HARDWARE DEVELOPMENT ON AUTO FOCUS MICROSCOPE

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UNIVERSITI MALAYSIA PAHANG

HARDWARE DEVELOPMENT ON AUTO FOCUS MICROSCOPE

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This thesis is submitted as partial fulfilment of the requirements for the award of the Bachelor of Electrical Engineering (Hons.) (ELECTRONICS)

Faculty of Electrical & Electronics Engineering
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SUPERVISOR'S DECLARATION

I hereby declare that I have checked this thesis and in my opinion, this thesis is adequate in terms of scope and quality for the award of the degree of the Bachelor Degree of Electrical Engineering (Hons.) (Electronics).

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STUDENT'S DECLARATION

I hereby declare that the work in this thesis is my own except for quotations and summaries which have been duly acknowledged. The thesis has not been accepted for any degree and is not concurrently submitted for award of other degree.

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I dedicated this work to my beloved parents and friends for always supporting me, because they are the driving force in my life and career. Without their love, none of this would matter. Better late than never.

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ABSTRACT

The scientific instrument technology has growth faster than we all could imagine, there are many research team keeping their momentum in creating new innovation in scientific instrumentation technologies. The optical microscopes are still being used widely in the scientific research especially by researcher and medical practitioners. Manually deal with the microscope could make the user spend so much time to obtain the result of cleared image. It could cost hours to obtain the desire result. From this problem, the author would like to introduce a hardware system for auto focused of optical microscope. There consist of two stepper motor that will be function to control the fine focus knob and the course focus knob. The timing belts are being used as mounting between the stepper motor and the fine/course focus knob. The motor will moves step by step in same degree given from the command of programming. The motor are able to be control and it move slowly and in able to move in a small angle to finding the exact proper exposure of the images scan. The hardware implementation of auto focus on the optical microscope has been tested and it work perfectly.

ABSTRAK

Teknologi alat saintifik berkembang dengan lebih cepat daripada yang kita semua boleh bayangkan, terdapat banyak kumpulan penyelidikan yang mengekalkan momentum mereka dalam mencipta inovasi baru dalam teknologi dalam peralatan saintifik. Mikroskop optik masih digunakan secara meluas dalam penyelidikan saintifik terutamanya oleh penyelidik dan pengamal perubatan. Berurusan secara manual dengan mikroskop boleh membuatkan pengguna menghabiskan begitu banyak masa untuk mendapatkan hasil imej yang jelas. Masa yang lama akan diperuntukan bagi mendapatkan hasil yang diinginkan. Dari permasalahan ini, penulis ingin memperkenalkan sistem perkakasan untuk auto fokus mikroskop optik. Terdapat dua motor stepper yang akan menjadi fungsi untuk mengawal tombol fokus halus dan tombol tentu fokus. Tali pinggang masa digunakan sebagai pemasangan antara motor pelangkah dan pelarasan halus atau pelarasan kasar. Motor akan bergerak selangkah demi selangkah dalam darjah yang sama diberikan oleh program. Motor mampu untuk dikawal dan ia bergerak perlahan-lahan dan dapat bergerak di sudut yang kecil untuk mendapatkan pendedahan yang betul yang tepat daripada imej imbas. Pelaksanaan perkakasan auto fokus pada mikroskop optik telah diuji dan ia berfungsi dengan sempurna.

CHAPTER 1

INTRODUCTION

1.1 PROJECT BACKGROUND

The scientific instrument technology has growth faster than we all could imagine, there are many research team out there with different agencies who keep their momentum in creating the new innovations in scientific instrumentation technology to help researcher out there to obtain the precise result from the instrumentation they used. The optical microscopes are still being used widely in the scientific research especially in hospital and laboratories. Help a lot of researchers and medical practitioners to deal with their own specific task like finding the cause of the disease.

The auto focus of optical microscope, where the object, sputum was being put on the stage to be scan and then everything was run automatically and give the clear result image of the object's scan. The sputum is the mucus that forms through coughing, which it is not really the saliva and spit. The sputum is being used as the sample for the experiment. The characteristic of the sputum it consist of the pus cell and the epithelial cell

The stepper motor will be mounting into the thick Perspex and it connected to the motor drivers. The motor drivers are a little current amplifier. It will take the low current signal from the Arduino and then turn it into a higher current signal to drive on the stepper motor. Here, the Arduino plays the main role because it will process and transmit the input signal to motor driver in order to implement the auto focus for optical microscope.

1.2 PROBLEM STATEMENT

The microscope are usually being used in laboratories, the user commonly used it for scan the micro object which our normal eye can't seeing it. The microscope helps a lot in order to determining the problem but manually deals with the microscope could spend much time. Imagine if the objects that need to be scan are many, it could cost hours or even a day. The new technology has proved the innovations of the auto focus microscope which it can scan and obtain the cleared image for 42 objects just in minutes. By these technologies, the time spending on the microscope to obtain the cleared images could be minimizing.

1.3 PROJECT OBJECTIVES

The main objective of this project is:

i. To develop the hardware system for auto focused of optical microscope.

1.4 SCOPE OF THE PROJECT

The scope of study for this project included the development of the hardware. The scope will covers the highlighted fields of this project which includes:

i. The design an electronic circuit for processing and controlling the stepper motor.
ii. Involve in specific task that related into the mechanical design and hardware works until the task is completing.

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