

ELECTRICAL AUTOMATION SYSTEMS TOWARDS INTELLIGENT AND ENERGY EFFICIENCY APPLICATIONS

Musse Mohamud Ahmed



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APPLICATIONS

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CHAPTER 22

DEVELOPMENT OF A METHOD TO MAINTAIN TEMPERATURE AND HUMIDITY IN AN OPEN COMPOUND RESTAURANT

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22.1 Introduction

This chapter deals with the development of a method to control temperature and humidity in a restaurant is discussed in this script. The system involves mechanical part as well as the control mechanism. When the temperature and humidity of the open compound restaurant is detected more or less than the range provided, it will send a signal to the controller. The information sends to the outputs which are fan, motor, and booster pump. Therefore, when the humidity decreases, the mist water turns on. While the temperature increases, the speed of motor also increases. Microcontroller is used as a decision maker replacing the conventional system.

22.2 The Developed System

Air cooling is a method of dissipating heat by cooling the object and have a larger surface area or have an increased flow of air over its surface [1, 2]. Due to the second law of thermodynamics, which states that heat will only move spontaneously from a hot reservoir (the heat sink) to cold reservoir (the air), the air has to be cooler than the object or surface from which it will be expected to remove heat [3].

This study emphasizes on automatically maintain the humidity and the temperature using fan and the nozzles in an open compound restaurant. A fan is used to maintain the temperature and the water mist is used to maintain the humidity. Speeds that are available in the fan are modified so that it will change according to the temperature at that time. The water flow from the mist is also be adjusted so that it will react according to the range by changing the pressure from the pump.

The main objectives of this study are to design and develop a method to automatically maintain humidity and temperature using a fan and a water nozzle/jet and control the fan speed and water nozzle speed within the desired range of humidity and temperature in open compound of a restaurant. Microcontroller is used as a controller and pulse width modulation (PWM) is used to control the speed.

The misting fan systems use the process of evaporative cooling, which is known as Thermal Dynamics. The hotter it is the quicker evaporation will occur. The quicker the evaporation the more heat is used in the energy exchange process and the better our misting