TEMPERATURE ALERT ALARM SYSTEM

(TAAS)

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ABSTRACT

This paper presents the implementation of the Temperature Alert Alarm System which is used for environmental monitoring using heat sensors. The current situation in Malaysia, especially in Universiti Malaysia Pahang, Gambang Campus is that the weather is unpredictable and can be unstable. According to the Deputy Dean for Academic Affairs, Student Affairs and Alumni, Industry and Community, Faculty of Environmental Studies, Universiti Putra Malaysia (UPM) Associate Professor Dr Ahmad Makmom Abdullah said despite the lack of water occurs within a short period, it is still considered as the dry season. He also said that climate change in Malaysia was based on the annual pattern when the arrival of February, the changes of monsoon season will occur. According to Dr Makmom, warm weather experienced during this is due to lack of wind emission from Sumatra as well as volcanic eruptions are quite active in Indonesia. It is recorded in the Metro newspaper dated 2 February 2014. Therefore, this work would like to propose a monitoring mechanism that takes reading samples at constant rates throughout its operation. The aim is to design a system that evaluates samples only when it is triggered by an outside event, especially hot air and winds that have probability to result of fire forest occurs. The objective of this paper is to develop an embedded sensor of heat detector to alert residence the certain area about the hot dry weather. The embedded sensor that will be mechanism developed has variable sampling rates with interfaces to temperature sensor. The developed system would provide an applicable device that can be used in Universiti Malaysia Pahang as an organised weather and environmental forecasting system.

ABSTRAK

Projek ini membentangkan tentang pelaksanaan Penggera Pengesan Kebakaran yang digunakan untuk pemantauan alam sekitar menggunakan sensor haba. Menurut Timbalan Dekan Akademik, Hal Ehwal Pelajar dan Alumni, Industri dan Masyarakat, Fakulti Pengajian Alam Sekitar, Universiti Putra Malaysia (UPM) Profesor Madya Dr Ahmad Makmom Abdullah berkata walaupun kekurangan air berlaku dalam tempoh yang singkat, ia masih dianggap sebagai musim kemarau. Beliau juga berkata bahawa perubahan iklim di Malaysia merujuk kepada corak tahunan apabila kedatangan bulan Februari, perubahan musim monsun akan berlaku. Menurutnya lagi, cuaca panas yang dialami semasa ini terjadi kerana beberapa gunung berapi yang agak aktif di Indonesia. Hal ini direkodkan dalam akhbar Harian Metro yang bertarikh 2 Februari 2014. Oleh itu, projek ini mencadangkan satu mekanisma pemantauan yang mengambil sampel bacaan pada kadar yang berterusan sepanjang ia beroperasi. Tujuannya adalah untuk mereka bentuk sistem yang menilai sampel hanya apabila ia dicetuskan oleh faktor-faktor luar seperti udara dan angin yang panas yang mempunyai kebarangkalian berlakunya kebakaran hutan. Objektif kertas ini adalah untuk membangunkan sebuah prototaip sensor yang mengesan haba dan menghantar amaran kepada penduduk yang mendiami kawasan yang berdekatan dengan sensor tersebut. Sensor terbenam yang akan dibangunkan mempunyai mekanisma kadar pensampelan ubah dengan antara muka untuk sensor suhu. Sistem yang akan dibangunkan akan memberi manfaat yang boleh digunakan di Universiti Malaysia Pahang sebagai sistem ramalan cuaca yang teratur dan sistematik.

CHAPTER 1

INTRODUCTION

1.0 Introduction

This final year project is a part of the required subjects to be taken during the Bachelor of computer science course. This is done during the final semester before advancing into the industrial training program. Therefore, it is vital to complete this project in order to receive a final grade on the effort put in.

The final year project is also to give students the individual ability and confidence to complete a task with under less supervision of lecturers. With this, student can learn problem-solving skills in areas of designing analysis, fabrication and testing as well learn to do a complete formatted report which is important to future technical writing.

1.1 Project Background

This project presents the implementation of the prototype of embedded sensor for temperature.

Therefore, this project would like to propose a monitoring mechanism that takes reading samples at constant rates throughout its operation. The aim is to design the system that evaluates sample's temperature and can alarm people using personal computer and sms to phone.

The objective of this project is to develop a prototype that embedded sensor using arduino uno by modify the programs that run the sensor network. The embedded sensor that will be mechanism developed has variable sampling rates with interfaces to the temperature sensor. The developed system would provide an applicable that can be used anywhere.

1.2 Problem Statements

i. The people in some area do not realize about the fire that occurs around them.
ii. Slower action to alert emergency personnel from the area
iii. Some people are not aware that temperature rise in their home

1.3 Objectives

i. Design a product to detect developing of fire.
ii. Develop a prototype to alert emergency personnel
iii. Verify information about the fire condition to responders

1.4 Scope

i. The area that will test for this prototype is Universiti Malaysia Pahang.

1.5 Project Overview

This part of introduction provides the work frame of the system. This project consists of five chapters, including the introduction on chapter 1.

Chapter 2 holds discussion of the literature review or the past research on this project. Then the methodology will be discussed in chapter 3.

In the chapter 3, the sensor and processor chosen are then applying to develop and build the prototype.

Chapter 4 is about design, which is the physical and logical design for all needed on this project. It is about implementation that designed in the earlier chapter and then implemented into the real devices.

Chapter 5 is about the result and discussion of the project. The result obtains of the display is then discussed throughout this chapter.

Chapter 6 is about the conclusion. In this chapter can include future work and recommendations on how far this project can go further.

1.6 Summary

In this modern world, most of the systems, especially in our country, Malaysia had been developed by experts in their own specific areas for the better quality of life. Due to this factor, we can now predict and forecast the weather anywhere on the earth. So with the development of this project will ensure the quality of life will be fine. To achieve this objective, we come out with an idea to build and develop a prediction system on fire that can guarantee a better weather forecasting approach.

CHAPTER 2

LITERATURE REVIEW

2.0 Introduction

According to The writing Centre, the University of Wisconsin-Madison;"*A review may be a self-contained unit – an end in itself – or a preference to a rationale for engaging in primary research. A review is a required part of grant and research proposals and often a chapter in thesis and dissertations. Generally, the purpose of a review is to analyses critically a segment of a published body of knowledge through summary, classification, and comparison of prior research studies, reviews of literature, and theoretical articles."* From this statement, the literature review is like a way to gain the ideas on how the developed system is going to be.

The discussion in this chapter consists three sections: The first describe the current system using in market and organization nowadays. From the information gather by the existing systems, fond the constraint that occurs from the system. The second section will explain about the comparison between the systems. There will three parts to be discussed such as thesis access, user availability and level of the thesis.

The last section will briefly explain about development tools using while developing this system. The temperature alert alarm needed the proper development tools that cover on software use to design the interface. Secondly, a programming language that can be used to build on how the system should be works. Thirdly cover the hardware that connects with the system and any related other hardware.

2.1 Thesis Overview

The study in the project was conducted around Universiti Malaysia Pahang, especially at Faculty of Computer System and software Engineering (FSKKP). By default, the current situation where Malaysia experienced dry, hot phenomena that caused forest fires. This phenomenon also happens at UMP, especially places that have many grass and trees such as forest near Kolej Kediaman 2.

There is a benefit on build this project that in current time and for the future. The system can help a student, especially and all residents in UMP generally. With this system, all people that in UMP will more alert and can be more prepared if anything happened such as fire around UMP. The sensors will embed around UMP that has higher probability to become the scene of a fire.

2.2 Existing System Review

There are many existing systems that currently used on the market will be evaluated. Here three examples of the existing system to compare with the temperature alert alarm.

2.2.1 A Web Based Temperature Monitoring System [1]

The research was developed to produce a prototype product of a Web Based Temperature Monitoring System that allows the user to continuously monitor the temperature condition of the room. The system was created using Visual Basic 6.0 and application to display the temperature and saves the data into the database. An active Server Page (ASP) scripting language is used as server side scripting to publish the current temperature at the web browser.

The system will continuously monitor the temperature condition of the room and the data can be monitored at anytime and anywhere from the internet. The purpose model is where the temperature sensor is connected to the computer to monitor the temperature, and the data are captured and saved in MS Access Database and can displayed using web browser. Figure 2.1 show the Web Based Temperature Monitoring Model.

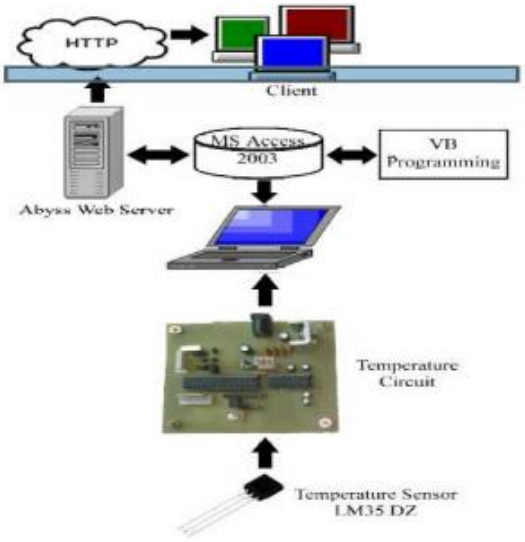

Figure 2.1 A Web Based Temperature Monitoring Model

The microcontroller will read the analog value from the sensor and convert it to the digital value that can be understood by the computer. Visual Basic 6.0 is the software that is used to build an application to capture and display the temperature and also store it into the MS Access database. Figure 2.2 will show the flow model of the Web based Temperature Monitoring Model

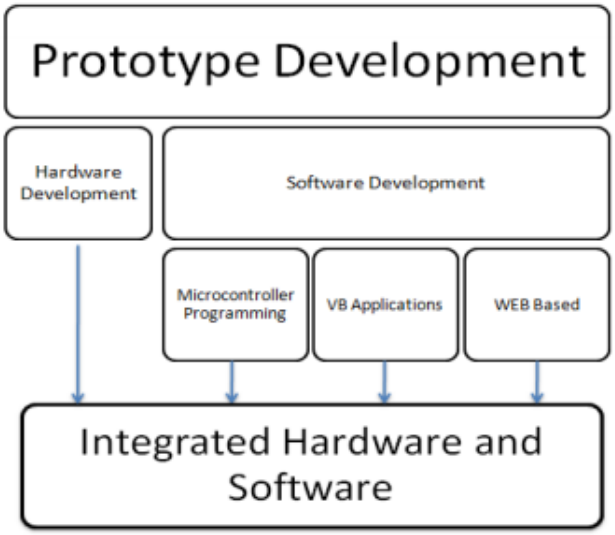

Figure 2.2 Flow model of the Web Based Temperature Monitoring Model

The hardware development for temperature, LM35 sensor will be sued to detect and sense the temperature and it is connected to the computer serial port. Figure 2.3 show Soldered Temperature Sensor Board.

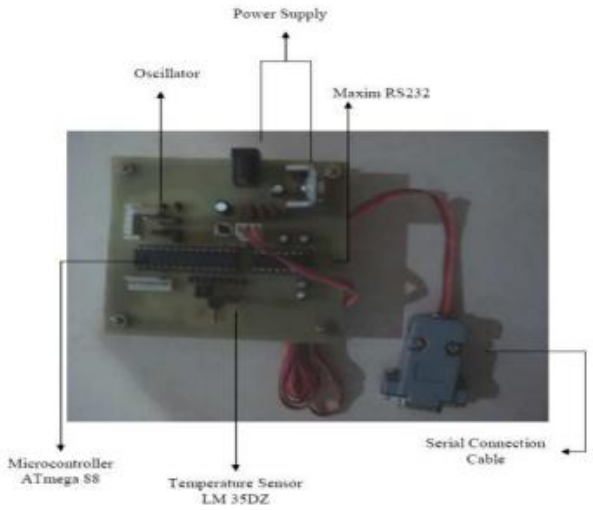

Figure 2.3 Soldered Temperature Sensor Board

Figure 2.4 show the result of Web Based monitoring System. The test cases are carried out individually and in tetsing phase, the most important function is selected to be test and make sure the product run according as planning.

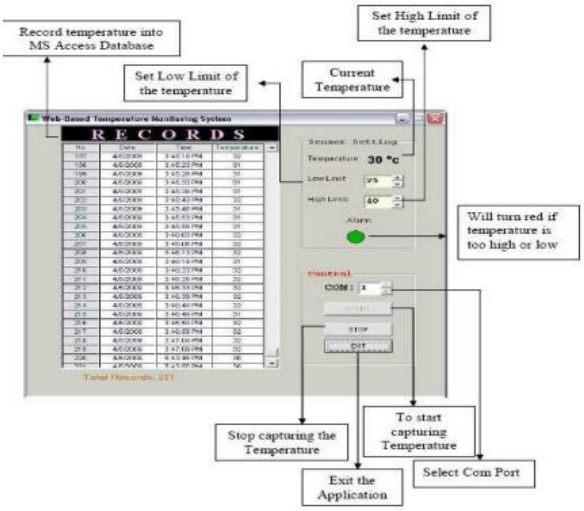

Figure 2.4 The result of A Web Based Temperature Monitoring System

2.2.2 Embedded Sensor Networks for Weather Monitoring In UMP Pekan [2]

This paper presents the implementation of the event- driven Embedded Sensor Network for weather monitoring, which is used for environmental monitoring using temperature and humidity sensors. The aim is to design a system that evaluates samples only when it is triggered by an outside event, which in rain, hot air, wind, and cold air. The objective is to develop an embedded sensor network by modifying the programs that run the sensor networks. The embedded sensor network will be mechanism developed had variable sampling rates would provide an applicable device that can be used in UMP as an organised weather and environmental forecasting system.

The scope of project

i. Determine the area covered by the network
ii. Determine the number of sensor nodes needed to be placed in the network
iii. Identify the type of sensor used

2.2.3 Wireless Smoke Alarm Detector [3]

The Wireless Smoke Alarm Detector was built by NorSuraya binti Radzuan from Universiti Teknologi Malaysia to give alert to a user upon any detection of smoke and to monitor using a computer upon location of any detection of smoke in a building. After finished this project, this wireless smoke

alarm detector was tested and analysed. The monitoring system was also being tested to get the input from a smoke detector was triggered.

In the transmitter part, it consists of XBee (TX) with shield, Arduino Duemilanove board, smoke detector and simple circuit in order to make a connection between smoke detector and Arduino board..

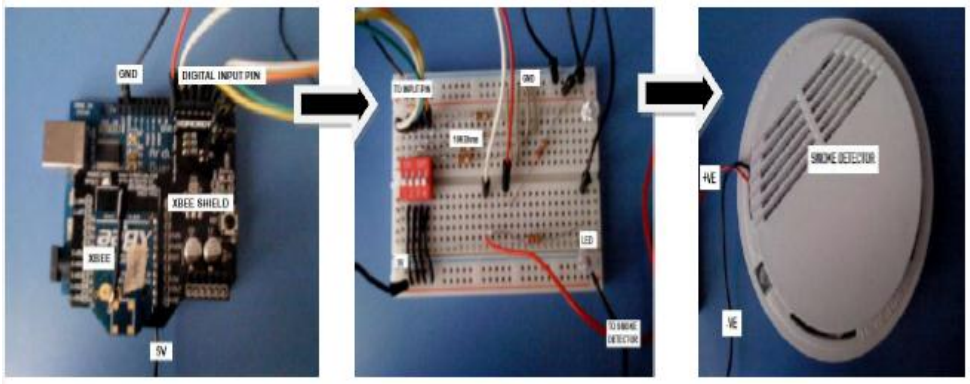

Figure 2.5 Transmitter part

For the receiver part, the connection was made using USB cable plug into the computer and Arduino board and make sure the jumper in XBee setting so it can receive data from the transmitter. By using Visual Basic to create an interface for the data, the result will clearly receive.

Figure 2.6 Interface to receive data

2.3 Propose System (Temperature Alert Alarm System)

For Temperature Alert Alarm System (TAAS), by using arduino uno as microprocessor, SIM900 GSM/GPRS Module and waterproof DS18B20 Digital Temperature Sensor, it will send alarm to alert a user about the high temperature (because of fire) around the residential area.

The prototype of TAAS mainly comprises two parts: The mobile station and the microcontroller unit. The mobile station is responsible for giving the command and control instruction to the devices and sensor and to get a response from it. The second unit, the microcontroller is responsible for controlling the devices, processing information gathered from the device.

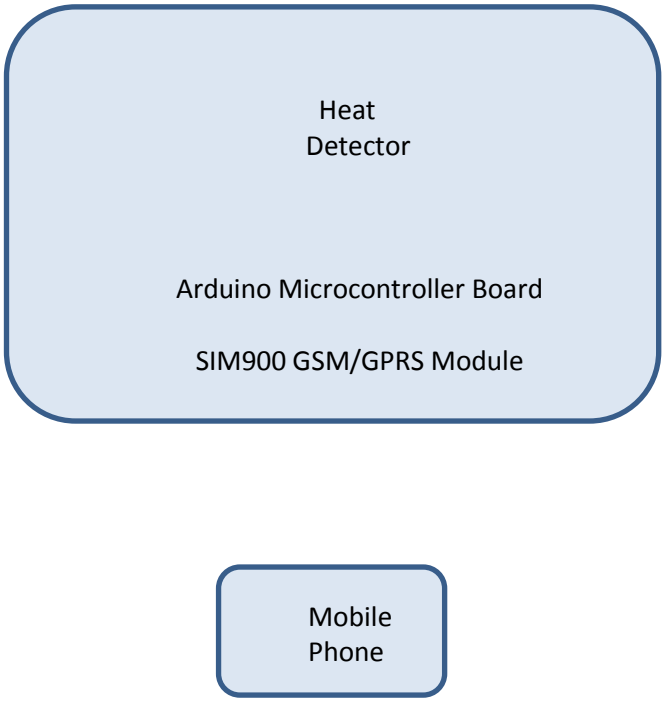

Diagram 2.1 Basic operation between microcontroller and mobile phone

The data from the DS18B20 sensor is processed by the microcontroller and an alert is sent to the mobile phone is the temperature is higher than 58°C. Heat detectors are intended to go into alarm when the temperature in an area reaches a predetermined level. Temperature rating start at around 135°F(58°C0 and go up from there[4]

Figure 2.7 Arduino Uno board

Figure 2.8 Z Waterproof DS18B20 Digital Temperature Sensor

2.4 Comparison between Existing System and Propose System

Table 2.1 Show comparison between existing system and The Temperature Alert Alarm System

	A Web Based Temperature Monitoring System	**Embedded Sensor Networks For Weather Monitoring In UMP Pekan**	**Wireless Smoke Alarm Detector**	**The Temperature Alert Alarm System (TAAS)**
Type of notification	Web based	Web based	Alarm sound	Short Message Service(SMS)
Range of notification	Anywhere with Internet	Anywhere with internet	Anywhere with wireless connection	Anywhere with telco signal
Credit charges	None	None	None	Yes
Type of sensor	LM35	Temperature and Humidity sensor	Smoke detector	DS18B20
Device needed	ATMega88	ZigBee	Arduino Duemilanove	Arduino Uno GSM board
Connection medium	Internet	Wireless	Wireless	Use Sim Card