



UNIVERSITI TEKNOLOGI MARA

**HEART RATE MONITORING SYSTEM DESIGN
USING LABVIEW**

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ABSTRACT

The level of a person's health can be known through their heart rate. This pulse rate can be measured anywhere on the part of the body where the arteries beat to the surface of the skin. This project shows the methods of monitoring a person's heart rate by using embedded system and LabVIEW technology. The main objective of this project is to study the effectiveness of Light Dependent Resistor (LDR) for heart rate monitoring. The hardware is developed on myRIO controller and designed in LabVIEW. The LDR used in this system to measure changes in blood volume inside the patients' fingers. The amount of light absorbed by a finger depends on the changes of blood volume. There is a change of heart rate when the blood volume in a finger changes. Since the measured output from LDR is too small, the system requires a signal conditioning circuit to produce a usable sensor output. The heart rate monitoring system can be designed at a low cost by using the Light Dependent Resistor. The LDR depends on the light. The accuracy of this sensor for heart rate monitoring is 93.66% in normal light. With additional light, the accuracy of this system increases from 93.66% to 98.08%. The error reduces by 4.42 percent by adding external sources of light. In poor illumination, the error is higher and this system cannot calculate the actual heart rate value.

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CHAPTER 1

INTRODUCTION

1.1 BACKGROUND OF STUDY

Heart rate is defined as the amount of pulse rate (blood pumping by heart) within a minute. Therefore, it is often written with bpm units (beat per minute) [1]. It is also known as pulse. A person's health level can be determined by observing their heart rate [2]. Heart rate is dependent on individual body size, age and heart condition. The normal heart rate for adults which is at the age 10 years old above is around 70 bpm while the infant's heart rate which is at the age 0 to 11 months old is around 120 bpm and the heart rate adult children which is at the age 3 to 10 years old is around 90 bpm [3]. Apart from age, the heart rate also depends on the activity performed such as whether the individual moving or sitting, the use of medicines and air temperature as well. In fact, feelings can also affect heart rate [4]. For example, when a person is surprised the heart rate will increase.

The use of medical devices is important to diagnose people's health. It is also an indication that a person has a disease or not. One of the most common diseases is heart disease. Technological advancement especially in the field of cardiac checking continues to be conducted, but some obstacles faced such as patients need to continuously visit the doctor, is certainly not effective. Hence the heart rate monitoring system is generated to facilitate people to measure heart rate without the help of doctors. Heart rate monitoring is used to measure the amount of heartbeat. Abnormal heart rate changes are often experienced by people with heart disease. Monitoring heart rate as initial information so that a person can be more careful in doing activities so that abnormal heart rate changes can be reduced.