

# Abstract

**Iman Gamal Morsi**

## **Measurement of Blood Pressure and Heart Beat Based on Sensors and Microcontrollers**

As heart related diseases are increasing over days, a mandatory need for an accurate, affordable heart rate and blood pressure measurement is essentially required now a day. This paper illustrates the simulation of two devices used to measure the heart rate and the blood pressure. The two proposed designs are built using different type of sensors and the generated results are compared to those of the (HEM-907XL) device from OMRON company. The first proposed design is constructed using either infrared (IR) sensor light dependent resistance (LDR) to measure the heart rate. On the other hand, the second design is constructed using either a group of strain gauge sensors, or a group of piezoelectric sensors to measure the blood pressure. One hundred human subjects of different ages between 25 and 70 years old are used to test both designs. The two designs are implemented using microcontroller (ATMEGA 16) for it is lower cost and high efficiency. A comprehensive study is conducted on the results using statistical analysis to verify the validity of both designs.