



AIN SHAMS UNIVERSITY

FACULTY OF ENGINEERING

Computer and Systems Engineering

Design and Implementation of Wireless Electrocardiography (ECG) Monitoring System

A Thesis submitted in partial fulfillment of the requirements of the degree of

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(Computer and Systems Engineering)

by

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Statement

This thesis is submitted as a partial fulfillment of Master of Science in Computer and Systems Engineering, Faculty of Engineering, Ain shams University.

The author carried out the work included in this thesis, and no part of it has been submitted for a degree or a qualification at any other scientific entity.

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Thesis Summary

With the increasing interest about healthcare, more people desire to check their health conditions frequently. Home healthcare electronic devices enable patients to monitor their vital signals. Electronic measurement of ECG faces many challenging problems such as the electric field interference, low ECG amplitude and motion artifacts due to the patient movements. An on-body wireless sensor network is used for monitoring the ECG signals from the human body. This thesis demonstrates a new application for the wireless domain to improve the home healthcare of patients. Home healthcare electronic devices, which enable patients to test, monitor ECG continuously, and treat certain healthcare conditions are becoming an important aspect of healthcare. The main difference between this system and the existing ones is that the electrodes themselves are communicating with a base station in a wireless fashion, thus providing better

mobility for the patient. In this thesis, the techniques for motion artifacts reduction are explored for a wireless sensor system for ECG monitoring.

This thesis is divided into 5 chapters:

1. Introduction
2. Background and Literature survey on wireless systems for ECG monitoring architectures
3. System design and simulation for the wireless sensor system top level architecture
4. Circuit design, simulation for the sensor interface front end building blocks and System implementation and testing
5. Conclusion

Keywords:

Telemedicine, Electrocardiogram (ECG), accelerometer, real-time monitoring, single lead, adaptive filter, motion artifacts, body sensor network

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