

Optimization of Electricity Consumption using Android App for Smart Computer Lab

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Abstract

This work demonstrates a simple Computer Lab automation system that allows the user to control Simple Computer Lab appliances through wireless. Lights, air conditioners, Computers and fans are among the appliances that can be used in this system. The controlling and monitoring the appliances can perform using an application which is connected to the web server. This application has a login option for Lab Incharge. Here Lab incharge is going to monitor and control the activities which are ongoing on students computer and he has authority to manage processes.

Keywords:-Smart lab, user profile, remote lab, automation, kill processes, monitor, control, optimization.

Introduction

The Smart Computer Lab" concept has existed for many years. The terms Smart Lab "Intelligent Lab" followed and has been used to introduce the concept of networking appliances and devices in the Lab. Lab automation Systems (LASs) represents a great research opportunity in creating new fields in engineering, and Computing. LASs includes centralized control of lighting, appliances, systems, to provide improved comfort, energy efficiency and security system. LASs becoming popular nowadays and enter quickly in this emerging market. Each of the connection has their own unique specifications and applications. Among the four popular wireless connections that often implemented in LAS project, WIFI is being chosen with its suitable capability. The capabilities of WIFI are more than enough to be implemented in the design. Also, most of the current laptop/notebook or Smartphone come with built-in WIFI adapter. It will indirectly reduce the cost of this system.

We present this farm management system and provide an operational example. We also analyze the technological enablers that will make this architecture a reality. Also the recommended fertilizers can be purchased from the site.

The wireless communication is increasing day by day. This has motivated us to use mobile phones to remotely control Lab appliances and to receive a feedback. This application has a login option for Lab Incharge. Here Lab incharge is going to monitor and control the activities which are ongoing on students computer and he has authority to manage processes.

Literature Survey

As per our survey, there exist many systems that can control lab appliances using android based phones/tablets. Each system has its unique features. Currently certain companies are officially registered and are working to provide better lab automation system features.

Following models describes the work being performed by others. N. Sriskanthan explained the model for lab automation using bluetooth via PC. But unfortunately the system lacks to support mobile technology. Muhammad Izhar Ramli [8] designed a prototype electrical device control system using Web. They also set the server with auto restart if the server condition is currently down. Amul Jadhav [10] developed an application in a universal XML format which can be easily ported to any other mobile devices rather than targeting a single platform. Each of these system has their own unique features and on comparison to one another lacks some advancement. F. Y. Leu, M. C.

Li, J. C. Lin, and C. T. Yang has paper MIS: Malicious Nodes Identification Scheme in Network- Coding-Based Peer-to-Peer Streaming, in this paper, a novel approach

to limiting pollution attacks by rapidly identifying malicious nodes. Scheme carefully satisfy the requirements of live streaming systems, and achieves much higher efficiency than previous schemes. Each node in our scheme only needs to perform several hash computations for an incoming block, incurring very small computational latency.

Microcontroller

The AT89S52 is a low-power, high-performance CMOS 8-bit microcontroller with 8K bytes of in-system programmable Flash memory. The device is manufactured using Atmel's high-density nonvolatile memory technology and is compatible with the industry-standard 80C51 instruction set and pinout. The on-chip Flash allows the program memory to be reprogrammed in-system or by a conventional nonvolatile memory programmer. By combining a versatile 8-bit CPU with in-system programmable Flash on a monolithic chip, the Atmel AT89S52 is a powerful microcontroller which provides a highly-flexible and cost-effective solution to many embedded control applications.



Fig 1 Microcontroller

Features

1. 4.0V to 5.5V Operating Range
2. 8K Bytes
3. 8 Bits
4. Dual Data Pointer

Serial Port PL2303

USB-TTL level conversion board Product features: 1 imported original control chip PL2303HX, high speed stable brush machine 2 set two data transmission indicator can monitor the status of data transmission 3 for 3.3V and 5V pin interface, different voltage power supply system need convenient brush 4 pin interface and parallel board, rather than a vertical installation and board, leads to the DuPont line convenient brush machine 5 of the entire circuit board with high quality transparent heat shrinkable coating, the pieceB circuit and the outside into the insulating state In order to protect the metal board by accidental short circuit Android App and burned, due to the use of transparent material, so does not affect the board.

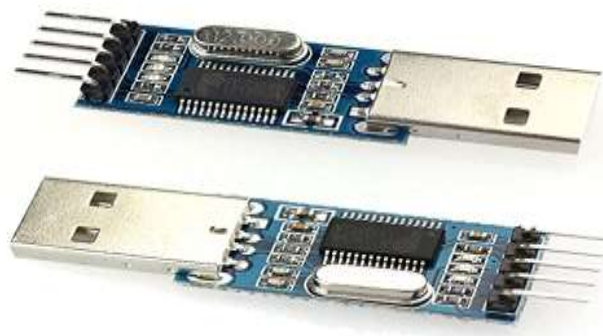


Fig. 2 Serial Port PL2303

2 CHANNEL RELAY MODULE

5V 10A 2 channel relay module shield for Arduino ARM PIC AVR DSP electronic relay. The item is a 24v 2-channel relay interface board, it can be controlled directly by a wide range of microcontrollers such as Arduino, AVR, PIC, ARM and so on. If you have ever had a project that required an interface with a high power device that needed AC or DC voltage and high current levels you have probably already discovered that attempting to control those devices directly with your Arduino, Raspberry PI and other Microcontroller or Microprocessor can be a real challenge. This board is designed to interface easily with your 5V IO's without consuming much current on your IO pins. Relay contact capacity 250V10A. Relay output normally open, normally closed. Low level valid. 5V relay signal input voltage range, 0-5V. VCC power to the system. JD-VCC relay in the power supply. The default 5V relay. JD-VCC and VCC can be a shorted. Ring Instructions, VCC: System power cathode. GND: System power cathode. IN1-IN2: Relay control port.



Fig 2 Relay Module

Android

Android is an open source and Linux-based operating system for mobile devices such as smartphones and tablet computers. Android was developed by the Open Handset Alliance, led by Google, and other companies. This tutorial will teach you basic Android programming and will also take you through some advance concepts related to Android application development.



Android Studio is the official integrated development environment for Google's Android operating system, built on JetBrains' IntelliJ IDEA software and designed specifically for Android development.

System Architecture

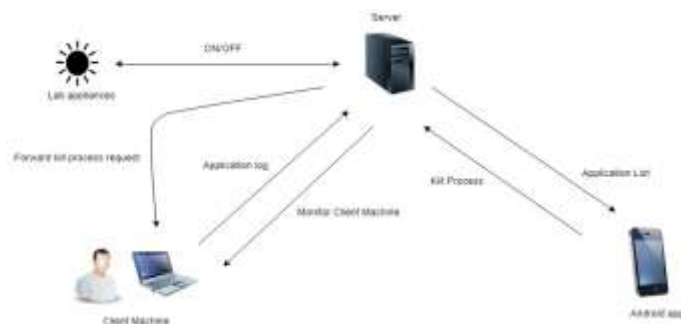


Fig 4 :Working

The system which proposed by us is for monitoring and controlling application which is running on client machine

Frist of all there are several client machines are present in computer lab and one main server.furthermore, lab appliance are connected to main server.

Firstly,when client turn on computer then he needs to login,afterwards as he logins lab appliances will automatically get started.

As user login into the system his/her system will send this info towards the main server and server send this information towards the microcontroller.microcontroller will work on that information and control the lab appliances using relay module.

As soon as user get login lab appliances get automatically turn on.when user logouts then appliances will get automatically turn off.This whole system will monitor all clients which are logged into the system using android app which is controlled by lab incharge.

Secondly,lab incharge will monitor and control clients machine using that android app. Lab incharge can monitor the application which are running on client machine. And he have authority to kill the application if client misbehaves or opens an unauthorized application.

We have also provided the login authentication for user and lab incharge

Advantages

1. Reduce and optimize electricity consumption of lab.
2. It is user friendly.
3. cost effective
4. Easy to implement.
5. Ease of use.

Applications

1. Automation of lab appliances.
2. monitoring user system.
- 3.managing user processes.
- 4.can also use for home automation

Conclusion

This paper summarizes and effective system for developing a smart lab which automates the appliances and also monitor and control client machine using android application .overall,we can aslo reduce the electricity consumption of an computer lab.

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