh, B. A. Mir, J. Lohith, D. S. Chakravarthi, A.R. Alharbi, H. Kumar, and S. K. Hingaa, "Smart Healthcare System with Light-Weighted Blockchain System and Deep Learning Techniques", Computational Intelligence and Neuroscience, vol. 2022, Article ID 1621258, 13 pages, 2022.
[24] A. Brunetti, D. Buongiorno, G. F. Trotta, and V. Bevilacqua, "Computer vision and deep learning techniques for pedestrian detection and tracking: a survey," *Neurocomputing*, vol. 300, pp. 17–33, 2018.
[25] N. Punn, S. Sonbhadra, S. Agarwal, and G. Rai, "Monitoring COVID-19 social distancing with person detection and tracking via fine-tuned YOLO v3 and Deepsort techniques", 2020.
[26] S. Saponara, A. Elhanashi, and A. Gagliardi, "Implementing a on-time, AI-based, people detection and social distancing measuring system for Covid-19," *Journal of On-time Image Processing*, vol. 18, no. 6, pp. 1937–1947, 2021.

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