UNIVERSITI TEKNIKAL MALAYSIA MELAKA

DEVELOPMENT OF SMART TEMPERATURE MONITORING SYSTEM USING UBIDOTS

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

by

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FACULTY OF ENGINEERING TECHNOLOGY

2017

UNIVERSITI TEKNIKAL MALAYSIA MELAKA

BORANG PENGESAHAN STATUS LAPORAN PROJEK SARJANA MUDA

TAJUK: **DEVELOPMENT OF SMART TEMPERATURE MONITORING SYSTEM USING UBIDOTS**

SESI PENGAJIAN: **2016/2017 Semester 1**

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I declare that this thesis entitled "Development of Smart Temperature and Humidity Monitoring System Using Ubidots" is the result of my own research except as cited in the references. The thesis has not been accepted for my degree and is not concurrently submitted in candidature of any other degree.

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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 Electronics Engineering Technology (Telecommunications) with Honours. The member of the supervisory is as follow:

……
(Mr Mohd Khanapiah Bin Nor)

ABSTRAK

Suhu adalah parameter yang sangat biasa untuk mengukur di banyak tempat seperti ladang, rumah hijau, perubatan, industri rumah dan pejabat. Kami meliputi Kelembapan dan Pengukuran Suhu menggunakan NodeMcu Versi 1 (Arduino) dan memaparkan data pada UBIDOTS. Dalam projek IoT ini akan Memantau Suhu melalui internet menggunakan Ubidots di mana kami akan memaparkan data Suhu semasa melalui Internet menggunakan platform Ubidots. Ia dicapai oleh komunikasi data antara Arduino (NodeMcu), (modul wifi) dan sensor suhu DS18B20 OneWire. Skala termometer celcius dan meter kelembapan skala peratusan memaparkan suhu ambien melalui pelayan Ubidots untuk pemantauan langsung dari mana-mana sahaja di dunia. Ubidots menyediakan alat yang sangat baik untuk projek berasaskan IoT untuk Arduino. Dengan menggunakan pelayan web Ubidots, kami boleh memantau data kami melalui Internet dari mana-mana sahaja, dan kami juga boleh mengawal sistem kami melalui Internet, menggunakan Saluran dan halaman web yang disediakan oleh Ubidots. Ubidots server 'Mengumpul' data dari sensor, 'Analisis dan Visualisasikan' data dan 'Kisah' dengan mencetuskan reaksi.

ABSTRACT

Temperature are very common parameters for measuring at many places like farm, green house, medical, industries home and offices. We covered Humidity and Temperature Measurement using NodeMcu Version 1 (Arduino) and displayed the data on UBIDOTS. In this IoT project is going to Monitor Temperature over the internet using Ubidots where we will show the current Temperature data over the Internet using the Ubidots platform. It is accomplished by the data communications between Arduino (NodeMcu),(wifi module) and DS18B20 OneWire temperature sensor. Celsius scale thermometer and percentage scale humidity meter displays the ambient temperature through a Ubidots server for live monitoring from anywhere in the world. Ubidots provides very good tool for IoT based projects for Arduino. By using Ubidots web server, we can monitor our data over the Internet from anywhere, and we can also control our system over the Internet, using the Channels and webpages provided by Ubidots. Ubidots server 'Collects' the data from the sensors, 'Analyze and Visualize' the data and 'Acts' by triggering a reaction.

DEDICATION

Extraordinary because of my father and mother, Samsuri Bin Mansor and Raiyah Binti Arshad and the greater part of my companion for their help and support through my journey in UTeM. Special thanks too to my supervisor, Mr. Mohd Khanapiah Bin Nor for all the direction and advices.

ACKNOWLEDGEMENT

In the name of Allah, the Most Helpful and Most Kind, I have taken endeavours in this project. However, it would not have been conceivable without the kind help and help of numerous people and associations. Thanks to Allah, the All-powerful God, that has given me the strength and soul for me to finish this project. I wish to express my sincere thanks to my Project Supervisor, Mr. Mohd Khanapiah Bin Nor. I am extremely thankful and obligated to her for sharing skill, and sincere and significant direction and support extended to me. I take this opportunity to express gratitude to my parents for the unceasing encouragement, support and consideration. I additionally might want to express my deep gratitude one and all, who straightforwardly or in a roundabout way, have loaned their turn in this wander.

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LIST OF ABBREVIATIONS, SYMBOLS AND NOMENCLATURE

EPA	-	Environmental Protection Agency
CDC	-	Centers for Disease Control
HVAC	-	Heating, Ventilating and Air-conditioning
GSM	-	Global System for Mobile Communications
SMS	-	Short Message Service
PPM	-	Part Per Million
LCD	-	Liquid Crystal Display
VOC	-	Volatile Organic Compound

LIST OF ABBREVIATIONS, SYMBOLS AND NOMENCLATURE

PAH	-	Polyaromatic Hydrocarbon
CO2	-	Carbon Dioxide
WHO	-	World Health Organization
CH2CI	-	Methylene Chloride
ASHRAE	-	The American Society of Heating Refrigeration and Air Conditioning Engineers
OSHA	-	Occupational Safety & Health Administration
DC	-	Direct Current
AC	-	Alternating Current
AVR	-	Advanced Virtual Risc
ARM	-	Advanced RISC Machine
PWM	-	Pulse Width Modulation
ICSP	-	In-Circuit Serial Programming
USB	-	Universal Serial Bus
IDE	-	Integrated Development Environment
SIM	-	Subscriber Identity Module
MS	-	Mobile Station
BSS	-	Base Station Subsystem

LIST OF ABBREVIATIONS, SYMBOLS AND NOMENCLATURE

MSC	-	Mobile Service Center
IMEI	-	International Mobile Equipment Identity
IMSI	-	International Mobile Subscriber Identity
BTS	-	Base Transceiver Station
SS	-	Signalling System
BTS	-	Base Transceiver station
VLR	-	Visitors Location Register
HLR	-	Home Location Register
AuC	-	Authentication Center
ADC	-	Analog Digital Converter
PIC	-	Peripheral Interface Controller
GND	-	Ground

CHAPTER 1

INTRODUCTION

1.0 Background

Nowadays, the ventilating is comprehensively used especially in Malaysia. When in doubt, the customary circulating air through and cooling is consistently cooling the room dependent upon the settled temperature setting and is not normally adjusted for the comfort of the customers. In the central ventilating control field, unfathomable continuous, high constancy, and incredible understanding are proposed by various researchers. The standard proportional–integral–derivative estimation is, frankly, so far expecting a rule some portion of the control system. The circulating air through and cooling structure has transformed into a field to be analyzed to improve the customer comfort by applying watchful system.

While the updated circulating air through and cooling structure is being arranged, the possibility of the kind of control system must be consolidated into a showing plot. In particular, the controller must have the ability to sidestep the inefficiency of having the ventilating work always. A couple control decisions were considered at proximity distinguishing circuit, which would execute the circulating air through and cool when people are not in the existence with the ventilating and a temperature sensor input, which would change the cooling operation depending upon room temperature [1].

This wander demonstrates a circulating air through and cooling temperature control by using the present temperature in the room. The complexity of temperature sensors will impact to compressor speed to achieve the desired point. Exactly when the indoor temperatures are nearly nothing or zero, and the indoor temperature outperforms a predefined restrict does the controller run the ventilation framework [9].

1.1 Problem Statement

The issue happens when the circulating air through and cooling is up until now working in spite of the way that on account of cold atmosphere. The limit is uncontrolled and must be physically turned on and off. Now and again, it can incite high utilization of energy which in this manner raises the power charge when the customer fails to turn it off. The system in like manner does not be able to change the room temperature paying little personality to the encompassing temperature. To address the issue, change of splendid temperature and sogginess checking structure that can control the temperature therefore is proposed. The upsides of such a structure are less imperativeness utilize and give more beneficial to the clients.

1.2 Objectives

The objectives of this project are:

1. To design a monitoring system using "UBIDOTS" and "Arduino" programming.
2. To develop the connection between Arduino, temperature sensor and "UBIDOTS" (web server).
3. To analyze the performance of the monitoring system.

1.3 Scope of The Project

Below are the scopes of the project:

1. The monitoring and evaluating used is "UBIDOTS" (Web Server)
2. Arduino allows installation of third-party platform packages using Boards Manager.
3. Inside room temperature is used in the monitoring design.
4. The analysis controller performance in terms of monitoring temperature control based on the changing of temperature and humidity of air conditioning system.

1.4 Thesis Structure

The report begins with the wander establishment which joins a prolog to circulating air through and cooling structure. The section communicates the objective of the wander. The degree of the diagram, which involves four points that related to the arrangement of the watching, is in like manner communicated.

Section 2 shows the composition reviews, highlighting related research on this wander taken from books and the journals. This part begins with the examination of the fundamental of the circulating air through and cooling structure and the limit of compressor that impacts the temperature room. The sorts of structure watching are furthermore discussed in this area and the once-over from the framework watching that others practice are abbreviated.

Section 3 looks at the strategy of this wander. It exhibits the stream layout that demonstrates the whole research handle. The system to layout the model for the plant, arrange the web server "UBIDOTS" work and the Arduino IDE chief board are discussed in this segment.

The last segment layouts and shuts this wander with proposals for future works.

CHAPTER 2

LITERATURE REVIEW

2.1 Principle of Air Conditioning System

Cooling includes more than bringing down the air temperature. It incorporates dehumidifying, cleaning (separating), and circling the air [2]. Great aerating and cooling frameworks play out these capacities, albeit the vast majority concentrate on the cool idea. In the broadest feeling of the term, aerating and cooling additionally implies warming, humidification, and ventilation [3]. The aerating and cooling framework has numerous dynamical factors and a regular nonlinear time variable multivariate framework with unsettling influences and instabilities. It extremely hard to locate the scientific model to portray the procedure over the wide working extent [5].

The objective with aerating and cooling is to catch warm in the house and toss it outside. The distinction between the aerating and cooling and cooling framework are the ventilating framework for an application for the cooling framework as a control framework for the development of air, dampness and temperature changes in a clean specific space and the cooling framework. The essential vapor pressure intended to chill off nature through presentation to a bubbling fluid. The System is required to create the temperature of a space.

The schematic of the cooling framework is represented in Figure 2.1, which demonstrates that the aerating and cooling is a mind boggling framework. In view of the schematic of framework ventilating, the fundamental material that impacts the cooling framework is Freon gas. Within a curl a substance, for example, Freon 12 or Freon 22 which is brand names for a refrigerant are utilized. This refrigerant is a dismal gas at an environmental temperature and weight [3]. The curls inside control the Freon

to make it a fluid or a gas. The Freon keeps running in a circle, going through the indoor loop, through a copper pipe to the outside, through the open air curl, and back inside through another pipe to the indoor curl. The primary segments are evaporator loop, blower fan, compressor and consolidating curl. In this venture are just concentrate in light of the application compressor in aerating and cooling framework that impacts the temperature room. The compressor is the primary segment of the cooling framework.

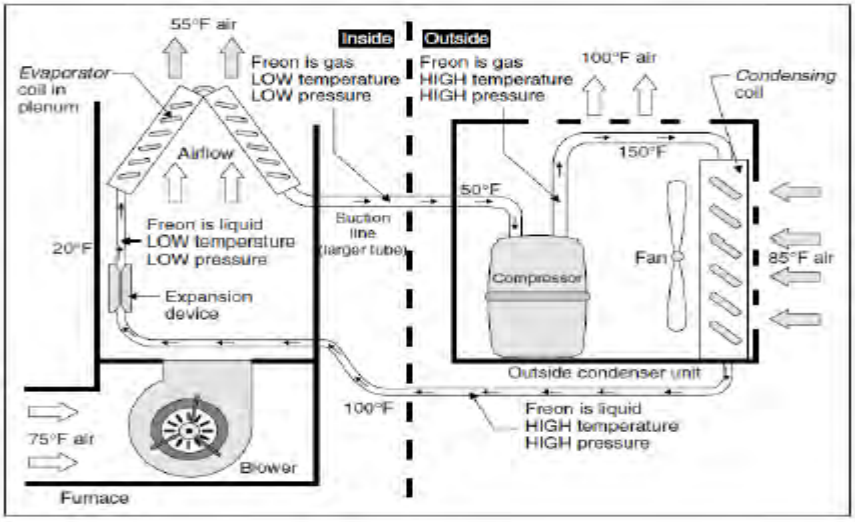

Figure 2.1: Schematic of Air Conditioning System [3].

Cooling framework handles the exchanged warmth. Two loops are introduced at inside and outside the house. The exchange head happens from within and the outside house through the funneling. The warm air from inside house is through the indoor loop and the warm air release outside the house through the open air curl. The capacity of fans is blowing air over the evaporator and condenser loop when the aerating and cooling framework is running. The evaporator curl and condenser loop in an aeration and cooling system are warmth exchangers. The capacity of refrigerant that gathers warm from the house, moves it outside and discharges it into the open air. The compressor is crushing a cool low-weight gas into hot high-weight gas. The extension gadget at close to the evaporator loop is changing over a hot high-weight fluid to cool low-weight fluid. The Freon gas believers to Freon fluid after conclusive process cooled air for encompassing the room [3].

2.2 Function of compressor that Effects the Temperature

The capacity of compressors is like pumps both increment the weight on a liquid and both can transport the liquid through a pipe. As gasses are compressible, the compressor additionally lessens the volume of a gas. Fluids are moderately incompressible while some can be compacted, the fundamental activity of a pump is to pressurize and transport fluids. The compressor will breathe in refrigerant from the evaporator curl and afterward pack it into the condenser loop. The compressor is typically determined by electric engines that require high electrical energy to drive the compressor. The compressor is normally controlled by an indoor regulator that measures the room air temperature. In the event that the room temperature was very chilly, the indoor regulator will kill the compressor. Altering the engine speed can control the refrigerant mass stream rate. The refrigerant mass stream rate, thus, is the primary consider representing heat trade the condenser and evaporator, which trade decides temperature. In outline, then, changes of compressor engine speed can control the temperature of a cooled room [10].

The essential of the vapor pressure are configuration to chill off the earth through the bubbling fluid. This framework is required to deliver the temperature that requirements for surrounding space. Figure 2.2 outlines the stream of the cooling framework in which the compressor is the principle segment. The operation of the compressor when is turned on, it will enthusiasm to breathe in refrigerant from the evaporator curl and packed it to the condenser loop. The temperature of evaporator loop will end up plainly icy and condenser curl will get hot. The fan at evaporator loop attracts air outside to cool and the frosty air will happen. The fan at condenser oil attracts air outside to decrease the refrigerant temperature in the loop. The high-weight refrigerant that originates from the outside condenser curl will change to the low-weight refrigerant. At the point when the temperature room was very cool, the indoor regulator will kill the compressor. At the point when the room temperature transcends of the coveted level of icy, the indoor regulator will turn on the compressor. The reasonable control calculation, the compressor can work at the power level that required keeping up the coveted surrounding temperature [11].

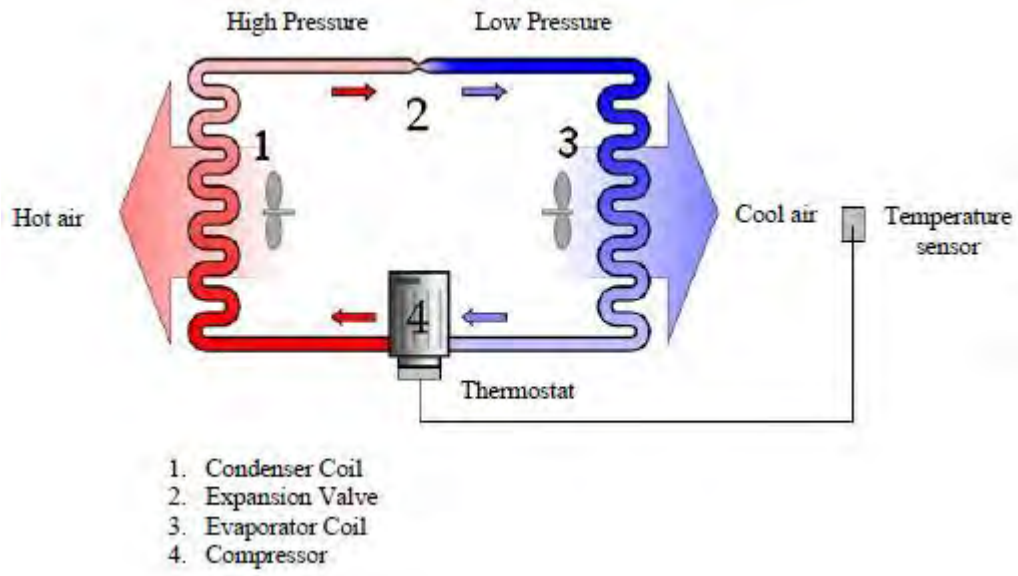

Figure 2.2: The process of cooling system.

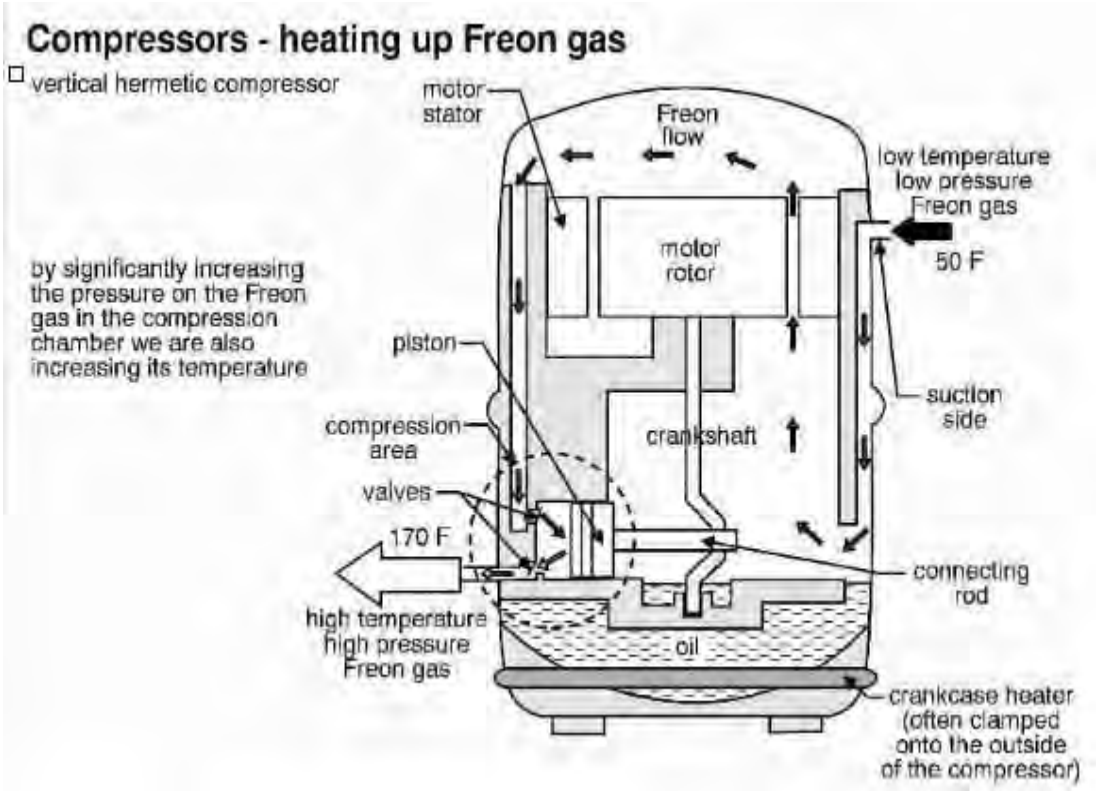

Figure 2.3: The flow of the Freon in compressor [3].

Figure 2.3 demonstrates the stream of the Freon gas and the changing of temperature and weight in the compressor. At the point when the compressor is compacting, the weight and temperature are high. At early section compressor, the