

Computer Lab Management and Maintenance System using IoT & Data Science Concept

M. Umapathy¹ S. Rajesh Kumar² B. Karthik³ N. Chandru⁴

¹Assistant Professor ^{2,3,4}BE Student

^{1,2,3,4}Department of Computer Science & Engineering

^{1,2,3,4}Anna University, The Kavery Engineering College, Salem, Tamil Nadu, India

Abstract— In this paper we presented the computer lab management and maintenance is very difficult. In this challenges are fixed by the data science and IoT concepts. Data Science are the information is generated from different sources like text files, multimedia forms, sensors, and instruments. We need more complex and advanced analytical tools and algorithms for processing, analyzing and drawing meaningful conclusions and results. So the data science concepts are used to maintain the logs, because the huge amounts of data are collected in various systems. Internet of Things is the concept of connecting any device on/off switch to the Internet and to other connected devices. The IoT is a giant network of connected things and people, so the IoT concepts are used to controlling the electronic appliances using Raspberry pi. A computer lab is a space which provides computer services to a defined association. This generally consists of the user not engaging in illegal activities or undertake to any security or content-control software while using the computers. Above the illegal activities are controlled by generating random password because of security purpose.

Keywords: IoT-Internet of Things, Lab Automation, Data Science, Raspberry Pi

I. INTRODUCTION

A. Overview

The Lab Automation using IOT and Data Analytics for user log maintenance, control the illegal activities. To generate the random password from the entering system to maintain the security and automatically system will be shutdown. Controlling the appliances using Raspberry pi.

II. ADVANTAGES

A. User log management:

Log administration is the concerted processes and arrangement used to administer and facilitate the reproduction, transportation, analysis, cache archiving and ultimate disposition of the large quantity of log data created with in an information system.

A log in a computing situation is the automatically produced and time – stamped documentation of events consistent to the particular system.

B. Generate the Random password:

With expanding technology, everything has relied on data and securing these data is the main concern. Passwords are meant to keep the data safe that we upload on the internet. An easy password can be hacked easily and all person information can be misused. In order to prevent such think and keep the data safe, it is quite necessary to keep our very strong.

C. Control illegal activities:

Uploading or downloading copyrighted material, violating the intellectual property rights of other or illegal sharing trade secrets.

Consciously replicating or transmitting computer viruses or otherwise deliberately damaging the systems or files of other people. Buying or selling are illegal substances via computer network. Accessing or printing out articles solely for educational and research purposes.

D. Controlling appliances using Raspberry Pi:

IOT is to develop an electronic device that can facilitate automatic switching ON/OFF of appliances. We will then program the system to automatically.

III. ANALYSIS OF SYSTEM

Problem Definition: Computer Lab Management and Maintenance System using IOT and Data science concept which is referred here, face three main challenges, these are high cost of ownership, inflexibility, poor manageability and difficulty in achieving security. The main objective of this work is to implemented an existing [1.1],[1.2], User log management is the generation, transmission, analysis, storage, archiving and ultimate disposal of the large volumes of log data created and create a simple application which can randomly generate strong password using python. This application can generate random password, with the combination of letters, numeric and special character. Mention random length of password based on requirement and can also select the strength of the password.

A. IOT Implemented System Feature:

Server controls and monitors the various system and appliances can be easily configured to handle more hardware interface such as Raspberry Pi, LED, Resistor, Breadboard, Male-Female jumper wires

IV. SYSTEM DESIGN AND IMPLEMENTATION

The referred model of the Computer lab management and maintenance system is as shown in Figure 3.1 and 3.2.

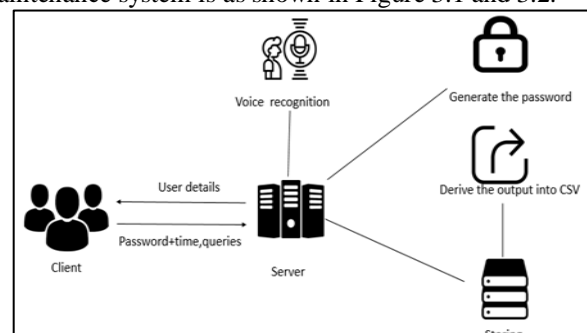


Fig. 3.1: Block Diagram for Server Side

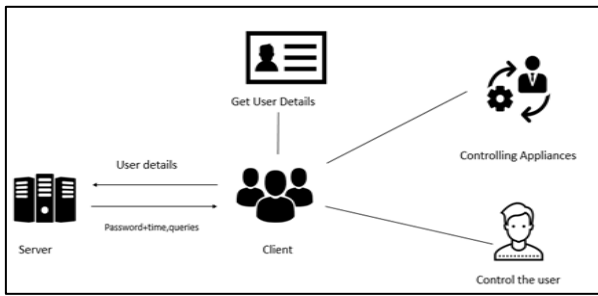


Fig. 3.2: Block Diagram for Client Side

Lab management and Maintenance System use client/server architecture that is a computing model in which the server hosts, delivers and manages most of the resources and services to be consumed by the client. This type of architecture has one or more client computers connected to a essential server over a network or internet connection. Client/server architecture is used in many way

A. *User log maintenance:*

The benefits of good lab maintenance is students are login use the student name and staff name that is used to find the how many system can be use and its details .

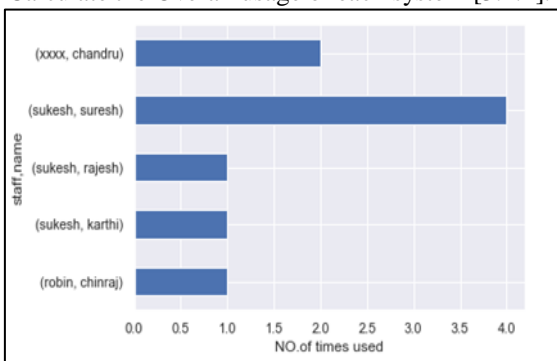
This details are send the central server , server receive data's from all system .The details are date and time, system name, student name and staff name Server create the data frame that are help to derive some results [3.1.1]

	IP	name	staff
0	192.168.113.1	rajesh	xxxx
1	192.168.113.2	chandru	xxxx
2	192.168.113.3	karthi	xxxx
3	192.168.113.3	karthi	xxxx
4	192.168.113.1	rajesh	xxxx

Fig. 3.1.1: Data frame of Student details

The implementation of Data Science concepts in this place to derive results like,

- 1) Calculate the Overall usage of each system [3.1.2].



- 2) How many times the particular system used by each student [3.1.3].

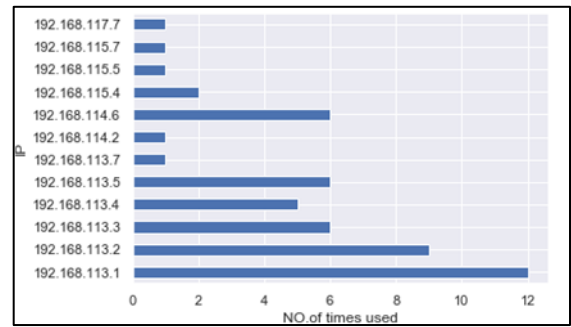


Fig. 3.1.2: Overall usage of each system

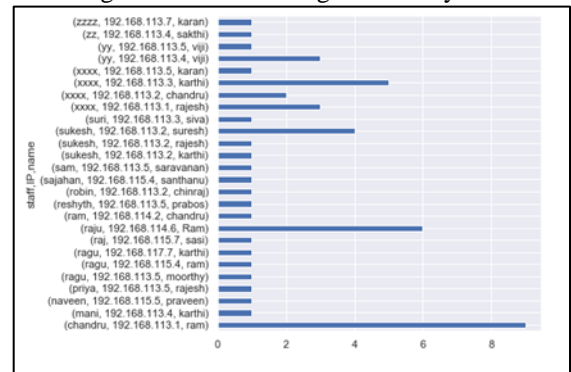


Fig 3.1.3: Usage details of each system

- 3) Calculate the staff use the lab [3.1.4].
- 4) How many times the particular system used by each student in the staff. [3.1.5].
- 5) Calculate the Overall usage of each system in all students [3.1.6].

Fig3.1.4: Staff use the lab

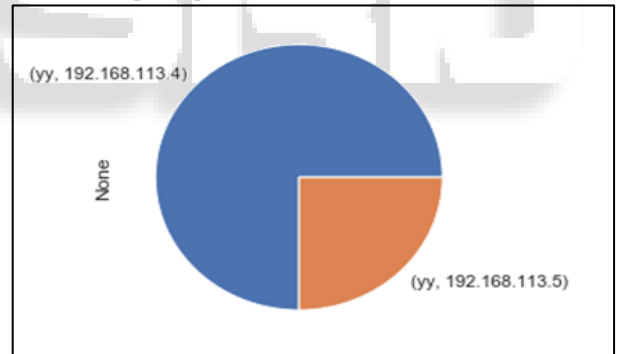


Fig. 3.1.5: particular system used by each student in the staff

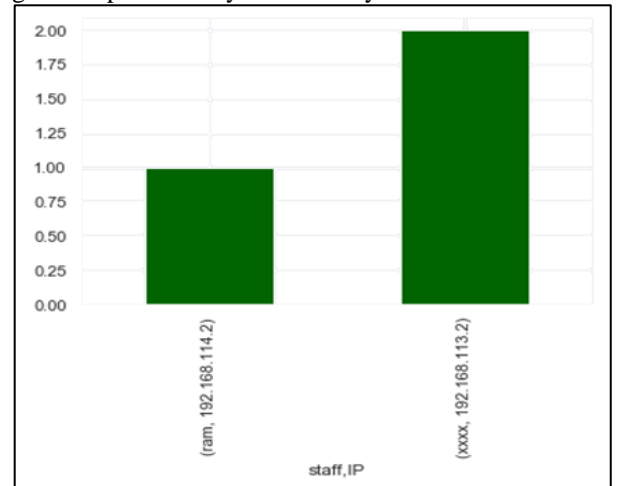


Fig. 3.1.6: Overall usage of each system in all students

- 6) How many times the particular student used the system [3.1.7].

Fig 3.1.7: Particular student used the system

B. Control illegal activities:

A lab security system should, among other things, increase overall safety for lab organization and the public, improve emergency alertness by assistant with set up and lower the organization's liability.

Electronic security that is access control systems, password protection procedures, background checks, delay criminal activity by imposing multiple layered boundary of increasing stringency or “hardening” in the form of personnel and access controls.

Password protection procedures are use the random password generator method. Having a powerless password is not good for a system which demands high confidentiality and security of user credentials. It turns out that people find it challenging making up a strong password which is strong enough to prevent unauthorized users from memorizing it. This paper use a mixture of numbers, alphabets and other symbols found on the computer keyboard to form a random character password which is unpredictable and cannot easily be memorized and its change in every day that are no repeated in here life time.

Closing programs running in the background on the computer students use the third-party software that's running on your system. I have a predefined program that requires background python tasks to run on a periodic basis for cleanup, maintenance, updates, etc. They can either be kicked off at a scheduled time.

C. Controlling appliances using Raspberry Pi:

The Raspberry Pi [3.3.1] is a low cost, bank-card sized computer that plugs into a computer monitor or TV, and uses a standard keyboard and mouse. It is a proficient little device that enables people of all ages to delve into computing, It's capable of doing everything you'd expect a desktop computer to do flip through the internet and playing high-interpretation video, to making spreadsheets, word-processing, and playing games.

Raspberry Pi has the ability to collude with the surface world, and has been used in a wide pattern of digital maker projects, from music machines and parent detectors to weather stations. We want to see the Raspberry Pi being used by kids all over the world to learn to program and discern how computers work.

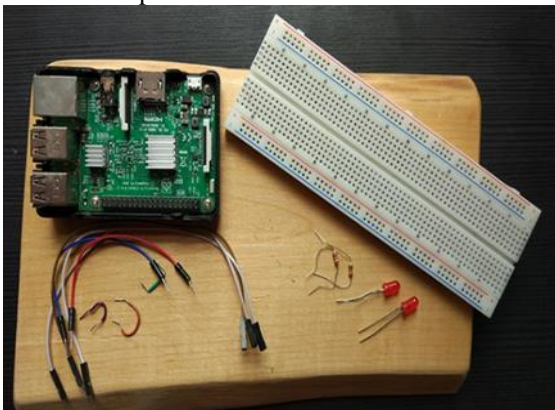


Fig. 3.3.1: Raspberry pi and components

Along with Raspberry Pi, we will need light that are used to difference color (Red, Blue, Yellow and Green LEDs), Solderless Prototyping Breadboard, 4 x 330 ohm Resistors, Some Male to Female jumper wires [3.3.1].

Build the circuit [3.3.2] on your breadboard making sure that none of the components leads are touching and that the LEDs are connected the correct way round [3.3.2].

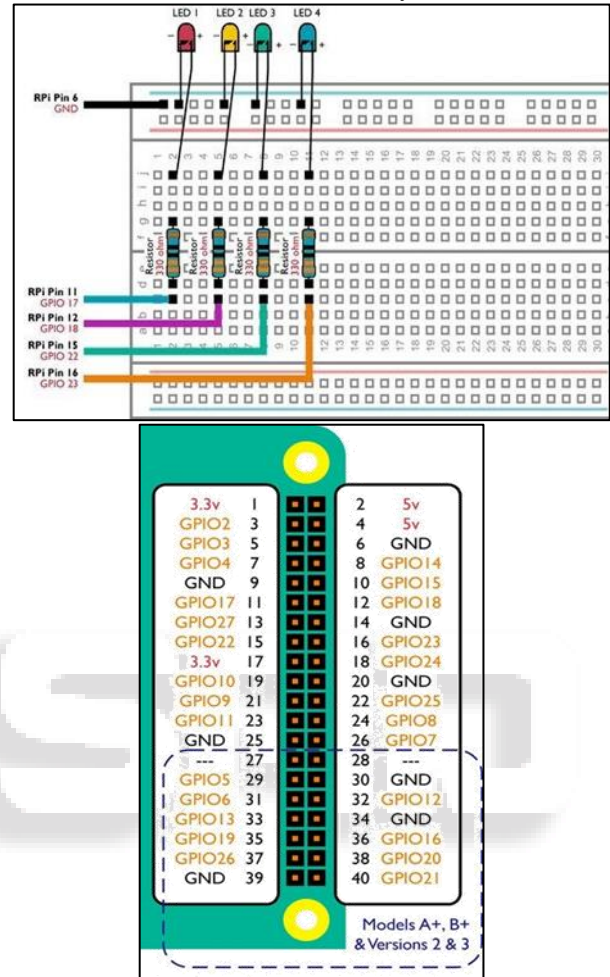


Fig. 3.3.2: Bread board circuit Diagram

The purpose input/output (GPIO) is an uninvolved digital signal pin on an unified circuit or electronic circuit board whose demeanor including whether it acts as input or output is governable by the user at run time. GPIOs have no preordained purpose and are unused by default.

Programed the light controlling using python the GPIO module help to Switch(ON/OFF) the light .Students are login the system client side program are send the data into server the switching the nearby light and its automatic off the light in schedule time.

V. CONCLUSION

The Computer Lab Management and Maintenance System using IOT & Data Science Concept has been experiments proven to work satisfactorily by manage the log and connecting simple appliances are controlled through Raspberry Pi. The designed system not only monitors the sensor data, but it maintenance the User log and Controlling the illegal activities and appliances in the computer lab.

This will help the staff analyze the condition of data analyze and various parameters in the lab anytime.

VI. FUTURE ENHANCEMENT

Using the system can be broaden to include various opportunity which could include lab security feature like capturing the photo of a person moving around the lab and storing it. This will scale down the data storage than using the CCTV camera which will record all the time and stores it. The system can be expanded for capturing photo students can do any illegal activities in the lab.

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