
Securing electronic health system using cryptography technique

Yunusa Simpa Abdulsalam*,
Olayemi Mikail Olaniyi and Aliyu Ahmed

Computer Engineering Department,
Federal University of Technology Minna,
Niger State, Nigeria
Email: abdulsalam.pg611937@st.futminna.edu.ng
Email: mikail.olaniyi@futminna.edu.ng
Email: aliyu.ahmed@futminna.edu.ng
*Corresponding author

Abstract: Telemedicine application mostly takes place in advance settlements, where important medical information is to be effectively secured and transmitted on public networks. Whilst the data is accessed by an illegitimate individual, it may lead to malicious attack or any modification of medical image can result in misdiagnosis. The notion of medical information storage in automated form arose immediate concerns about healthcare data security and privacy. The need to design a secure distributed system to provide adequate authentication of patient data and confidentiality of patient medical record becomes imminent. This paper addresses confidentiality issues of electronic health record (EHR) in clinic tele-diagnostic system using cryptography technique. The developed cryptography algorithm embraces discrete wavelet transform (DWT) steganography technique instead of the traditional least significant bit (LSB) technique thereby providing required data robustness, payload capacity and imperceptibility of patient data over tele-consultation in Tele-clinic diagnostic scenario. Results of quantitative performance evaluation of host medical image of the EHR system showed an encrypted imperceptible and robust stego image of peak signal to noise ratio (PSNR) greater than 40 db. Results of evaluation portray a system capable of providing countermeasures against eavesdropping attack in data communication networks in clinic tele-consultations.

Keywords: confidentiality, electronic health record; EHR; authentication; security, tiny encryption algorithm; TEA.

Reference to this paper should be made as follows: Abdulsalam, Y.S., Olaniyi, O.M. and Ahmed, A. (2019) 'Securing electronic health system using cryptography technique', *Int. J. Telemedicine and Clinical Practices*, Vol. 3, No. 2, pp.132–155.

Biographical notes: Yunusa Simpa Abdulsalam obtained his BEng in Electrical/Computer Engineering and Masters of Computer Engineering in 2015 and 2017, respectively, from Federal University of Technology, Minna, Nigeria. He is currently a PhD candidate in Data Science, Networking and Algorithm Thinking (DNA) at University Mohammed VI Polytechnic. He is a promising computer network security expert. His research interests are in distributed systems design, wireless sensor networks, privacy and computer network security.