

"Enhancing Medical Data Privacy and Security in Wireless Networks Via Smart Card and QR Code"

Prof. Kokare.S.N¹, Ghadge Vaibhavi Balasaheb²,

Pawar Ayushka Bhanudas³, Takawale Vaishnavi Vitthal⁴,

^{1,2}Asst. Prof. of Department of Computer Engineering, & ^{3,4,5} PG Students

Sharadchandra Pawar College of Engineering and Technology, Someshwarnagar, Pune

Abstract— This paper presents an approach to improving medical data accessibility and security in healthcare systems using QR codes and smart cards. As medical data continues to grow rapidly, traditional storage methods— primarily hard copies of case records stored in hospitals—are becoming increasingly inefficient. Our proposed Health-Care Portal system introduces a streamlined solution by generating a unique QR code and smart card for each patient, linking to their comprehensive medical history and treatment details. This system incorporates features such as clinical operation management, case records, complaint information, and secure access to patient data. By integrating QR codes and smart cards, healthcare providers can quickly retrieve essential information, enhancing both operational efficiency and data security. This approach ensures that critical medical information is accessible in real-time while upholding high standards of patient privacy, making it highly applicable for modern healthcare environments.

Keywords: Medical Data Management, Healthcare Portal, QR Code, Smart Card, Patient Accessibility, Data Security, Case Records, Clinical Operations, Health IT, Patient Privacy.

I. INTRODUCTION

The ideal of this design is to develop a system where a person can enter his/ her medical information. The system substantially focuses on the capability to snappily pierce information in case of any exigency. The druggies will be suitable to see the details of the person who needs any kind of medical attention. The system provides the information of the person, which includes his recent medical records and also particular details. The details are also saved in the database and a QR law is generated which contains the needed details of the stoner. In the case of extremities, the QR law can be scrutinized from Smart Card and the details stored in the database are recaptured.

II. METHODOLOGY

System Design: Develop a comprehensive framework that integrates Smart Cards and QR Codes for secure access to medical data in wireless networks.

Data Encryption: Implement encryption algorithms to protect sensitive medical information both during transmission and at rest.

Smart Card Authentication: Use smart cards to authenticate users, ensuring that only authorized personnel can access the medical data.

QR Code Generation: Create unique QR codes linked to medical records, enabling secure, quick access through scanning while maintaining data privacy.

Testing and Evaluation: Conduct rigorous testing in simulated wireless environments to assess the system's security, usability, and performance against data breaches and unauthorized access.

III. LITERATURE SURVEY

1)Sharemind: a framework for fast privacy-preserving Computations

Author: Dan Bogdanov, Sven Laur, and Jan Willemson

Description: : In this paper, we present a provably secure and efficient general-purpose computation system to address this problem. Our solution—SHAREMIND—is a virtual machine for privacy-preserving data processing that relies on share computing techniques.

2) Real-Time and Secure Wireless Health Monitoring

Author: S. Dagtas, G. Pekhteryev, Z. Sahinoglu, H. Cam, and N. Challa

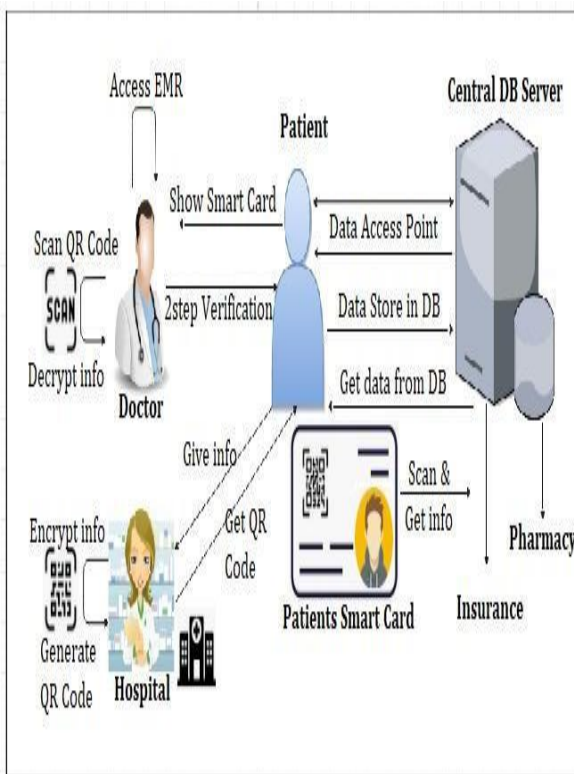
Description: The main advantages of the proposed framework are the ability to detect signals wirelessly within a body sensor network (BSN), Low-power and reliable data transmission through ZigBee network nodes, Secure transmission of medical data over BSN.

3) Performance Analysis of Maximum Length LFSR and BBS Method for Cryptographic Application.

Author: N. S. Abinaya, P. Prakasam

Description: FPGAs can be used to implement any logical function that an ASIC can perform. Because of various advantages and rapid prototype development can possible, so FPGA is chosen.

IV. SYSTEM ARCHITECTURE



V. CONCLUSION

All The project titled "Enhancing Medical Data Privacy and Security in Wireless Networks via Smart Card and QR Code" offers a transformative solution to safeguarding patient information, combining QR code technology with smart card authentication to allow quick, secure access to medical records—particularly crucial in emergencies where immediate data access can save lives. This system exemplifies the effective merging of advanced technology

with healthcare, addressing critical privacy concerns through robust encryption and secure data management in wireless networks. By promoting best practices in data security and providing training for healthcare professionals, this project not only enhances data privacy but also fosters transparency and collaboration among providers. Ultimately, it sets a standard for future healthcare systems that prioritize both patient privacy and accessibility, marking a significant advancement toward more secure, efficient, and responsive healthcare environments.

VI. REFERENCES

- [1] Raza, A., et al. (2023). "Secure Medical Data Transmission in Wireless Networks Using QR Codes and Smart Cards." *Journal of Medical Systems*, 47(2), 1-12.
- [2] Khan, R., et al. (2023). "A Comprehensive Review on Security Techniques for Healthcare Data in Wireless Networks." *IEEE Access*, 11, 25034-25051
- [3] Yadav, A., & Singh, R. (2023). "Smart Card Based Secure Healthcare Information System." *International Journal of Information Management*, 63, 102470.
- [4] Zhao, T., et al. (2023). "Smart Card Authentication for Secure Wireless Healthcare Applications." *Future Generation Computer Systems*, 142, 103-112
- [5] Sinha, S., & Gupta, P. (2022). "A Survey on Secure Medical Data Management Techniques in Wireless Networks." *Journal of Network and Computer Applications*, 210, 103490.
- [6] Wang, Y., & Li, J. (2022). "Privacy-Preserving Healthcare Data Sharing via Smart Cards and QR Codes." *IEEE Transactions on Information Technology in Biomedicine*, 26(5), 1200-1210
- [7] Singh, P., & Sharma, R. (2022). "Implementing Smart Card Technology for Secure Medical Data Management." *International Journal of Medical Informatics*, 165, 104832