

A SURVEY ON MICROCONTROLLER BASED MACHINE TO MACHINE INTERACTION WITH TEMPERATURE CONTROL SYSTEM

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ABSTRACT: Temperature monitoring is become a necessary part of our basic life. Any changes in the temperature, leads to several changes on things living on earth. Temperature control is needed in places like room, areas where sensitive industrial items are placed. Since manual calculation of temperature is difficult and requires more time, new automated systems for controlling temperature has been proposed using technologies and devices like PID controller, ZigBee sensor, microcontroller, WSN and Bluetooth technologies. This paper provides a survey on temperature control methodologies used till date and provides further enhancement to the old technologies.

KEYWORDS: PID Controller, ZigBee sensor, WSN, Bluetooth, micro controller

INTRODUCTION

The temperature control alert system is like programmed thermometer, that checks the temperature of certain environment. The advantage of temperature detection is any changes in temperature that causes damage of equipment can be found and malfunctioning of the instrument can be saved.

At Homes: Some places at home are set to certain temperature ie., it is neither too hot nor too cool. So that the person can lead a comfortable life.

At Industries: Many instruments are stored in places where the temperature is set to certain degrees, if there is a change in the, it may result in wastage of capital.

1. **Micro Controller:** A microcontroller has one or more processor or cores along with memory and peripherals for getting input and processing output. These micro controller are usually used for embedded application. Microcontroller are used in design products with automatic control units. It is capable of waiting for responses and acting accordingly.
2. **Machine to Machine communication:** It is defined as communication between devices, it can be wired or wireless. Frequently used in remote monitoring. The main aspects of machine to machine communication is warehousing technology, robotics, communication in microcontroller.

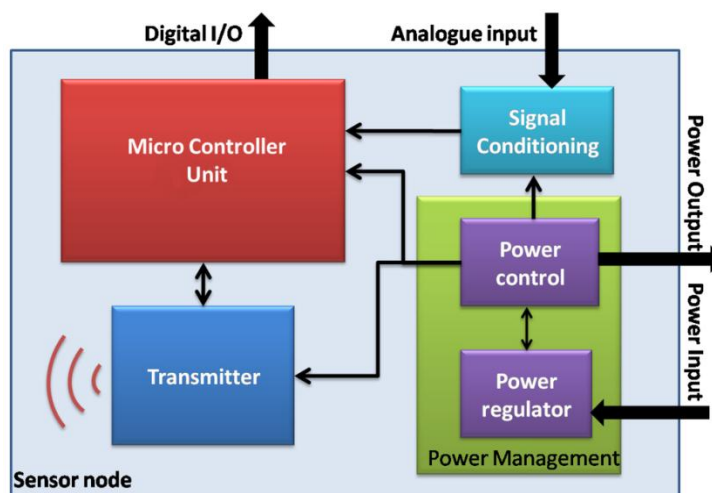


Fig 1: Working model of Temperature Controller

RELATED SURVEY

In paper [1], The performance of control system algorithm has been proposed. The controller helps to retain constant value for temperature. This temperature maintenance helps in the treatment of hyperthermia. The improvement of performance is done on hybrid controller (CMA). The maintenance of stable constant value for a long temperature is difficult.

In paper [2], A system for monitoring server room temperature . When the server room temperature gets heated up abnormally, incharge receives an alert message regarding the server room temperature to cool back the temperature to the suitable state of the server. For sending these alert messages to the administrator a modem called wave com global system for monitoring is used. There is a delay in transmission of the alert message to administrator and waiting for him to control the temperature.

In paper [3], A real time instrument was developed for room temperature control by interfacing the system with microcontroller. It is beneficial for physically challenged people. The Arduino microcontroller is used for cooling the temperature of particular by comparing it with environment climate. Further improvements are needed for its business value.

In paper[4], A system is developed for getting immediate responses in case of emergency. The wireless sensor network technology is used for rescue purposes. Further enhancements are required for the device to be used in real time emergency cases like fire accidents.

In paper[5], A sensor technology is used in monitoring the temperature of the air conditioner. The sensor monitors and get information and this information sent to the Ishell application.

In paper[6], The runtime and status of air conditioner is maintained through the internet. The Arduino UNO is the module used for switching the air cooler power-on and power-off using browser in mobiles. For large industrial usage, the capability is in need of improvement.

In paper[7], The home appliances are devised under a single control system. All the home appliances are interconnected and communicate using Bluetooth. It uses a single host as a smart phone and multiple applications that is appliances. Here Bluetooth technology is used communication which is limited in range.

Zhang Hai- feng et al[8], A system for complex mitigation temperature functionality system has been designed. This system improves the performance of the control system with capability and stability to change the temperature depending on the mitigation value using enhanced PID controller.

Chunhua Dua et al[9], Developed a thermoforming system. This system uses fuzzy logic for controlling the activities of PID controller. This system combines with MATLAB for stimulation.

In paper [10], Reduction of manual calculation of temperature and making temperature automatic. The temperature variation is noted in LCD screen for the user knowledge. The automatic temperature remains constant for long time and the constant value is used for further calculation. It uses matrix keypad for recording changeable temperature. High Precision sensor finds high temperature in system.

In paper[11], It deals with technologies of energy saving. Energy saving mechanism works on intensity of the light. It provide solution for temperature changes in the environment based upon heat.

Tarun Kumar Das et al [12], controls atmospheric moisture and heat. It uses two fuzzy logic controller. First fuzzy controller gets input from the temperature and set on moderate value, whereas other fuzzy logic controller calculates the humidity in terms of percentage. It was the optimization fuzzy logic system in automation.

In paper[13], brings optimized and effective performance based algorithm for automatic control system. It is used in medical industry .It also used in clinical treatment such as hyperthermia.

In paper[14], Industries uses PID controller. It monitors the temperature. Fuzzy logic is used in many industries to control the temperature accurately. Fuzzy logic produces accurate temperature control from inferred temperature. Fuzzy logic led to more calculation.

In paper [15], room temperature is controlled for different climate conditions. User control the electrical devices manually which will led to inaccurate changes. Manual changes may led to malfunction in their regulators and can cause short circuit. To overcome the manual changes, temperature control system becomes automatic using temperature sensor and microcontroller. Automatic temperature change reduces electricity charges.

SURVEY TABLE 1

Titles	Technologies used
Automatic Temperature Controller for Multi element Array	Hybrid controller
Room Microcontroller- based Temperature Monitoring System	Wave com GSM modem
Real Time Based Temperature Control Using Arduino	Arduino Microcontroller
ZigBee Based Sensor networks for temperature monitoring and controlling	WSN, PIC microcontroller
A ZigBee Based Smart Wireless Sensor Network for Monitoring an Agricultural environment	WSN, ZigBee
Low Cost Embedded System/Android Based Smart Home Automation System Using Wireless Networking	Bluetooth Technology
A Precision Temperature Controller Using Embedded System	High precision Sensor
Design of Temperature Control System Using Conventional PID and Intelligent Fuzzy Logic Controller	PID controller, Fuzzy logic
Design of A Room Temperature And Humidity Controller Using Fuzzy Logic	Fuzzy logic
Temperature Based Fan Speed and Automatic Light Control by Using Sensors	Electromagnetic Sensor

Automatic control of temperature is certified to be a best methodology because it doesn't require human interaction with the device. This can be further improved to provide better performance

CONCLUSION

Temperature control system being a necessary technology required in any climatic conditions, this paper deals with various technologies being used for controlling the atmospheric temperature. On researching previously existing technologies on automatic temperature control. The areas where the performance of these technologies need be improved for better market value has be survived in the paper. By improving these features that can be enhanced, these technologies can be used in real time.

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