Faculty of Electrical and Electronic Engineering Technology

UNIVERSITI TEKNIKAL MALAYSIA MELAKA

AUTOMATIC COFFEE TEMPERATURE WITH VOICE RECOGNITION AND SMARTPHONE APP CONTROLLER WITH SMART ENERGY MEASUREMENT SYSTEM

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AUTOMATIC COFFEE TEMPERATURE WITH VOICE RECOGNITION AND SMARTPHONE APP CONTROLLER WITH SMART ENERGY MEASUREMENT SYSTEM

PREMRAJ A/L NAGARAJAN

A project report submitted
in partial fulfillment of the requirements for the degree of
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I declare that this project report entitled “Automatic Coffee Temperature With Voice Recognition And Smartphone App Controller With Smart Energy Measurement System” is the result of my own research except as cited in the references. The project report has not been accepted for any degree and is not concurrently submitted in candidature of any other degree.

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DEDICATION

This dissertation is dedicated to my beloved parents whose unyielding love, support, and encouragement have enriched my soul and inspired me to pursue and complete this project.

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ABSTRACT

This world is moving towards the (IoT) which means objects or physical things with internet connection. The (IoT) refers to a system of interrelated or internet-connected objects which has embedded with software, sensors, and other technologies that can make the object function without human intervention by collecting and transferring the data over a wireless network. As the (IoT) has been started to apply to all devices include coffee machines as well. This research has designed a coffee temperature controller machine using IoT function which allowed the consumer to measure the energy using for the coffee machine and absorbs the heat from being waste. Nevertheless, this product also designed using voice recognition and android application which is used to set and detect the coffee machine temperature. The main idea of this project is to design a coffee machine that can measure and monitor the electrical energy used by the machine while can control the temperature by using voice recognition and an android application. This project design by using Arduino UNO as a microcontroller, Peltier as a heating element, NodeMCU ESP8266 Wi-Fi module and a smartphone application named Blynk and Voice Recognition is used with a serial data communication between the ESP8266-01 Wi-Fi module. The outcome of this project is a coffee temperature controller machine that developed using IoT function, and have voice recognition and android application which will be used to adjust the temperature according to the consumer preference and at the same time measure the electrical energy produce by the coffee machine.

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ABSTRAK

Dunia ini bergerak menuju (IoT) yang bermaksud objek atau benda fizikal dengan sambungan internet. (IoT) merujuk pada sistem objek yang saling berkaitan atau terhubung dengan internet yang telah disertakan dengan perisian, sensor, dan teknologi lain yang dapat membuat objek berfungsi tanpa campur tangan manusia dengan mengumpulkan dan memindahkan data melalui rangkaian tanpa wayar. Oleh kerana (IoT) telah mulai berlaku untuk semua perangkat termasuk mesin kopi juga. Penyelidikan ini telah merancang mesin pengawal suhu kopi menggunakan fungsi IoT yang membolehkan pengguna mengukur tenaga yang digunakan untuk mesin kopi dan menyerap haba daripada menjadi sampah. Walaupun begitu, produk ini juga direka menggunakan pengecaman suara dan aplikasi android yang digunakan untuk mengatur dan mengesan suhu mesin kopi. Idea utama projek ini adalah merancang mesin kopi yang dapat mengukur dan memantau tenaga elektrik yang digunakan oleh mesin sambil dapat mengawal suhu dengan menggunakan pengecaman suara dan aplikasi android. Reka bentuk projek ini dengan menggunakan Arduino UNO sebagai mikrokontroler, Peltier sebagai elemen pemanasan, modul Wi-Fi NodeMCU ESP8266 dan aplikasi telefon pintar bernama Blynk dan Voice Recognition digunakan dengan komunikasi data bersiri antara modul Wi-Fi ESP8266-01. Hasil projek ini adalah mesin pengawal suhu kopi yang dikembangkan menggunakan fungsi IoT, dan mempunyai pengecaman suara dan aplikasi android yang akan digunakan untuk menyesuaikan suhu mengikut pilihan pengguna dan pada masa yang sama mengukur hasil tenaga elektrik oleh mesin kopi.

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LIST OF SYMBOLS

℃	-	Celcius
V	-	Voltage
W	-	Watt

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LIST OF ABBREVIATIONS

Wi-Fi	-	Wireless fidelity
API	-	Application programming interfaces
LCD	-	Liquid Crystal Display
IDE	-	Integrated Development Environment

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CHAPTER 1

INTRODUCTION

1.1 Background

Within the early decade, coffee got to be a colossal trade inside the European and Asian markets and started the concept of cafes and customer coffee machines. The coffee machines were changing into very thought item that everyone required to have, in any case making a container of coffee got to be an extended and mussy strategy. The presentation of the essential espresso system by Bezzera and Pavoni in 1906 pointed to restore the ones troubles through technology an ideal glass of espresso as cleanly and speedy as achievable.

With the later “Internet of Things” drift, a parcel of and a part of domestic gadgets are associated to the web. As example like smart light bulbs, thermostat, entryway locks basically to call a few. These great machines can switch clients so that they can view their location and settings remotely on their smartphones with just a few clicks. In addition, the input of intelligent individual voice partners like Amazon Alexa has definitely revolutionized the customers who trade with these smart devices. These days, clients control prepared to administration these gadgets by basically talking. Apart from that, there's two elements of electrical sources that had been consume by majority individuals around the globe. It is classes into two class that are the standard power supply and renewable energy supply. The conventional power supply that primarily the most provide comes from power distribution grid line a generation from coal or hydropower plant because the renewable energy resource, the current comes from the harvesting of solar power, wind energy, hydropower and biomass. These two power sources are a large dependency for human as an electricity consumption.

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The aim to develop a coffee machine which can automactically can detect the selective temperature of the user. The peltier using as a heating element to heat up the coffee machine. As follows, the consumption of electrical energy can measure and monitor by the user using NodeMcu ESP8266 via Blynk and Voice Recongnition application.

1.2 Problem Statement

In this modern world the usage of conventional energy and renewable energy sources are very common in our daily life. These two energies mostly play role in contribution electricity generation either residential or building units. There is excessive waste of electricity especially generated by some electrical appliances. Coffee machine is one of the electrical appliances which consuming more electricity. Apart from that the coffee machines having a weakness to detect the temperature and display to the user. The electrical energy used by the coffee machines unable to monitor by the user. The lack of temperature detection of the coffee machine can lead to several causes such as the taste of the coffee. The important criteria of the coffee are the taste and hot. Since coffee should be heated with the suitable temperature which can maintain the taste of it.

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Furthermore, by using features of the Internet of Things (IoT), the coffee will be heated up with selective temperature by user. NodeMCU Esp8266 is use as a microcontroller acting as the heart in this system which is control all the input or output devices. There is a sensor which able to detect the temperature of the coffee. Besides that, relay is used to cut off automatically when the suitable temperature detected by the temperature sensor from the Blynkk and Voice Recognition application. LCD will display all the energy used by the coffee machine and the temperature of the coffee. Buzzer is functionally acted as alert signal. This is alternative way to remind the user if the suitable temperature has been detected.

1.3 Objective

1.) Construct and develop a coffee temperature controller machine based on IoT things.

2.) To order and detect the amount of temperature of coffee using voice recognition and android applications.

3.) To test and develop a device that measure electrical energy and heat loss from the device.

1.4 Project scope

The purpose of this project is to adapt existing coffee machines innovative into Internet of Things (IoT) devices. The main idea is to have a voice recognition system to be able to interface with an essential coffee machine by speaking. Additionally, this machine its help to detect the temperature of the coffee and make more reliable to user to select the temperature accordingly. A mobile apps also will be made to get signals relating to the coffee machine as well permitting the end-user to select the suitable temperature for the coffee. Peltier is using as heating elements for this machine. To develop more innovative this coffee machine can able to measure and monitor the electrical energy that used up to heat. This project also develops to measure the excess heat release by the coffee machine. Other than that, this project consists of Arduino microcontroller, Peltier as a heating element, Wi-Fi module ESP8266 for transmission data from the phone application which Blynk and Voice Recognition. The electrical energy data measurement will be display in the phone application of the user.

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