

COLOUR AND SIZE DETECTION SYSTEM

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Dedicated to my beloved family especially my father and mother, thanks for your sacrifice towards my success.

For my Final Year Project supervisor, Mr. Mazran Bin Esro, thanks for all your guidance and assistance towards the final year project.

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ABSTRACT

This project is about designing a colour and size detection system that can detect colour and size of cubes and display the result in Visual Basic. In this project, Light Dependent Resistor (LDR) is used as the colour detector. The LDR will detect the reflected intensity of light for the cube by using Light Emitted Diode (LED) and the output voltage from LDR will be determined by using voltage divider. Infrared sensor (IR) will be used as the size detector. Two pairs of infrared sensors will be used to detect the height of the cube when it goes through the infrared sensor. After that, both of the signals from IR and LDR will act as input to the PLC microcontroller. Then, the Visual Basic will display the result of the total number of cubes counted. Besides that, the notification setting will send the data of the total number of cubes processed to the specific phone number that has been set in the Visual Basic. Lastly, the data acquisition of the total cubes processed will be stored using Microsoft Access that links with the Visual Basic. Therefore, the manual counting system will be replaced and the manpower can be reduced.

ABSTRAK

Projek ini bertujuan mereka cipta sistem pengesanan warna dan saiz yang boleh mengesan warna dan saiz kiub dan memaparkan hasil dengan menggunakan “Visual Basic”. Dalam projek ini, Perintang Peka Cahaya digunakan sebagai pengesan warna. Perintang Peka Cahaya dapat mengesan keamatan cahaya yang dipantul daripada kiub dengan menggunakan “LED” dan voltan keluaran dari Perintang Peka Cahaya akan ditentukan dengan menggunakan pembahagi voltan. Penderia Infra-merah akan digunakan sebagai pengesan saiz kiub. Dua pasangan penderia Infra-merah akan digunakan untuk mengesan ketinggian kiub apabila ia melalui penderia tersebut. Selepas itu, kedua-dua isyarat daripada penderia Infra-merah dan Perintang Peka Cahaya akan bertindak sebagai masukan kepada “PIC Microcontroller”. Pada masa yang sama, “Visual Basic” akan memaparkan hasil jumlah bilangan kiub yang diproses. Selain itu, data jumlah kiub yang diproses juga akan dihantar kepada nombor telefon tertentu yang telah ditetapkan dalam “Software Visual Basic”. Akhirnya, data daripada jumlah keseluruhan kiub yang telah diproses akan disimpan dengan menggunakan “Microsoft Access” yang telah ditetapkan dalam “Visual Basic”. Oleh itu, sistem manual pengiraan dapat digantikan dan tenaga kerja dapat dikurangkan.

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LIST OF ABBREVIATIONS

LDR	–	Light Dependent Resistor
IR	–	Infrared
LED	–	Light Emitting Diode
IC	–	Integrated Circuit
PIC	–	Programmable Interface Circuit
VB	–	Visual Basic
GUI	–	Graphical User Interface
IDE	–	Integrated Developed Environment
ADC	–	Analog to Digital Converter

CHAPTER I

INTRODUCTION

In this chapter, the main objectives and concept of this project will be discussed. Moreover, the problem statement on this project will be stated and the significant idea will be provided to solve the problem. Besides that, the work scope of this project and the overview of this project will be briefly explained in this chapter.

1.1 Project Introduction

Purpose of this project is to design colours and sizes detection system which able to detect the colour and size of cubes and display the result in visual basic.

Meanwhile, Light Dependent Resistor (LDR) will be used to detect the colour. Different colours provide different intensity of lights and hence produce different voltages. Thus, the range for each colour can be categorised by using comparator to send the range of voltage of each colour. Moreover, infrared sensor will be used as size detector in this system and the output will act as an input to the PIC microcontroller. The PIC microcontroller will send signal as the input to the pc and the visual basic will show the result according to its colour and size.

1.2 Objectives

The main objectives of this project are:

- I. To detect the objects based on various colour and size.
- II. To count the amount of objects based on colour and size after pass through colour and size detection process.
- III. Create smart interface using visual basic.

1.3 Problem Statement

This project attempts to design colour and size detection system. Nowadays, most of the small and medium factory still using man power to segregate their products.

Moreover, the colour sensor circuit used in factory is also very complicated circuitry which required the specialist in order to fix it when problem occur such as digital fiber sensor. Besides that, the manually data acquisition in factory is also required the used of man power which is less efficiency. Therefore with the implement of the colour and size detection system, it will increase the efficiency of the factory to count, their products and also computerize data of products. Hence, reduce in man power.

1.4 Scope of Work

The scopes of this project are:

- I. Infrared sensor (IR sensor) is used as size detector.
- II. Three different colour (black, green, blue) of the objects will be used.
- III. Light Dependent Resistor sensor (LDR sensor) is used as colour detector.
- IV. The number of the objects that have been process based on colours and sizes will be shown in visual basic.

1.5 Brief Explanation of Methodology

At the beginning of this final year project, a suitable title will be search and discuss the general idea and concept with my supervisor about the relevant title to my project. After that, research and study of journal and reference on this project will be carrying.

Basically, this project is divided into two parts which is software and also hardware. Software part consists of the programming by using PIC microcontroller to control the infrared sensor circuit, light dependent resistor (LDR) circuit with the data obtain will be shown in visual basic. For the hardware part, the size detector circuit, and colour detector circuit will be designed.

After that, the prototype of this project will be fabricated and the software and hardware part will be combining to present the outcome of this project. Lastly, a writing of the final year project report will be summit after end of the last semester.

1.6 Report Structure

This report is divided into five chapters which delivers the ideas generated, concepts applied, activities done and prototype of the project.. Below is the briefly explanation of each chapter.

Chapter 1 is briefly discusses about the introduction of the project. This chapter includes the introduction, objectives, and problem statements, scopes of work, methodology and report structure.

Chapter 2 is the literature review on theoretical concepts applied in this project. This chapter includes the background study of several colour and size detection systems and also study the concept of infrared sensor (IR) and Light Dependent Resistor (LDR) sensor. In addition, it also explains on how the PIC works in controlling the system, all the required aspect such as specification, requirements and comparison of the components and equipments used are covered in this chapter.

Chapter 3 introduces the methodology of the project. This chapter contains the flow chart which explains the overall method used along the implementation of this project. Besides that, this chapter also covers the construction of sensor circuit for LDR sensor and IR sensor by using simulation to test the circuit functionality.

Chapter 4 shows the result for the simulation and experimental results with the project outcome. It also includes the analysis and discussion of this project based on the simulation results, experimental results for project outcome for LDR sensors, IR sensor, hyperterminal and visual basic.

Chapter 5 will be the conclusion of the final year project. This chapter will summarizes and discusses the achievement of this project. Besides that, this chapter also includes some recommendations and suggestion that can be implemented in the future.

CHAPTER II

LITERATURE REVIEW

In this chapter, each part related to the projects and systems will be discussed. The idea about the project design, concept and other related information such as comparison between components used to be improved on this project will review.

2.1 Visual Basic

Visual Basic (VB) is one of the programming languages with integrated development environment (IDE) from Microsoft. Basically, Visual Basic is designed to development a graphical user interface (GUI) applications, access to database using data access objects, remote data objects and so on.

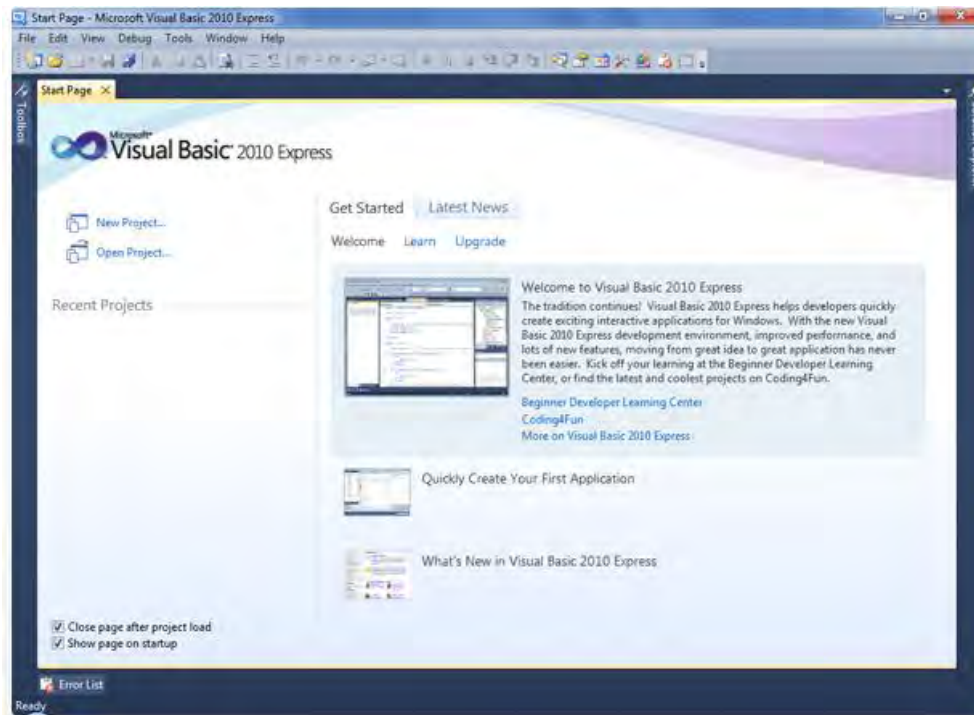


Figure 2.1: Start option of the Visual Basic

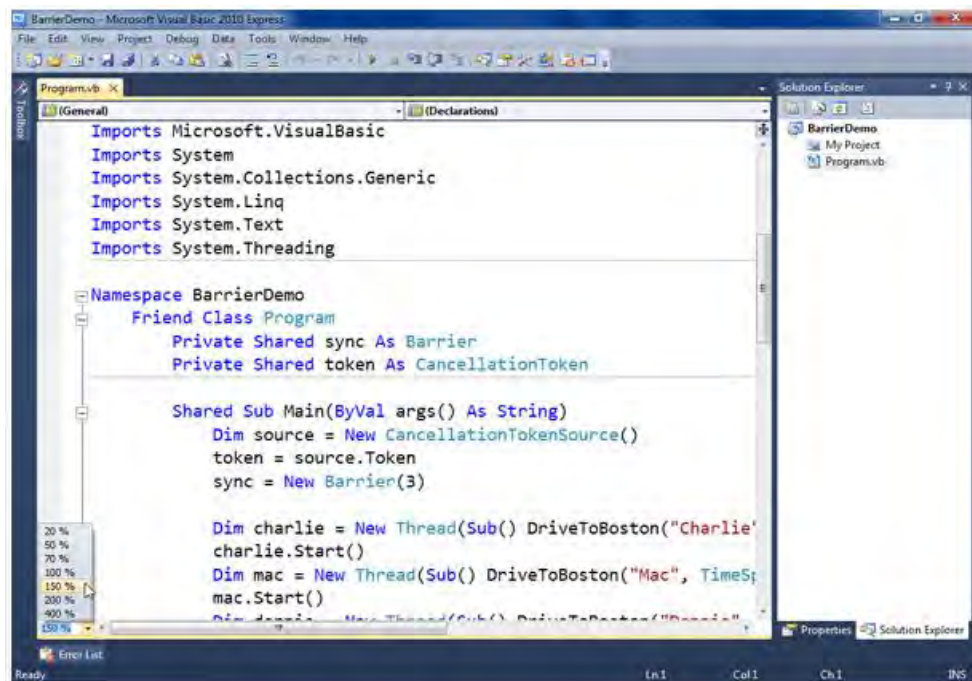


Figure 2.2: The programming used on Visual Basic

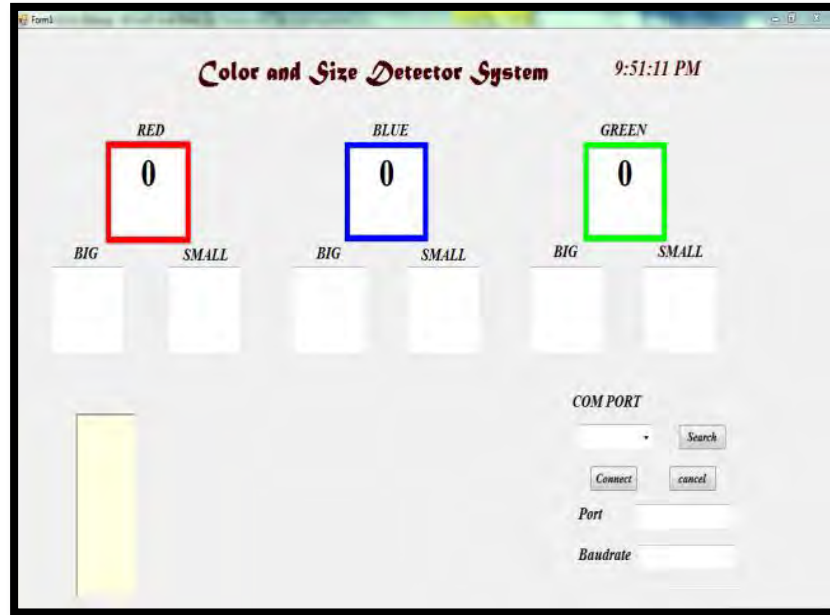


Figure 2.3: The basic design GUI of counting system

2.2 PIC Microcontroller 16F877A

PIC is referred as Peripheral Interface Controller which made by Microchip Technology. A PIC microcontroller is a processor with built in random-access memory (RAM) and read-only memory (ROM), input/output (I/O) lines, build in peripheral such as analog to digital converter (ADC) and digital analog converter (DAC), serial and parallel port.

Microcontrollers have advantages more than microprocessor. Microprocessors have only the Central Processing Unit (CPU) and Math Co-processing unit. These microprocessors do not have built in memory, input or output function which needs many extra supports from external chips and part to make the microprocessor workable.

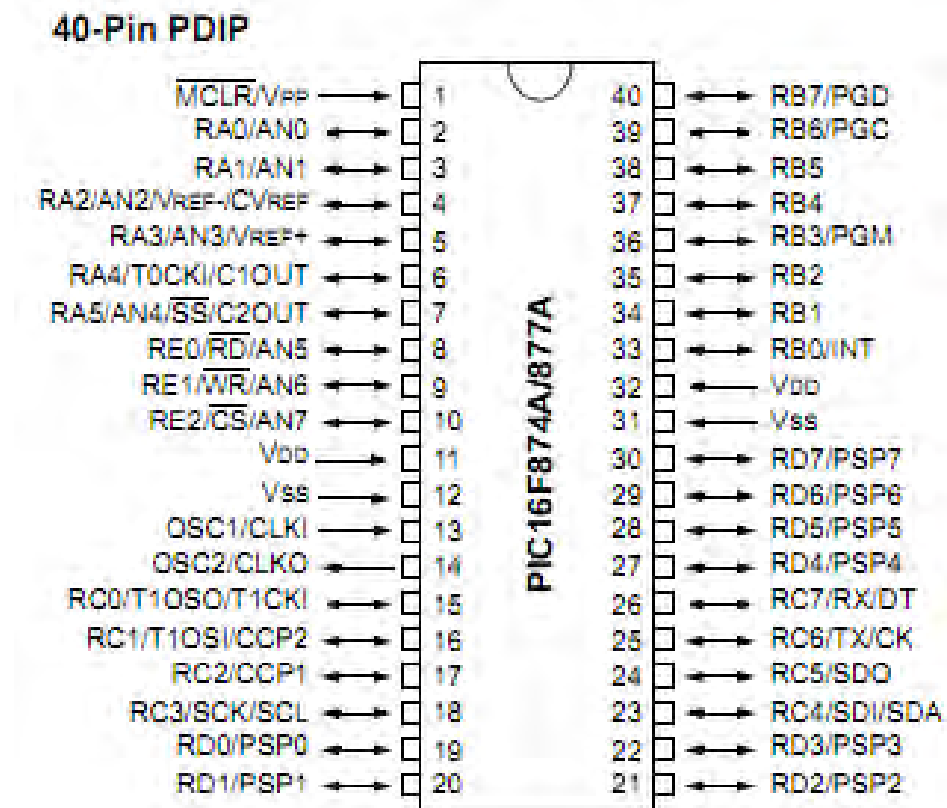


Figure 2.4: PIC16F877A microcontroller [1]