

Lab Automation Using Arduino

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ABSTRACT

These days there is so much in software labs to do. From keeping track of attendance of students and controlling the temperature of AC to turning on and turning off the computers before and after the students leave the lab. This project will reduce the overhead of the clerks and lab assistants to switch on and switch off the computers before and after the student's usage. Also, the implementation of this project will provide two major benefits. The reduction in consumption of power being the first, and the reduction in the bills of electricity which will profit the organization. This project contains three main modules for implementation of respective goals. First, the attendance module using RFID (Radio-Frequency identification) and Arduino Uno. Second, the switching on the computers on LAN (Local Area Network) using the Wake On Lan command when student enters the lab and switching off the computers automatically as the student leaves. Third, controlling the temperature of the air-conditioner using Arduino mega and temperature sensor.

Keywords:-Arduino, Weak On Lan, Automated AC Control, RFID

INTRODUCTION

Today's student wants to learn new things at a great speed at any cost and at a comfortable level. But, it is not feasible to spend unnecessary money and resources where they can be conserved. The implementation of this paper will bring in four major benefits. [1] The extra work of the lab assistants of switching on the computers and switching off the computers before and after the student's use will be reduced.[2] The conservation of electricity [3] The monetary benefits to the organization as less power are consumed.[4] The reduction of teacher's extra work of conducting attendance and keeping a check on student's absentee and eliminating the chances of faking the attendance. This paper will be implemented using the RFID technology, different types of Arduino boards, temperature sensor. And all the modules are integrated using customized software

LITERATURE SURVEY

Review of Existing Systems

Counting to 315 million students, India has the most number of students in the world. This counts that there is a strong need for the automation when it comes to mark the attendance of these students. 69.133 % of the total youth are found college going or taking some kind of education. The traditional system

which is being followed since ages is the pen and paper method.

Later we observe a time wherein to avoid the intentional fake attendance given by the student's adoption of biometric system was observed. Colleges have started to turn down to this in order to say goodbye to intentional proxy attendances, apart from this when it comes down classroom automation we also need to consider the electric equipment's and their functioning. We have a strong need of a system where it can mark attendance along with a regular thing (say ID card). Hence these systems will be not only help in attendance but also make things like ID cards compulsory for college premises. A classroom mostly consist of a fan and a tube light at least.

Many at times it is observed that it's the human nature and we tend to forget to switch off the lights when we leave the house. This leads to more of energy consumption and wastage of energy. The same scenario can also happen with the classroom. Hence it is considered as one of the most important issue that needs to be addressed. The same system is not only dedicated to solve the problems of class room but the same can also be used in home automation application. The said system can be used to keep a track on the devices that are on

in the classroom when we are not present. This will lead to automation plus the energy consumption factor that will save energy. The system will operate with the help of a relay module. The relay controls the circuit functions and acts as an interface between input and output circuits. The system will also require a communication network channel that helps to transmit messages between the application at the user end and the hardware at the system end.

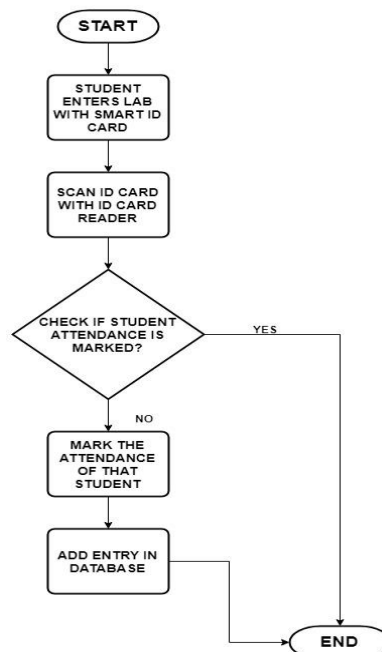
THE PROPOSED SYSTEM

An AC (Air Conditioner) which was once considered to be a luxury item and was only to be found in big hotels, movie halls, restaurants etc... But, now almost everyone has a AC in our home to beat out the summer/winter and those who have it, worry about one common thing. That is their high electricity consumption and charges due to it. In this project it is shown how to make a small Automatic Temperature Control Circuit that could minimize the electricity charges by varying the AC temperature automatically based on the Rooms temperature. All the Remote Controls in our home that we use to control TV, Home Theatre, AC etc work with the help of IR Blasters. An IR blaster is nothing but an IR LED which could blaster a signal by repetitive pulsing; this signal will be read by the receiver in the electronics appliance. For each different

button on the remote a unique signal will be blasted which after read by the receiver is used to perform a particular pre-defined task. If we are able to read this signal coming out from the Remote, we can then mimic the same signal using an IR LED whenever required to perform that particular task. We have previously made a IR Blaster circuit for Universal IR Remote. A TSOP is an IR Receiver that could be used to decode the signal coming from the Remotes. This Receiver will be interfaced with Arduino to signal for each button and then an IR Led will be used with Arduino to mimic the signal whenever required. This way we can gain control over our AC using Arduino. Now, all that is left is to read the Temperature value using DHT11 and instruct the AC accordingly using the IR signals. To make the project look more attractive and user friendly I have also added an OLED display that display the current Temperature, Humidity and AC set temperature. Learn more about using OLED with Arduino.

Automatic attendance of lab

In automatic attendance of lab the RFID tags will be attached to each and every id-card of the student. The RFID scanner will be placed at the entrance of the lab. As the student will enter the lab, attendance would be automatically scanned using RFID technology. Flow chart for the attendance's module is as follows:

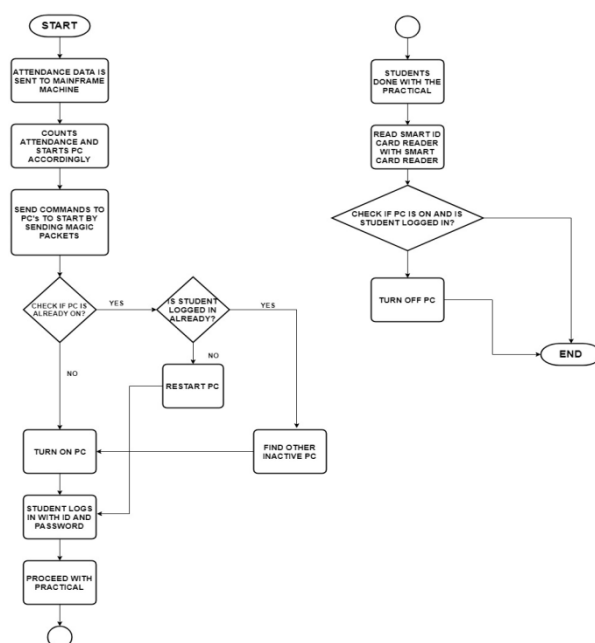


Automatic turns on and turns off of computers in lab.

The turning on of the pc would take place once the student has entered the lab. As per the no. of students entered the same no. of computers will be turned on by automatically executing

wake on LAN command via software. The computers would be turned off by using event ghost (would be changed most probably).

Flow chart for the automated computer's turn on and off module is as follows:

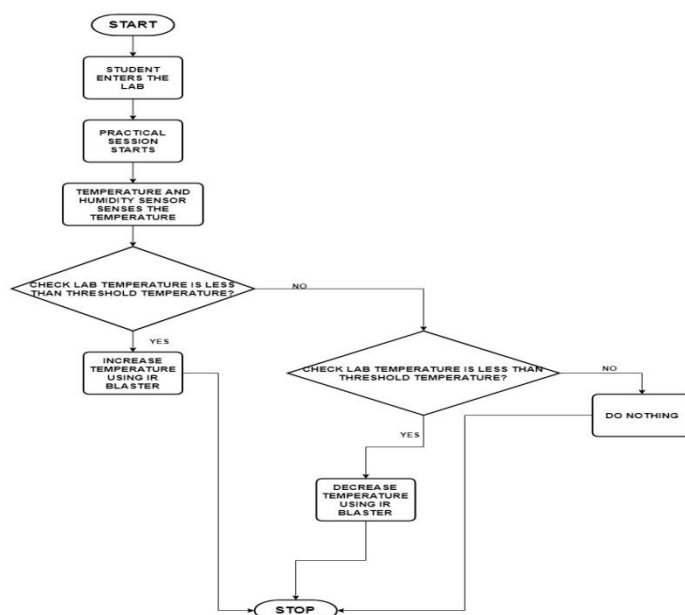


Automatic temperature control of AC in lab.

Temperature of the AC would depend on the temperature of the lab detected by the PIR sensor and Arduino will control the

temperature by the code which this paper develops by setting a threshold for specific temperatures.

Flow chart for automatic temperature control of temperature using AC is as follows:



CONCLUSION

Hence this project synopsis concludes with the fruitful and beneficial information gathering about the “lab automation”. The implemented work will efficiently aid the students, teachers and lab assistants. This work differs from its predecessors in a way that it helps the staff maintaining attendance of students and defaulter list too. Proposed system gives the ability to maintain ac’s temperature according to need. In time, improvements could be made in the system to maintaining temperature. For example, the proposed work leads the ac’s maintain room temperature according to humidity sensor not by looking at air temperature. The proposed work leads the automatic turn on and off of machine based on attendance. The proposed work gives the ability to successfully registering attendance using weak on lan and some kernel commands. 29 future work: In time, improvements could be made in the system to maintain in attendance. For example, mailing student’s attendance weekly to the teacher and students themselves so that they can manage their attendance on their own not after the defaulters list is displayed. In time, improvements could be made in system to turn on and off with better accuracy and user applications like mail opened documents to xxx@mail.com etc. In time, improvements could be made in software which we developed for taking input as which

os students want to work. For example, putting login screen before asking options for os selection.

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