DESIGN OF ENERGY SAVING AIR –CONDITIONING CONTROL SYSTEM

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This report is submitted in partial fulfillment of the requirement for award of
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Dedicated for my beloved family

To My Beloved Father and Mother

Mr Mohd Taufik bin Radzali

And

Mrs Norrasidah bt Ariffin

And To Someone Special

Nurhidayu A.Rahman

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ABSTRACT

Design for energy saving air-conditioning control system means we can control the air-conditioning system by using software to reduce electricity cost. The air-conditioning system use a lot of electricity compares to other appliances and this was proved by research. We all know user sometimes did not turn off the air-conditioning either they forgot or not before leaving the room. My developed air-conditioning control software makes things easier. User can turn on or turn off the air-conditioning system by clicking one button and they also can set the time for the air-conditioning to automatically off. User can reduce their electricity bill by reduce the air-conditioning usage. This software can control up to six air-conditioning. User can control the air-conditioning by using their laptop or personal computer (PC). This software is very user friendly. The software been connected to the air-conditioning system by a circuit consist PIC 16F84 and RS232 communication module. The circuit connected to the PC using serial communication port (comm1).

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ABSTRAK

Mereka bentuk untuk sistem penjimatan tenaga dalam pengawalan sistem penghawa dingin bermaksud pengguna boleh mengawal system penghawa dingin dengan penggunakan perisian computer untuk mengurangkan penggunaan tenaga elektrik.. Sistem penghawa dingin menggunakan sejumlah besar tenaga elektrik berbanding peralatan elektrik yang lain. Fakta ini disokong oleh kajian dan artikel. Kita tahu bahawa kadangkala pengguna tidak menutup sistem penghawa dingin sama ada mereka lupa atau tidak sebelum meniggalkan bilik. Perisian komputer untuk sistem pengawalan penghawa dingin yang dimajukan ini boleh menyenagkan pengguna. Pengguna boleh membuka atau menutup sistem penghawa digin dengan menekan satu butang dalam perisian komputer ini dan mereka juga boleh menetapkan masa supaya sistem penghawa dingin tutup secara automatik. Pengguna boleh mengurangkan bil elektrik dengan mengurangkan penggunaan penghawa dingin. Pengguna boleh mengawal sehingga enam penghawa dingin dengan menggunakan komputer riba atau komputer sendirian. Perisian ini sangat mesra pengguna. Perisian ini disambungkan dengan sistem penghawa dingin menggunaka litar yang mengandugi PIC 16F84 dan modul perhubungan RS232. Litar ini disambugkan dengan komputer melalui slot sesiri (Comm1).

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ABBREVIATION

PC - Personal computer

GUI - Grafical User Interface

VB - Visual Basic

PIC - Progammable Integrated Circuit

DOS - Disk Operating Systems

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CHAPTER 1

INTRODUCTION

1.1 Introduction

Nowadays the electricity is one of the most important element in our life. What will happen if suddenly there is no more electricity to supply for our daily life? Majority of people will lose their job and will not know what to do. Without we realize it, people used electricity everyday but they do not realize that we must pay for the electricity. Most people do not know that sometimes them wasting the electricity and must pay extra money for their own ignorance. People do not realize that by do not turn off the electrical appliance for a minute it cost them extra money.

Energy consumption for room air-conditioning and lighting system accounts for about 60% of the total energy used in the building equipment area. Energy wasting occurrences in the campus are significant, especially in the air-conditioning and lighting system. Hence, there is a need for better control strategies associated with the air-conditioning and lighting system to reduce energy wasting and energy consumption.

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1.2 Problem Statement

Electricity is very important in nowadays life. Electricity must be used smartly and efficiently. Currently, UTeM has not applied energy efficiency in its buildings and the result is electricity been wastes, especially in the air-conditioning system.

User sometimes did not turn off the air-conditioning either they forgot or not before leaving the room. This project air-conditioning control the software makes things easier. User can turn on or turn off the air-conditioning system by clicking one button and they also can set the time for the air-conditioning to automatically off. User can reduce their electricity bill by reduce the air-conditioning usage. This software can control up to six air-conditioning. User can control the air-conditioning by using their laptop or personal computer (PC)

1.3 Project Objectives

The objectives of this project are to:

i. develop an air-conditioning control system to optimize energy saving;

ii. build a working prototype of an air-conditioning control system using GUI.

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1.4 Scope of Project

This project aims to develop a Graphical User Interface of an air-conditioning control system for energy saving application. Microcontroller will be the heart of the system and it will communicate with Graphical User Interface using RS 232 communication module. The main target of this project is to switch off the air conditioning system at pre-designated time using graphical user interface (if no people inside the area). The scopes of the project are:

i. Software development of microcontroller using MPASMWIN and Melabs Programmer Beta and GUI using Visual Basic (VB).
ii. Hardware design for the control air conditioning system circuit.
iii. Develop interfacing link between hardware circuit hardware and software programming for display purpose and PIC command

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CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

Approximately half of the energy consumption in a building is due to the air-conditioning in trying to achieve a comfortable and conducive work environment. Clearly, a major energy saving can be obtained if the air conditioning systems can be made more energy efficient through better control. This has been proven to be true as in the case of Malaysia's Security Commission Building, Sultan Zanariah Library U.T.M, Takeuchi MDF Sdn. Bhd. and Universiti Kebangsaan Malaysia. [7]

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2.1.1 Home air conditioning systems around the world

Resident in Japan, South Korea, Taiwan, Singapore and Hong Kong use a large amount unit of air conditioning especially for people that live in small high-rise flats in warm climates. In this area, with soaring summer temperatures and a high standard of living, air conditioning is considered a necessity and not a luxury. Air conditioners are usually window or split types, the latter being more modern and expensive. It is also increasing in popularity with the change of lifestyle in other tropical Asian nations such as India, Indonesia, Malaysia, and the Philippines.

In North America, home air conditioning is more prevalent in the South, Midwest, East Coast, the Great Lakes States and South-Eastern Canada, (Southern Ontario, and Southern Quebec), in most parts of which it has reached the ubiquity it enjoys in East Asia. Central air systems are most common in the United States, and are virtually standard in all new dwellings in most states. Older houses and buildings not retro-fitted with central air often still use window or through-wall units.

In most parts of Australia, central evaporative coolers were a popular choice, as Australia's dry climate makes this form of air conditioning very effective and economical. However, in recent times low cost reverse cycle units have led to an increase in their use, creating extreme load factor issues for the National Electricity Market (NEM) in wide heat wave conditions.

In Europe, home air conditioning is less common in part due to a more clement northern climate. Although in the southern European countries with a high standard of living, like Spain and Italy, air conditioning is becoming a necessity. Still, the lack of air conditioning in homes, in residential care homes, and in medical facilities was identified as a contributing factor to the estimated 35,000 deaths left in the wake of the 2003 heat wave. There were almost 15,000 deaths in France and 2,000 in the UK; in contrast, only

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141 died in Spain despite the higher temperatures, in part due to the extensive use of air conditioning. Due to the 2003 and the 2006 heat waves, portable air conditioners have become more popular in France. [6]

2.2 Visual Basic 6.0 (VB 6.0)

Microsoft released Visual Basic in 1987. It was the first visual development tool from Microsoft, and it was to compete with C, C++, Pascal and other well-known programming languages. From the start, Visual Basic wasn't a hit. It wasn't until release 2.0 in 1991 that people really discovered the potential of the language, and with release 3.0 it had become the fastest-growing programming language on the market. [1]

Programmers have undergone a major change in many years of programming various machines. For example what could be created in minutes with Visual Basic could take days in other languages such: as "C" or "Pascal". Visual Basic provides many interesting sets of tools in building exciting applications. Visual Basic provides these tools to make your life far easier because all the real hard code is already written for you.

Even though people tend to say Visual Basic's compiler is far behind the compilers of Pascal and C, it has earned itself the status of a professional programming language, and has almost freed BASIC of the reputation of a children's language. Overall you would class Visual Basic as a Graphics User Interface(GUI).This must always be remembered in any kind of creation of a Visual Basic program. All in all, VB is the preferred language of many future program mers. Visual Basic is the best way to start the programming windows. [2]

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Visual basic is an event driven programming language and associated development environment from Microsoft for its COM programming model. VB has been replaced by Visual Basic .NET. The older version of VB was derived heavily from BASIC and enables the rapid application development (RAD) of graphical user interface (GUI) applications.[2]

The three main things that we wish to accomplish through the use of Visual Basic are: [2]

1. Execute and perform the tasks correctly as per our objectives.
2. Create a user friendly GUI that allows any person with little technical knowledge to successfully use our application.

2.3 Graphical User Interface (GUI)

A GUI (usually pronounced GOO-ee) is a graphical (rather than purely textual) user interface to a computer. As you read this, you are looking at the GUI or graphical user interface of your particular Web browser. The term came into existence because the first interactive user interfaces to computers were not graphical; they were text-and-keyboard oriented and usually consisted of commands you had to remember and computer responses that were infamously brief. The command interface of the DOS operating system (which you can still get to from your Windows operating system) is an example of the typical user-computer interface before GUIs arrived. An intermediate step in user interfaces between the command line interface and the GUI was the non-graphical menu-based interface, which let you interact by using a mouse rather than by having to type in keyboard commands. [3]

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