AN AUTOMATIC POURING MACHINE

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I would like to dedicate this project to my family

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ABSTRACT

This project is to design and develop an automatic pouring machine that suitable for various kind of container. The machine will be operated by lifting the container in certain height and pour the liquid or water at the same level in any size of container. Because of the wide application in fast food restaurants and also self service RO water dispenser, state this resulted need consumer to take time and the control machine by itself to ensure there no is wastage happen. Thus, a special system for this machine purposed in this project where consumer that using this machine only need to press a start button and machine would fill the liquid at the same level for any size of the container. For the detail, the machine will operate by move the container at the certain height and pouring liquids or water with the accurate quantity according to size of the container. This project will using a PIC program to control the motor which are used to lift the container to up or down and a detector that using in this machine. This system consists of an Infra-Red (IR) sensor, level sensor and a PIC module, and other mechanical equipment. By utilizing this machine, hopefully it can overcome the current problem encountered in the fast-food restaurant and other industry. Based on the project analysis, this machine will operate effectively by build a program that will control all the activity in the machine and the precise of the sensor that used in this machine.

ABSTRAK

Projek ini bertujuan merekabentuk dan membina sebuah mesin menuang automatik yang sesuai untuk pelbagai jenis bekas. Masalah mesin menuang pada hari ini ialah ia perlu di kendalikan secara manual mengikut bekas yang di perlukan. Disebabkan pengunaannya yang amat luas di restoran makanan segera terkemuka dan juga mesin air layan diri, keadaan ini menyebabkan pengguna perlu mengambil masa dan mengawal sendiri mesin tersebut bagi memastikan tiada sebarang pembaziran berlaku. Maka satu sistem khas untuk mesin ini perlu diperkenalkan dalam projek ini dimana pengguna mesin ini hanya perlu menekan satu butang dan mesin akan mengisi mengikut kuantiti bekas atau gelas. Mesin akan beroperasi dengan mengerakkan bekas pada tahap ketinggian tertentu dan menuang cecair atau air pada kuantiti yang tepat mengikut saiz pada bekas. Projek ini akan menggunakan PIC untuk mengawal motor yang digunakan untuk mengerakan bekas ke atas atau bawah dan mengawal kuantiti cecair mengunakan pengesan. Pengesan InfraRed digunakan untuk mengesan ketinggian bekas dan akan memberi isyarat kepada motor untuk berhenti. Selain itu, dengan meggunakan PIC satu program khas dibuat untuk mengawal kelajuan motor, pengesan dan beberapa parameter untuk memastikan mesin berada dalam keadaan stabil. Dengan adanya projek ini,diharap dapat menyelesaikan satu masalah dalam bidang perniagaan makanan dan industri pada hari ini. Melalui analisis-analisis yang dilakukan, mesin ini dapat berfungsi dengan baik dengan membina kawalan yang tepat menggunakan program PIC dan juga jenis sensor yang digunakan dalam mesin ini.

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NOMENCLATURES

CISC	- Complex Instruction Set Computer
CPU	- Central Processing Unit
EEPROM	- Electrically Erasable Programmable Read-Only Memory
I/O	- Input/Output
IC	- Integrated Circuit
IR	- Infrared
PC	- Personal Computer
PIC	- Peripheral Interface Controller
PLC	- Programmable Logic Controller
RAM	- Random Access Memory
ROM	- Read-Only Memory

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CHAPTER I

INTRODUCTION

1.1 INTRODUCTION

This project is to design and develop an Automatic Pouring Machine that suitable for various kind of container. The machine will be operated by lifting the container in certain height and pour the liquid or water at the same level in any size of container.

1.2 BACKGROUND OF PROJECT

Nowadays, there are many types of pouring machine that have been using in the restaurant or self-service machine. This machine actually was control manually by a user where else it needs the user to control the liquid or water that fill in their container. For a past few years, this machine was installing at school, fast-food restaurant and other placed that give many benefit to the people nowadays.

However, the system of the machine needed to be improved by using an automatically system. Therefore, the Automatic Pouring Machine is designed and develops. The machine can be operate automatically and need less observation.

This project is divided into two major parts; hardware and software. Hardware parts including the electronic circuit while the software part including the program which is writing using the PIC. This report will divided into seven chapters which is introduction, literature review, project methodology, application of program development tools, hardware development, and discussion and conclusion.

The microcontroller code is provided on the site. This project implemented the PIC microcontroller and combination of handful electronic components in developing the system.

1.3 OBJECTIVES

The project is aimed to meet the following objectives:

a) To design and implement automated pouring machine

The project is to design and develop an automatic pouring machine that suitable for various kind of container. The machine will be operating automatically by just push the start button and user will not be able to monitor when the field is full enough because the machine will stop it automatically.

b) To study and learn the type and characteristic of DC motor system and sensor.

By doing this project, the dc motor and sensor will be explore and analyze. As we know there are many type of electrical dc motor and each of it having a different system. The study will be done in this project such as the movement forward and reverse system. In this project also, the sensor will be study and analyze because in this project the infrared sensor and level sensor will be used.

c) To learn about the PIC16F84A.

This project were using PIC program as a main controller because of the accurate and good performance compare main controller. This program will be study and analyze to make us similar to the program.

1.4 PROBLEM STATEMENT

Nowadays, there a lot of pouring machine install at restaurant, school and a self-service machine or vending machine. However this kind of machine let user to control the amount needed or sometime they need system that pour a standard amount of liquid to fill in the standard container. All this kind of machine is widely used in fast-food restaurant; therefore it will create time and energy consumption to the restaurant.

This problem can be solving by design an automatic pouring machine that suitable for various kind of container and can be controlled automatically. The important pf this project because it will improve the pouring machine system by creates a system that suitable for various kind of container.

Other than that, this project will provide a system that can be elaborate from low productivity to high productivity in machine industries. The crucial part about this project is it will reduce energy consumption and can save time when it installs at restaurant or Water Dispenser Machine.

1.5 SCOPE OF WORK

The scope of project for implementation this project is:

a) Design; develop an automated pouring machine in term of hardware and software development.

   The designing stage of this project is to develop an automatic pouring machine that suitable in various kind of container. The machine will be operate by lifting the container in certain height and pour the liquid at the same level with any size of the container. In this project, electrical dc motor and the sensor used to implement the project.

b) The hardware development and implementation using mechanical structure, dc motor electrical system, PIC and sensing device.

   The hardware will consists a two sensors; Infrared sensor and Level sensor, mechanical will consists a valve, pump and tank. Meanwhile, to lift up and down the container the study of dc motor was needed and consists about a forward and reverse motor. Other than that, the PIC will be a main controller for the system. The study of PIC is consists how to create a program, doing simulation and burning to the IC.

1.6 METHODOLOGY

The methodology of this project is;

- Analysis the project scope and background
- Do the literature review, project objectives, problem statement, and methodology
- Design and drawing the model
- Prepare the hardware and software
- Troubleshooting and analysis

There are several phases or methods to be used to achieve the objectives of the proposed project. The first method is literature review of the project. It is important to gain more information of the idea and concept of this project. The information that related to the project is found from journals, articles, books, internet, lecture's note, etc. The information is all about the automation system, control system, PIC, dc motor, sensor, valve etc.

Then, the second method is design and drawing for the whole system. It is contained of mechanical drawing and electrical drawing that are determined in design process. The third stage is to construct the hardware for the project which is including electrical and mechanical parts. Finally, the last method is software development and implementation which is used a Programmable Interface Controller (PIC) program.

CHAPTER II

LITERATURE REVIEW

2.1 INTRODUCTION

Nowadays, most of pouring machine was used manual handling and it can't fill the liquid automatically in the various kind of container. The user needs to control the amount of the container needed by control the machine manually. This situation is because a problem at time and energy to the workers when the machine was install at cafeteria or restaurant. Sometime, when user want fill water or liquid into the container the quantity of water or liquid stated over.