Implementation of Automatic Controlling of AC through WI-FI

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Abstract—Air Conditioner is a machine which gives a cooling effect in high temperatures. But the AC usage in the home has no restriction. The controlling of device is done by manually, that is we using remote and off it on nearby the device. Nowadays the energy consumption has a greater need. And also the manual overhead is also there, this is because of the continuous on and off of AC. So to minimize the energy consumption, manual power etc, a new AC automatic control system was introduced. This is a system which works on a schedule base. Also we can control the AC using a laptop through Wi-Fi. Through the system we can give schedules and according to that the AC can be on and off. We can give daily or weekly schedules. And also a instant ON and OFF of AC. Through a button we can send the time of laptop to the system attached to the AC through a relay. Also a Wi-Fi router is attached to the system for a wifi access. Thus the full system will help to facilitate a full-fledged automatic AC control.

Keywords—Automatic AC controlled algorithm, AC, WI-FI

1 INTRODUCTION

Now a day, the energy consumption is higher than the energy production. In order to reduce this we have to preserve energy. In our college lab AC usage is high, so that to reduce the energy consumption this Automatic AC control will help. This process can be done by using the wireless technology, i.e. WI-Fi.Here, the system can instant ON/OFF the AC of labs and can also provide scheduled timings for the AC with respect to its room temperature. It can control from anywhere in the college campus as the WI-Fi range is available. By giving proper scheduling of AC, we can reduce the energy consumption. The system provides Automatic control over AC through Wi-Fi.

In this we can instant ON/OFF AC and can provide scheduling. Here we provided daily and weekly scheduling of AC as per the peek timings of college. The user of system can enter the timings as per his convenience. AC of labs can control through Wi-Fi from anywhere in the college campus as per it range covers. Here, the system can instant ON/OFF the AC of labs and can also provide scheduled timings for the AC with respect to its room temperature.

A Laptop can control the AC from anywhere in the college campus as the Wi-Fi range is available. In the existing system, the AC has the manual control. So the user has to control it through remote. To switch on the AC we have to make the placing of the remote sensor directly to the AC remote sensor. We can't control the AC of a room from outside. Existing system can't make scheduling and that system is dependent with the user. Only with the presence of user it will work and cannot set the timings of ON/OFF pre-defined giving proper scheduling of AC, can reduce the energy consumption.

AC can be switch ON/OFF on prescheduled time.1) Automatic control based on room temperature in prescheduled time.2) Display room temperature on LCD.3) Time schedule and temperature levels for operation can be set from a laptop using Wi-Fi Connection.4) AC can be switched ON/OFF using laptop application.5) AC should be completely OFF on holidays.

2 RELATED WORKS

In the earlier, AC is controlled by the manually. The user has to control it through remote. To switch on the AC we have to make the placing of the remote sensor directly to the AC remote sensor. We can't control the AC of a room from outside. Existing system can't make scheduling and that system is dependent with the user. Only with the presence of user it will work and cannot set the timings of ON/OFF pre-defined

In the earlier cases, some of the drawback identified are cannot maintain the following things 1) Manual Control 2) Remote Sensors 3) No Scheduling 4) Wastage of power 5) User presence needed 6) Outside control is not available 7) No Restriction for the AC Usage

3 PROPOSED SYSTEM

Our system provides the automatic control of AC from laptop and desktop using Wi-Fi connection. For that, there is a Wi-Fi hardware module is used. The system can also provide six weekly and daily scheduling of AC as per the college timings. This scheduling is programmed and stored in the PIC Microcontroller which is in the hardware part of the system. All the scheduling and ON/OFF process can be done in Laptop using the System GUI and send to the Microcontroller memory. Then the system will work as per the given schedule and command that given by the user.

3.1 Study of Proposed system

A micro controller based system is used to control the AC. The system consists of PIC microcontroller, LCD, temperature sensors, Wi-Fi modem and relay circuits.AC will be operated on scheduled timings. The time schedule can be set using any application that can be done by using a laptop. The schedule has a start and end time for week days. AC will be automatically switched ON at start time and switched OFF at end time.

AC can be switched OFF /ON from the laptop during this period of operation. Holidays can be set from laptop so that AC will be completely switched OFF on these days.

During ON state AC will work based on room temperature. There is a minimum and maximum temperature levels. AC will be switched OFF when room temperature comes down to minimum level and will be switched ON when temperature goes up to maximum level. Temperature and AC status will be displayed on LCD.

Users can configure time schedule, minimum and maximum temperature levels from a laptop. They can also switch ON/OFF AC from the same. Device status and temperature can be received from the micro controller based system on request. For the configuration and status enquiry different format of message is used. Based on the message format received system will take proper actions.

AC can be switch ON/OFF on prescheduled time.

3.2 Actions of AC

The AC functions can be displayed by following ways
1) AC can be switch ON/OFF on prescheduled time
2) Automatic control based on room temperature in prescheduled time.
3) Display room temperature on LCD.
4) Time schedule and temperature levels for operation can be set from a laptop using Wi-Fi Connection.
5) AC can be switched ON/OFF using laptop application.
6) AC should be completely OFF on holidays

4 PRACTICAL IMPLEMENTATION

4.1AUTOMATIC AC CONTROLLED ALGORITHMS

1. Start
2. Read the schedules and room temp from the sensor
3. Display time, date (day, month, year)
4. Check whether the current time is equal to scheduled ON time then run that schedule
   4.1 Check whether the current temperature is less than scheduled temperature.
      Then TURN OFF AC
      Otherwise TURN ON AC
   4.2 Display current time with date month and year
5. Else check whether the current time is not scheduled OFF time then goes to step 4.1
6. Stop

Figure: 1
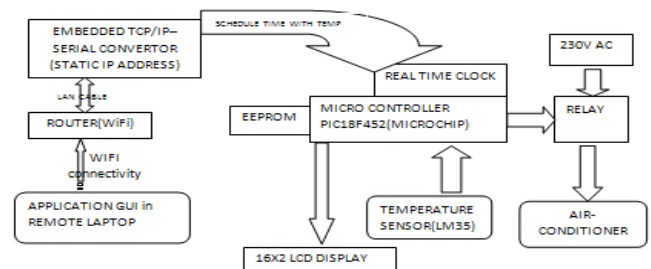
4.2 BLOCK DIAGRAM

Figure 2: Flow of Automatic AC Control

This diagram shows the components of the system and the flow of data/process for the automatic AC control. It includes hardware as well as the software components. The each and every component is important in this system.

5 EXPERIMENTAL RESULTS

5.1Energy consumption can be reduced
   As per giving the proper time scheduling of AC to ON/OFF can reduce the energy consumption
5.2 Automatic Control over AC
   AC can be controlled using Wi-Fi through a laptop as well as desktop. It can control the AC from any location as per the Wi-Fi range.
5.3 Scheduling can be done
   It can provide daily and weekly scheduling of AC ON/OFF. The system wills ON/OFF the AC as per the given scheduling in the GUI by loading it to the microcontroller using the laptop.

6 DETAILED DESCRIPTIONS

6.1. MODULE DESCRIPTION

The modules are the components of the system. They act specific roles in the working of the system. The different modules are,
- Login Module
- Wi-Fi module
- Scheduler Module
- Instant on/off Module
- Message Display Module

6.1.1. Login Module

This module is the entry point to the system. The users can communicate to the system using this module. The main 3 users are,
- Administrator
- Electrician
- Authorized staff

These three users can login to the system using the username and password, which are only known to them. The all users can give the scheduling and also, instant

on/off of AC. The all users will take into a same page when they logged in.

6.1.2 Wi-Fi Module

This is a core part of the system. This makes the connection between the laptop and the system / circuit connected to the AC. The data transformation is through this Wi-Fi module. This Wi-Fi module is actually implemented in the circuit connected to the AC. A wired internet connection is available to the system and the laptop has a Wi-Fi facility. Through Wi-Fi the connections has been established. The user can control the AC from any in the collage; the only condition is that the Wi-Fi access should be there.

6.1.3 Scheduler Module

This facilitates the main function of the system. The scheduling can be done using this system. There can be 2 types of scheduling can be possible Weekly and Daily

There should be six scheduling can be done at a time. The scheduling will be works as follows,
As the user login to the system, a window opens and it displays the whole scheduling details. First of all, we must set the time of the system. This is done by clicking on the button corresponds to it. Then the time on the laptop must be added onto the system. Then according to this time the scheduling must be worked. We can give whether it is daily or weekly schedule and give the time and date also. Also given a particular temperature, when the temperature is below that temperature, the AC will be turned off. If the temperature is above that particular temperature the AC will be switched on. The room temperature was identified using a thermo coupler temperature sensor. Here the important fact is the date, time and the temperature at the moment.
For Example .We set a schedule on 17/05/13 at 9.45am with a temperature, 30 degree Celsius. If the room temperature is below 30 degree at that time the AC will be turned off. If The temperature is above 30 degree then the AC will turn on.

6.1.4 Instant on/off Module

This module facilitates an emergency on/off of AC. When an emergency situation arrives the AC can be controlled through this module. There are 2 buttons provided on the Graphical user interface in the laptop. These on/off buttons provide the instant on/off of AC.

6.1.5 Message Display Module

These module facilities the display messages of each control mechanisms. Through this the each and every controlling mechanisms can be identified and helps to check out the errors. A LCD display is used for this purpose, where the whole information's are displayed. This module is attached to the system (i.e.to the PIC microcontroller) . The actions take place in the PIC microcontroller should be displayed in the LCD display.

CONCLUSION

Thus we conclude that the automatic AC controlling system was lead to great changes in the world. The energy consumption can be reduced in large manner. This system should have been used for any labs and thus the manual work also can be reduced. The whole system is so efficient, since it could sense the temperature in the labs and according to that the AC can be on/off. Also there is an emergency switch will be provided. The same system can also apply in home and also in offices. A human sensory unit can also attached to the system (AC only on/off when people in the lab), to make it more efficient this will help to switch on/off the AC in emergency situations. There may be six schedules can be given and also weekly and daily schedules can be also be given. This will make the system a great advantage that the system may become more and more efficient.

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