

**DEVELOPMENT OF FINGER HEART RATE SENSOR
MONITOR USING GRAPHICAL USER INTERFACE
(GUI) IN MATLAB**

**This project is presented in partial fulfillment for the award of the
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ABSTRACT

The aim of this paper is to develop the finger heart rate sensor monitor system using Graphical User Interface (GUI) in MATLAB. The samples of normal pulse wave from the developed finger heart rate sensor monitor are loaded into the system where MATLAB mathematical software is used to perform the analysis to calculate and display the heart rate. The finger heart rate sensor monitor developed, outputs an analog signal that represent the cardiovascular pulse wave that is found throughout the human body. This pulse wave will result in a change in the volume of arterial blood with each pulse beat the heart rate is calculated based on the difference between the time occurrences of the peak amplitude of two consecutive pulses. In this paper, the performance of this monitoring system is tested by using the real data. An analog to digital converter (ADC) is also designed to interface the analog signal obtained from the hardware to the computer for real-time processing. However the ADC needs to be further improved for better output performance.

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CHAPTER 1

INTRODUCTION

1.1 BACKGROUND

The Finger Heart Rate sensor monitors the light level transmitted through the vascular tissue of the fingertip and the corresponding variations in light intensities that occurs as the blood volume changes in the tissue. The Finger Heart Rate Sensor monitor is used to measure the cardiovascular pulse wave that is found throughout the human body. This pulse wave will result in a change in the volume of arterial blood with each pulse beat. This change in blood volume can be detected in peripheral parts of the body such as the fingertip using a technique called Photoplethysmography.

The device that detects the signal is called a plethysmograph (or 'Pleth' for short). The Pleth consists of an infrared LED which illuminates the tissue and a light sensitive detector (LSD), which has been tuned to the same colour frequency as the LED, and detects the amount of light transmitted from the tissue. The Pleth supplied with this sensor is a transmission mode plethysmographic signal (PPG) device, which uses transmitted light to estimate absorption. The infrared LED and the light sensitive detector (LSD) are mounted in a spring loaded device that can be clipped onto the fingertip. The infrared light emitted by the LED is diffusely scattered through the fingertip or ear lobe tissue.