Faculty of Computer Science and Information Technology

Automatic System for Calculating the Static Weight-Volume of Boxes for Postal Service

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Bachelor of Computer Science with Honours

Network Computing

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Automatic System for Calculating the Static Weight-Volume of Boxes for Postal Service

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This project is submitted in partial fulfilment of the requirements for the degree of Bachelor of Computer Science with Honours

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Abstract

This project aims to describe the proposed of system of Automatic System for Calculating Weight-Volume of the Boxes for Postal Office. Development of the proposed system is to solve the problem that occurs at the postal office. The situation is where employees of the postal office need to entertain a lot of customers with variety of services. Due to this situation, postal office lack of man power to entertain their customer and company also need to hired a lot of employees because of that postal office company might face decreasing of their income. Furthermore, employees of postal office need to work overtime which is they open their services during weekend. So by automatic system of calculating weight-volume of the boxes it will help automate of one their services which is will make things easier not just for company and employees also benefits to their customer. Customer also doesn't need to wait for a long time to be entertained they can just register from home and scan their packages at the postal office. With this system, it will help cover for the company, employees and user.

Abstract

Project ini bertujuan untuk menerangkan mengenai sistem berasaskan automatik sistem untuk mengira berat isipadu kotak di pejabat pos. Pembangunan sistem ini adalah untuk menyelesaikan masalah yang berlaku di pejabat pos. Situasinya ialah dimana pekerja di pejabat pos perlu melayan ramai pelanggan dengan pelbagai servis yang disediakan di pejabat pos. Disebabkan oleh situasi ini, pejabat pos kurang pekerja yang diperlukan untuk melayan pelanggan mereka dan menyebabkan syarikat perlu mengupah lebih ramai pekerja untuk menangani situasi ini disebabkan itu syarikat mengalami kekurangan hasil pendapatan. Selain daripada itu, perkerja juga terpaksa bekerja lebih masa iaitu pada hujung minggu. Jadi dengan mengunakan automatic sistem untuk mengira berat isipadu kotak ia dapat membantu meringankan salah satu servis yang disediakan di pejabat pos and memudahkan kerja mereka pada masa yang sama memberi manfaat kepada pelanggan. Pelanggan juga tidak perlu menunggu lebih lama untuk dilayan, mereka boleh mendaftar akaun di rumah mereka dan terus membawa barang mereka untuk di imbas dan terus memasukkan maklumat yang diperlukan dan terus membuat bayaran. Dengan menggunakan sistem ini, ia dapat membantu syarikat, perkerja and pengguna.

Chapter 1: INTRODUCTION

4.3 Project Title

Automatic System for Calculating the Static Weight-Volume of Boxes for Postal Service

4.4 Introduction

Giving the best services to customer is the greatest thing that commonly been set when serving customer at the postal office. Delay in giving the services will negatively affect the postal office reputation. The profit obtain postal office can be affected and crash its popularity since there are a lot of new other delivery services provided.

Increasing the number of employees at the counter may be help in preventing delay but technically can affect the profit that gain by the organization such as a postal service. The monthly cost for the employee fee and resources to ensure good service can be high. Another challenge is, in maintaining the productivity of the employee, employer must spend more to send their employee for training before they were able to work as permanent worker in the postal office.

This problem becomes a motivation to develop a machine that can reduce the workforce, workload and time consuming that often face by any postal office. Due to this problem, this project will be determining the type of sensors, and algorithm required to collect the necessary data and to calculate the weight-volume measurement, to develop the front end system to collect data from the boxes into the system which enable tracking and to evaluate the effectiveness of the system by testing on different box dimensions and volume. This is our main object to overcome this problem.

4.5 Problem Statement

This project chooses Post Laju as a sample place. Like most of the postal office in Malaysia, Post Laju have more services provided and it well known. One of their services is which they provide customer to bring their own package in box and employees will need to calculate the volume and weight of the box manually.

Once customer come into the postal office, they can take their number first to wait their turn. Every counter serves different services such as for delivery, pay bills, license renewal, calculate volume and weight of box etc. Sometimes, certain counter was lack of employees and the other counters need to back up and serves the customers. It takes time to customer to wait their turn to be called and they must wait. Once their number were called, they can go to counter to finish their business.

This postal office delivery did come with new addition of counter so it can be reducing the time waiting for customer, but sadly, the customer still needs to queue long time before being entertained. Furthermore, the calculation of the box needs to manually measure and calculate the weight-volume of a box which not efficient and time consuming.

Another problem occurs which apply to any local postal delivery service. For example, when they lack of entertained their customer it will make certain customer can’t wait and leave besides of waiting. This will cause company income decrease due to not enough of manpower to serve customers. Besides that, this will increase inconvenient operating hours for working adult where they will also open the office during weekends so then they can cover to entertain their customer more.

Since this problem often occurs in our society, in this project an automate post office machine technology will be applying to give better serving to the customers. Ultrasonic sensor will be the main sensor in this project which it can be program to calculate the volume-weight of the box and the info will be automatically show the volumetric weight including price so then customer can just proceed make a payment.

4.6 Project Scope

This system is to develop based on Arduino platform. Hardware devices known as Ultrasonic sensor has been used to calculate the volume-weight of the box. Codes of calculation will be upload to Arduino Uno that been attach with the both sensors which act as the microprocessor of the system. The software will be written and run using Arduino IDE platform and all the information will be updated to the front desk for database purpose. Those sensors will be responsible for scanning for any regular box and will input their volumetric weight into the screen.

This system will be targeting any postal office delivery that using same concept where they manually calculate the volume-weight of their customer box. As long it has the same method as mentioned above, the system can be implemented since the calculation will be done by output the price and user can proceed to make a payment. User also can register and login from their home so they can input their information and the receiver information. Once they done that part they just can print and bring their packages to post office.

As a proof of concept, the dimension of the box will be limited to specific range and can only cater for regular shape boxes.

4.7 Objectives

The main objective of the project is to design and develop an automatic system for calculating the static volume-weight for boxes for a postal service.

- To determine the type of sensors, and algorithm required to collect the necessary data and to calculate the weight-volume measurement.
- To develop the front-end system to collect the data from the boxes into the system which enable tracking.
- To evaluate the effectiveness of the system by testing on different box dimensions and volume.

4.8 Methodology

The essential approach that will be use all through the undertaking is System Development Life Cycle (SDLC). This philosophy be picked on the grounds that it is the way toward creating information system with appropriate analysis, implementation and maintenance.

I. Planning

During this phase, a gathering with supervisor is done to recognize the issue of the venture that have been proposed. Getting a short thought regarding the issue that occur and distinguish the best answer for the venture.

II. System Analysis and Requirements

Make an examination of the arrangement by alluding to the target of the venture and the flowchart on how the task will work in future. All the necessity in finishing the venture are rundown down so it can meet the desires in future.

III. System Design

Start in structuring the undertaking by prepared with the source code and all the data on what kind of sensors, and calculation required to gather the essential information and to figure the weight-volume estimation.

IV. Development

Advancement stage is the beginning of converted into both equipment and programming. The underlying state of this machine and system can be seen during this stage.

V. Integration and Testing

This is where the item is being coordinated with the system. The testing will be tried with the supervisor to guarantee the machine is satisfying the target that have been set in the prior stage.

VI. Deployment

Arrangement stage is the real procedure of making the real machine and system. The full code will apply in this stage until the item are completely work and actualized.

VII. Operations and Maintenance

This stage where the framework will be checked for proceeds with execution. Any alteration of the system will be actualized here when the system doesn't meet the system target and necessity.

VIII. Evaluation

The last stage where the undertaking will be available to both examiner and supervisor to be assessed.

4.9 Significance of Project

- Can calculate volume-weight of the package
- Output the information on the screen about the billing
- Users can input their information for the delivery

4.10 Project Schedule

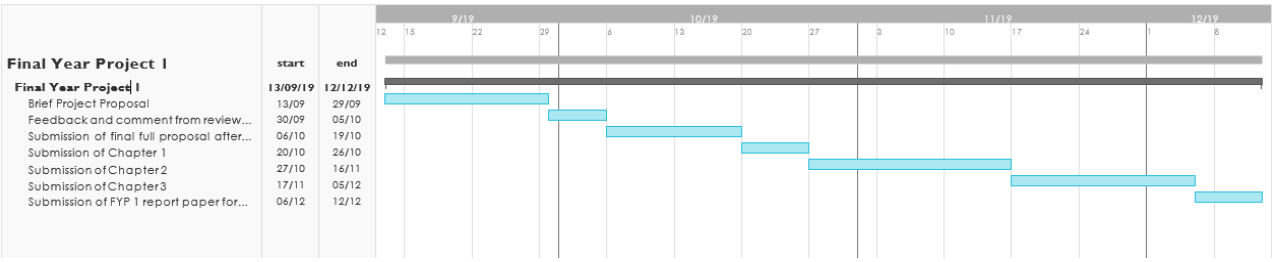

Figure 1.1 Shows the Gantt Chart which has the timeline of each task that needed to be completed before proceeding to the next task.

4.11 Expected Outcome

In the end of this project, the machine can calculate the volume-weight of the box and it will input the volumetric weight of the box and the price where users can have made a payment. User also can register and online from home so they can put their information and receiver information so they just can proceed to bring their packages at the postal office.

Chapter 2: Literature Review

5.3 Introduction

This chapter will clarify everything relevant to this proposed system in the context analysis. In order to ensure the reliability of this venture, a history analysis of the current technology that already exist in our market or in industry itself will be compared to a summary of how far the technology has progressed in this innovation century.

Any related article, journal, conference or website will also be used in this chapter to receive feedback of the current technology. The outcome from that source will help change, upgrade and improve the objective process to the current problem the previous system faces.

5.4 Review of Existing Tracking System

Automate System for Calculating the Static Weight-Volume of boxes for Postal Services is system that can calculate weight-volume of boxes of customer package that need to be deliver. Every product has their own dimension on how it calculated weight-volume of the boxes. There few products that already exist will be descripted.

2.2.1 Static Series Dimension and Weight Measurement (Cubizon-R)

Figure 2.1 Cubizon-R

With hundreds of successful installation in the Asia Pacific region, Cubizon-R is the most widely accepted Static DWS system. The portable model can be used as an independent workstation and can be use its unique slider kit to handle both boxes and irregular shipments.

Figure 2.2 Imaging Camera of Cubizon-R

Figure below show that Cubizon using imaging camera to collect data of the item. This is one of the Cubizon feature which containing high resolution of the camera so can collect correct data of the item.