# UNIVERSITI TEKNIKAL MALAYSIA MELAKA

## Development of Shoe Dryer Using Microcontroller with GSM Module

This report is submitted in accordance with the requirement of the Universiti Teknikal Malaysia Melaka (UTeM) for the Bachelor of Electronic Engineering Technology (Telecommunication) with Honours.

by

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2017

# UNIVERSITI TEKNIKAL MALAYSIA MELAKA

## BORANG PENGESAHAN STATUS LAPORAN PROJEK SARJANA MUDA

TAJUK: **Development of Shoe Dryer Using Microcontroller with GSM Module**

SESI PENGAJIAN: 2017/18 Semester 7

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# APPROVAL

This report is submitted to the Faculty of Engineering Technology of UTeM as a partial fulfillment of the requirements for the degree of Bachelor of Electronic Engineering Technology (Telecommunication) with Honours. The member of the supervisory is as follow:

……

(NURLIYANA BINTI ABD MUTALIB)

# *ABSTRAK*

Motivasi di sebalik projek ini adalah untuk menjelaskan tugas pada semester 7, semester terakhir sebelum latihan industri. sesi 2017/18 adalah pembangunan pengering kasut dengan mikropengawal menggunakan modul gsm. Usaha ini telah dipilih ke arah inovasi semasa terhadap item yang boleh dikawal oleh telefon bimbit gsm. rangka kerja ini dibuat dari pengaturcaraan dan bahan peralatan. tugas ini boleh digunakan untuk membantu individu mengeringkan kasut dalam jangka masa yang singkat. Matlamat dalam usaha ini adalah untuk membuat strategi mudah untuk mengeringkan kasut dalam jangka masa yang ringkas dan dapat digunakan sebagai sebahagian daripada banyak keadaan. Usaha ini termasuk cara untuk menggariskan pengering kasut terus dengan memikirkan tentang kegunaan, bentuk, syarat pemasangan, komponen pemanasan, dan kos pemasangan bagi individu untuk menggunakannya. Bahan pelan ini menggunakan kotak kayu lapis dan plastic untuk meletakkan litar. Dengan matlamat strategi yang menyertai itu boleh menjadi sempurna dalam mengumpul pengering kasut terus ini. Usaha ini juga mengharapkan pemeriksaan untuk memastikan komponen pemanasan pengeringan kasut untuk menjamin keselamatan pengguna.

# ABSTRACT

The motivation behind this project is to clarify the task amid semester 7, last semester before industrial training. The task 2017/18 session was development of shoe dryer with microcontroller utilizing GSM module. This venture was chosen towards current innovation incline toward an item that can be controlled by GSM hand phone. This framework was made from programming language and equipment materials. This task is about can be utilized to helps individuals drying shoes in a brief timeframe. The goals in this venture are to make a simple strategy to dry a shoe in a brief timeframe and it can be utilized as a part of numerous circumstances. This undertaking includes the way toward outlining the straightforward shoe dryer by thinking about the usefulness, shape, condition fitting, warming component, and the assembling cost for individuals to utilize it. The material of this plan is utilizing plywood and plastics box for putting the circuit. With the goal that the strategy joining that can be perfect in collected this straightforward shoe dryer. This venture additionally expected examination to ensure the warming component for drying of the shoe to guarantee the security for the users.

# DEDICATION

There are a number of people without whom this thesis might not have been written, and to whom I am greatly indebted. I owe my gratitude to all those people who have made this project possible and because of whom my graduate experience has been one that I will cherish forever. I dedicate my dissertation work to my friends, well-wishers and family. A special feeling of gratitude to my loving batch mates friends, whom have been my constant source of inspiration. They have given me the drive and discipline to tackle any task with enthusiasm and determination. Without their love and support this project would not have been made possible. My senior have never left my side and are very special. My deepest gratitude is to my advisor, Pn Nurliyana binti Abd Mutalib. I have been amazingly fortunate to have an advisor who gave me the freedom to explore on my own and at the same time the guidance to recover when my steps faltered. She taught me how to question thoughts and express ideas. Her patience and support helped me overcome many crisis situations and finish this project. I hope that one day I would become as good an advisor to my students as she has been to me. Many friends have helped me through these difficult years. Their support and care helped me overcome setbacks and stay focused on my graduate study. I greatly value their friendship and I deeply appreciate their belief in me. Besides, I am also thankful to lecturers for numerous discussions on related topics that helped me improve my knowledge in the research area better. All of them have been my best cheerleaders.

# ACKNOWLEDGEMENT

I take this opportunity to express my profound gratitude and deep regards to my supervisor Pn Nurliyana binti Abd Mutalib for his exemplary guidance, monitoring and constant encouragement throughout the course of this thesis. The blessing, help and guidance given by her time to time shall carry me a long way in the journey of life on which I am about to embark. I also take this opportunity to express a deep sense of gratitude to my academic advisor, Mr. Zulhasnizam his cordial support, valuable information and guidance, which helped me in completing this task through various stages. I am obliged to staff members of the Library in Universiti Teknikal Malaysia Melaka (UTeM), for the valuable information provided by them in their respective fields. I am grateful for their cooperation during the period of my assignment. Their excitement and willingness to provide feedback made the completion of this research an enjoyable experience. Lastly, I thank almighty, my parents, brother, sisters and friends for their constant encouragement without which this assignment would not be possible.

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# LIST OF ABBREVIATIONS, SYMBOLS AND NOMENCLATURE

| | | |
|---|---|---|
| GSM | - | Global System for Mobile Communications |
| W | - | Watts |
| LED | - | Light Emitting Diode |
| SW | - | Switch |
| CAP | - | Capacitor |
| REG | - | Regulator |
| LCD | - | Liquid Crystal Display |
| DC | - | Direct Current |
| AC | - | Alternating Current |
| VDC | - | Voltage Direct Current |
| IC | - | Integrated Circuit |
| PCB | - | Printed Circuit Board |
| UV | - | Ultra Violet |
| cm | - | Centimetre |
| m | - | Metre |
| Kg | - | Kilogram |
| LM35 | - | Linear Monolithic |
| SMS | - | Short Message Service |
| 3D | - | 3 Dimension |
| RM | - | Malaysian Ringgit |
| k | - | Kilo |
| u | - | Micro |
| n | - | Nano |
| M | - | Mega |
| F | - | Farad |
| °C | - | Degree Celsius |

# CHAPTER 1
# INTRODUCTION

## 1.0 Introduction

The project involves development of shoe dryer with microcontroller (PIC16F877A) using GSM module. This project can be use by people that need to dry their shoe in very short time anywhere. This shoe dryer is very simple but develop by attaching GSM module. It is because once the shoe dryer is activate via GSM module according to situation needed just place it inside the shoe space and wait till it dry in very short time. The shoe dryer will be silent, efficient and safe method to dry shoes overnight. This mobile shoe dryer uses thermal convection drying from light bulb that which means would warm the air naturally rises and the shoe dry within 3 to 4 hours safely. The shoe dryer also being controlled by microcontroller whereby it control the activity and understand the relationship between shoe condition and the shoe dryer to act. The light bulb is select from their high power watts to give heat and dry the shoes. Furthermore the shoe dryer is not large but it can only store one pair of shoes at a time. This projects involves the process of designing by considering the functionality, shape, environment friendly, heating element and the manufacturing cost for people to use it. This project also required analysis to make sure the heating element for drying of the product to ensure the safety for the user indeed of commercialize.

## 1.1 Problem Statement

Most of the travellers, backpackers, students and workers facing a problem where their shoe get wet while travelling or wash and doesn‟t have enough time to dry the shoe well for next day activity. So with this development, users able to use clean and fast. For this development, shoe dryer that exist is not safe because the risk to get short circuit is high and expensive. For future development it requires only one pair shoe and it is shaped as box and would be attractive.

## 1.2 Objectives

Basically this project is based on these objectives

1. To study characteristics current shoe dryer
2. To design a programmable logic control microcontroller (PIC 16F877A)
3. To design and develop a prototype mobile shoe dryer

## 1.3 Scope

These project is all about developing a shoe dryer with GSM module. This is because this tools in market currently are not attractive, not safety and its not moving equipment. This project had to made by bulb and a exhaust fan. Bulbs need to be used because its gives heat more, compared to the other material. Moreover it is easy to be installed. This project would be activate via GSM module with several extra features as needed.

# CHAPTER 2
# LITERATURE REVIEW

## 2.0 Introduction

Those days, people were tend to having problems to dry the shoes in a short of time. So, using a mobile shoe dryer, maybe it may use short time period to dry those wet shoes. It mean, with this equipment shoes can be dry in a shorter time and safely as well. The function of this equipment create is to store and dry the shoes in easy place to persons during in many situations. It is because this shoe dryer can be place anywhere that receive power supply in order to operate it. From above statement can be conclude that the simple shoe dryer equipment is a major role as an items transferring mechanism for people without having a problem of doing that easier. Moreover, the shoe dryer are also thermal action, circulates warm air throughout shoes removing odor and wetness without damaging the shoes. The Shoe Dryer is ideal for all types of shoes including leather, canvas, vinyl, rubber and plastic. This Shoe Dryer available in electric models for home or outdoor use to remove wetness, perspiration and odor. safely. Besides that, it also improves foot comfort, safety and healthy.

## 2.1 Basic Principles

The heating process of the shoe dryer is subjected fall into a few categories :

1. One exhaust fan on equipment
2. Flow of air around the shoe dryer
3. From four bulb-light (each 5W)

a) The dry element :

- Use four units of bulb-light that large than usual Watts (power) to give the high of heat on the shoe during dry process.
- The exhaust fan is also supply on the equipment. The function of the exhaust fan is an extra element of drying to the shoe. It will supply the heat in the equipment.

b) The time of shoes to dry :

- On market product, the shoe dryer is use the high of air pressure as an element of the dry. The product is looking simple but follows the function. So, on the simple shoe dryer that want to create, it maybe take a short of time compares as usual. For this equipment, it takes around 3 to 4 hours to dry the shoe in time.

c) How many shoes that can state on the equipment in one time:

- Only one pair because it suitable on the objective based.

d) Functions of this Shoe Dryer :

- Remove wetness, circulates warm air and odour.
- Maintain foot comfort and safe.
- Protects Shoes.
- Dry and store shoes with GSM.

e) Advantages :

- Able to place anywhere with power supply.
- Model looks simple.
- The cost of the development is not expensive and suitable for every community.
- Use more than one dry element to the equipment.
- Takes short time period to dry the shoe.
- Activates and receives notification by GSM via hand phone.

f) Disadvantages:

- Use a high power supply.
- Only one pair of shoe space allowed to dry in one time.

The light bulb is a method that is used to dry shoes. It is ideal compared to the heating element because the bulbs do not require high electrical currents. The advantages of this project is to be controlled automatically by temperature sensors. The results of this study microcontroller circuit suitable in use for this project. PIC 16F877A suitable for easy use in the find and have to walk analog input signal.

## 2.2 List of Components

| NO | COMPONENTS | UNIT |
|---|---|---|
| 1 | IC BASE 40PIN | x1 |
| 2 | LED 3mm | x2 |
| 3 | RESISTOR 1K | x1 |
| 4 | RESISTOR 470R | x1 |
| 5 | RESISTOR 10K | x1 |
| 6 | RESISTOR 4.7K | x2 |
| 7 | RESISTOR 10R | x1 |
| 8 | IN4007 | x1 |
| 9 | CAP 100n | x2 |
| 10 | CAP100uF | x1 |
| 11 | PRESET 5K | x1 |
| 12 | RESONATOR 4M | x1 |
| 13 | SW ON /OFF 6 PIN | x1 |
| 14 | REG 7805 | x1 |
| 14 | LCD CONECTOR | x1 |
| 16 | BOX HELDER 10PIN | x1 |
| 17 | DC CONECTOR | x1 |
| 18 | RESET SW | x1 |
| 19 | PIN HALDER 3PIN | x5 |
| 20 | PIN HALDER 7PIN | x1 |
| 21 | PIN CONECTOR 4PIN | x1 |
| 22 | PIN HALDER 2 LINE 10PIN | x2 |
| 23 | PIN 2 WAY BATERY | x1 |
| 24 | JUMPER PIN | x1 |
| 25 | PCB | x1 |
| 26 | Resistor 100k | x1 |
| 27 | Pre-set 5k | x1 |
| 28 | Sensor LM35 | x1 |

| | | |
|---|---|---|
| 29 | IC LM741 | x1 |
| 30 | Pin Header | x1 |
| 31 | PCB 3.5cm x 3.5cm | x1 |

**Table 2.1** List of components use for PIC 16F 877A and LM35

## 2.3 Current existed Shoe Dryer in Market

### 2.3.1 Portable Shoe Dryers at Hammacher Schlemmer

This is the shoe dryer favored when travel since they can be put away in your footwear, and when connected to an outlet at your goal they delicately, securely, quietly, and altogether dry your footwear overnight. Dryer fits inside a shoe to well ordered remove moistness, taking out odor create without damaging the footwear. A 20-watt warm convection warming procedure quietly flows air into the dryer, and all through the shoe. It is in like manner easy to-transport while the dryers are ideal for pursuing treks, shoreline escape, ski or climbing ventures, or away marathons. The dryers made by PEET, designer of the first electric shoe dryer in 1968. This gear can be utilized for men footwear which is scrutinized 7 and for ladies‟ examined 5 and. This shoe dryer is expensive whereby it cost RM150 and the time take to dry the shoes is approximate 3 to 5 hours

**Figure 2.1:** Portable shoe dryers at Hammacher Schlemmer

### 2.3.2 Shoe and Glove Dryer

A fan flows air through the shoes and gloves. In the unit here, the dryer able to warm the shoe. This boot dryer will similarly dry one arrangements of shoes or boots notwithstanding several gloves. For this specific model of shoe dryer, some idea should be put into supporting the unit. Other, more costly models have their own stands, where this unit cost more than RM200 in market and the approximate time taken for a shoe dry is within 2 to 4 hours

**Figure 2.2**: Shoe and glove dryer