Fayoum University
Faculty of Science
Department of Physics

IMPLEMENTING AN INTELLIGENT ELECTRONIC CIRCUIT FROM A SEMICONDUCTOR MATERIALS USING MICROCONTROLLER

By

Yasmeen Adel Kelanee

A thesis submitted in partial fulfillment Of
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(Electronics)

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Yasmeen Adel Kelanee

Bachelor of Science (2009)

Dr/
Mohamed Yousef Farag
Assistant Professor of solid state physics
Ain shams University

Prof.Dr /
Amr Khairat Radi
Professor of physics-
Faculty of Science-
Fayoum University

Approval Sheet

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This thesis for Master of Science degree has been

Approved by:

Dr/ Mohamed Youssef Farag

Assistant Professor of solid state Physics-Faculty of Science-Fayoum University

Signature…….

Prof. Dr / Amr Khairat Radi

Professor of physics- faculty of science -Ain shams University

Signature……

Date of Examination: / / 2014

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ABSTRACT

This thesis presents a view of the state of the art of microcontrollers and its implementations in an experimental circuit.

The object of the thesis is implementing an intelligent electronic circuit using a microcontroller. This study aimed to design an electronic circuit using a microcontroller and applying an artificial intelligent in physics problem. This intelligent electronic circuit is a simple circuit based on a microcontroller to measure heart rate using finger sensor and display the rate on a 7 segment display system. The measure of a heart rate is an important medical tool for all humans, especially to monitor people suffering from chronic heart diseases.

The circuit uses the optical technology to detect the blood volume change at fingertip with each heartbeat. This optical finger sensor consists of two high brightness light emitting diode (LED) and a photodiode. The change of blood volume with each heart beat produces a chain of pulses. These pulses are amplified and filtered to appropriate voltage level and filtered so that the pulses can be fed to a microcontroller for counting and displaying on a 7 segment display system. The performance of this heart rate measuring device is represented on an oscilloscope giving excellent results.

The important aspect of this thesis is the uses of artificial intelligent to analyze the heart rate signal .Depending on standard medical values for gender and age, the artificial intelligent will be applied on this circuit to detect the abnormalities pulse rates for different people.

Our proposed Heart Rate Measuring device is portable, economical and easy to use by non-professional people.