

IoT-BASED AUTOMATED HEALTH CARE MONITORING SYSTEM FOR SMART CITY

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ABSTRACT

The Internet of Things (IoT) is essential in innovative applications such as smart cities, smart homes, education, healthcare, transportation, and defense operations. IoT applications are particularly beneficial for providing healthcare because they enable secure and real-time remote patient monitoring to improve the quality of people's lives. We provide a systematic review on recent studies of IoT-based healthcare-monitoring systems through literature review. The literature review compares various systems' effectiveness, efficiency, data protection, privacy, security, and monitoring. The paper also explores wireless- and wearable-sensor-based IoT monitoring systems and provides a classification of healthcare-monitoring sensors. We also elaborate, in detail, on the challenges and open issues regarding healthcare security and privacy, and QoS. Finally, suggestions and recommendations for IoT healthcare applications are laid down at the end of the study along with future directions related to various recent technology trends.

Keywords: IoT; IoT; healthcare; monitoring; remote.

I. INTRODUCTION

Kevin Ashton coined the phrase "Internet of Things" (IoT) in 1999 to describe data on the Internet that are linked to a dynamic global service architecture (1,2). The Internet of Things is the outcome of cutting-edge information and communications technology research. It might improve the standard of living for people living in cities. The need for developing cost-effective healthcare systems that can effectively manage and provide a wide range of medical services while lowering overall expenses is growing due to the startling rate at which the world's population is growing and the rising prevalence of chronic diseases (3,4,5,6). But the Internet of Things (IoT) is a new paradigm that allows all linked physical things to be addressed and managed remotely in any intelligent application, including smart homes, smart cities, and smart healthcare (7). Medical care relies heavily on the diagnosis and patient monitoring of illnesses; integrating sensor networks to the human body will help tremendously with these tasks. Furthermore, the data may be easily accessed at any time and from any location in the world. It could be difficult for patients from particular areas or with severe injuries to get to the hospital. In order to better their health and save time and money, consumers can thus use video conferencing to connect with their doctors. With this technology, patients can take phone records of their medical issues (8).

Internet of Things, which will save healthcare administration expenses and enhance patient results. Drastic appointment scheduling and remote patient monitoring are made possible by Internet of Things (IoT) solutions for doctors. To lessen their reliance on medical visits and the possibility of obtaining unwarranted or improper medical care in hospitals or clinics, patients can also enhance their at-home healthcare (9). Because of this, the general cost of treatment may go down while the standard of medical care and patient safety may both improve. Healthcare can benefit greatly from the Internet of Things (7,10). Soon, we'll have access to a health monitoring system that will allow us to check our health from the comfort of our homes and expedite hospital procedures. IoT sensors ought to be widely

distributed in order to continuously monitor the environment and body. Progress in rehabilitation and the management of chronic diseases will be possible to be monitored thanks to this initiative. IoT-enabled efficient data connections from different locations will be useful for virtual consultations for remote medical treatment in the future (11).

II. OBJECTIVE

The principal objective is the creation of a reliable Internet of Things (IoT) patient management system, enabling healthcare providers to employ an IOT-based integrated healthcare system to provide high-quality patient care by monitoring patients in the hospital or at home. The Internet of Things (IoT) healthcare monitoring system seeks to collect, share, monitor, store, and analyse the data generated by various things by precisely tracking persons and connecting various services and objects globally over the Internet. The Internet of Things (IoT) healthcare monitoring system seeks to precisely track individuals and link diverse services and objects globally over the Internet in order to gather, exchange, monitor, store, and evaluate the data produced by these objects. But with the Internet of Things (IoT), all linked physical items in any intelligent application—like smart homes, smart cities, and smart healthcare—can be addressed and managed from a distance. Applying sensor networks to the human body will greatly aid in the diagnosis and patient monitoring that are fundamental to medical care. Furthermore, the data is easily obtainable at any time and from any location in the world.

III. IoT Based Healthcare system and their applications

People's lives are made easier by IoT-based healthcare systems and its applications in a variety of ways, including:

Remote medical care: Wireless Patients receive healthcare via IoT-driven solutions rather than the other way around. IoT-based sensors are used to securely collect data, which are then processed by a tiny algorithm and shared with healthcare providers for appropriate recommendations.

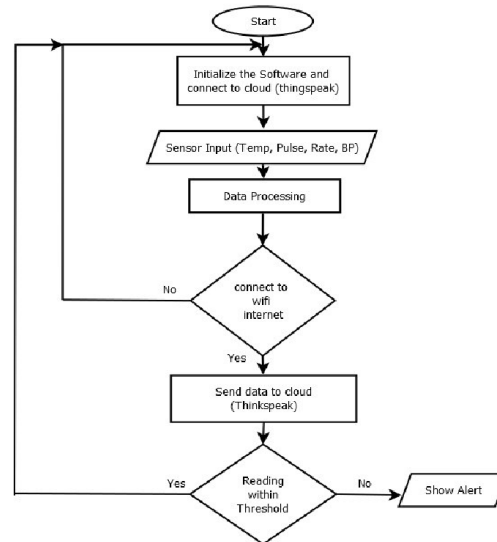
Real-time monitoring: Comprehensive psychological data is gathered by IoT-powered, non-invasive monitoring sensors. Data storage is managed via cloud-based analysis and gateways.

Preventive care: Sensor data is used by IoT healthcare systems to notify family members and assist in the early detection of emergencies. The Internet of Things enables machine learning for early anomaly detection and health trend tracking (12).

IV. Significance for IoT based Healthcare Monitoring system

Researchers and industry leaders in the medical profession are paying close attention to the development of healthcare monitoring systems. In this field, numerous fruitful research initiatives have been carried out, and numerous others are already in progress (13). The number of older persons and patients with chronic illnesses is expanding at an accelerated rate, which is directly contributing to the large rise in gaps in treatment that healthcare practitioners give. The main drawback is that healthcare is exclusively offered in hospitals, which makes it inappropriate and sometimes unable to satisfy the needs of the elderly and disabled (14). Real-time monitoring of senior health status is a problem that the Internet of Things (IoT) effectively and practically solves with the use of sensor values and telecommunications. It has been demonstrated that the Internet of Things, when combined with smart technology, may offer a number of upgraded and better services. Researchers have created a variety of emergency systems with sensors

and technology that allow for intelligent and distant wireless communication. Many medical applications have made use of these technology, most notably the monitoring of senior citizens' health. This makes it possible to gather information on general health and risky circumstances by taking crucial vital signs (15).



V. Benefits of Using IoT in Healthcare

Though there are countless ways the Internet of Things might enhance healthcare, the following are some of the main advantages:

- lower medical expenses.
- Errors made by humans are decreased.
- the removal of distance's constraints.
- decreased record-keeping and paperwork requirements.
- Early detection is the case with chronic disorders.
- enhancements to the administration of medications.
- The urgent need for medical attention.

VI. RESULT AND DISCUSSION

Our objective is to execute a shrewd understanding wellbeing checking framework that can monitor the pulse and body temperature. The keen persistent wellbeing care monitoring system created by us has various applications. These sorts of healthcare systems can be actualized in healing centres as well as at domestic places where a person needs to have prompt therapeutic consideration at whatever point his/her wellbeing goes unstable. As we are utilizing the Thing Talk IoT stage with the offer assistance of Thing Talk we can easily capture sensor information. This permits to keep a track of patients' pulse and body temperature esteem with alter in time. This would donate the specialist a wider perspective of treating the understanding in much compelling way inside less time. The system created persistent observing based on Web of things, is an alternative that can be utilized to offer assistance patients with persistent illnesses. Moreover, with this set of solutions the point is to progress the quality of life of patients, not fair observing them, but too to empower coordinate them to progress their eating propensities and workout routines. The setting show created for the framework demonstrated to be proficient when making inferences related to the setting, such as

proposals for taking measures through sensors, as well as suggestions and workout schedules tips to improve the eating propensities of patients.

VII. CONCLUSION

The Web of Things is considered presently as one of the attainable arrangements for any remote esteem following particularly in the field of wellbeing observing. It encourages that the individual thriving parameter information is secured interior the cloud, remains in the hospital are diminished for customary schedule examinations and most imperative that the health can be checked and malady analysed by any specialist at any separate. In this paper, an IoT based wellbeing checking framework was created. The system monitored body temperature, beat rate and room stickiness and temperature using sensors, which are too shown on an LCD. These sensor values are at that point sent to a medical server utilizing remote communication. This information was at that point gotten in an authorized personal shrewd phone with IoT stage. With the values gotten the doctor at that point analyse the illness and the state of wellbeing of the persistent. The main objective of the try was effectively accomplished. All the person modules like Heartbeat discovery module, drop location module etc. and farther seeing module gave out the aiming comes about. 55 The planned framework modules can advance be optimized and delivered to a last single circuit. More critical reality that came up during extend plan is that all the circuit components utilized in the farther health detection framework are accessible easily. In this paper, we found the significance and productive benefits of usage of IoT in farther wellbeing checking systems. The compact sensors with IoT will make a huge effect on each patient's life, that indeed in spite of the fact that they are absent from domestic and physician, this makes a difference them to decrease the fear of peril. The tactile information can be procured in domestic or work situations. Moreover, the challenges in sensing, analytics and forecast of the infection are too highlighted and those can be addressed to give a consistent integration. The principal component of people's needs is wellbeing. People confront a pull of shocking passing and bounty of diseases because of shifted infections that are a result of need of treatment to the patients at right time. The primary objective of this extend is to create a dependable sensible patient health recognition framework victimization IoT, so the consideration experts will monitor their patients. The sensors will be either worn or be implanted into the body of the patients, to unendingly screen their wellbeing. The information collected in such afashion will view on, analyzed, and well-mined to attempt and do the to begin with forecast of diseases

REFERENCE:

- Farhan, L., Hameed, R. S., Ahmed, A. S., Fadel, A. H., Gheth, W., Alzubaidi, L., ... & Al-Amidie, M. (2021). Energy efficiency for green internet of things (IoT) networks: A survey. *Network*, 1(3), 279-314.
- Alekya, R., Boddeti, N. D., Monica, K. S., Prabha, R., & Venkatesh, V. (2021). IoT based smart healthcare monitoring systems: A literature review. *Eur. J. Mol. Clin. Med*, 7, 2020.
- Sharma, R. K., & Nair, A. R. (2019, February). IoT-based secure healthcare monitoring system. In *2019 IEEE International Conference on Electrical, Computer and Communication Technologies (ICECCT)* (pp. 1-6). IEEE.
- Rathi, V. K., Rajput, N. K., Mishra, S., Grover, B. A., Tiwari, P., Jaiswal, A. K., & Hossain, M. S. (2021). An edge AI-enabled IoT healthcare monitoring system for smart cities. *Computers & Electrical Engineering*, 96, 107524.

- Alshamrani, M. (2022). IoT and artificial intelligence implementations for remote healthcare monitoring systems: A survey. *Journal of King Saud University-Computer and Information Sciences*, 34(8), 4687-4701.
- Gera, S., Mridul, M., & Sharma, S. (2021, April). IoT based automated health care monitoring system for smart city. In *2021 5th International Conference on Computing Methodologies and Communication (ICCMC)* (pp. 364-368). IEEE.
- Bhatia, H., Panda, S. N., & Nagpal, D. (2020, June). Internet of things and its applications in healthcare- A survey. In *2020 8th International Conference on Reliability, Infocom Technologies and Optimization (Trends and Future Directions) (ICRITO)* (pp. 305-310). IEEE.
- Jain, U., Gumber, A., Ajitha, D., Rajini, G. K., & Subramanian, B. (2021). A review on a secure IoT-based healthcare system. *Advances in Automation, Signal Processing, Instrumentation, and Control: Select Proceedings of i-CASIC 2020*, 3005-3016.