Investigation of data encryption algorithm for secured transmission of electrocardiograph (ECG) signal

ABSTRACT

Cardiovascular disease (CVD), especially coronary artery disease (CAD) is a leading cause of human morbidity and mortality. CVD involves blockage in the heart or blood vessels (arteries, capillaries and veins). Different techniques are used to check the condition and blockage in the heart. Electrocardiogram (ECG) is one of the medical techniques employed to monitor heart performance and used for the detection of different arrhythmias. Secured transmission of ECG system has transpired as a prospective solution to help the medical practitioner to check the patient's heart condition; either the heart is working normally or has some abnormalities like tachycardia or bradycardia. This study aims to design and develop security enhanced ECG system for secure and privacy-preserving, ECG diagnosing and ECG visualization. The QRS complex method will be used in this work to diagnose the acquired ECG signal. The result obtained from QRS complex method is used to display a healthy or unhealthy patient's condition. The system will alert for further diagnosis if the condition is critical, so it will help medical practitioner for further detection of arrhythmias and medical researcher for further studies. The security and privacy features of the system protect the authenticity and confidentiality of the patient's medical data and are implemented using security enhancing techniques. This problem will be solved by encrypting the signals, using the proposed fully homomorphic encryption (FHE) technique. This study demonstrates contributions by applying these ideas to two classical problems on the natural algorithm calculation and signal processing.

Keyword: Electrocardiograph; Signal processing; Homomorphic encryption