

Smart College Automation System Using Arduino

Aditya Adya¹ Vishvambhar Rushi² Swapnil Hanchnale³ Basavaraj Diwate⁴

^{1,2,3,4}Faculty

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

^{1,2,3,4}University of Pune, Pune, India

Abstract— The main objective of college management system is to automate all functionalities of a college or university. Using this system you can manage all information of all aspects of a college, its students, faculties, Departments, marks and other curricular activities. College management system provides the easiest way to manage all functionalities of a college. This system facilitates colleges to maintain the functionality related to college employees and their students. College management is becoming a very essential component in education in this modern day age. With the help of College Automation System we can gather all the useful information needed to the management in few clicks. College Automation System consists of different modules such as student, faculty, admin etc. Our main purpose is to create a software which will manage the working of these different modules. The interconnectivity among modules reduces the time to perform different operational task. We have used bootstrap which increases the responsiveness of the system. If in future we want to implement this system as the web based application or mobile application than because of bootstrap it will be easy and automatically screen will resolve according to that. The objective of our system is to reduce the paper work and to eliminate manual processes and to save significant staff time.
Key words: RFID;MEAN stack; Internet of things(IOT); REST server; JSON; Arduino; Express.js.; Angular.js; Node.js

I. INTRODUCTION

THE WEB OF Things is an active research area that focuses on the specific challenge of making smart things accessible and manageable through open Web standards. This vision is correlated with the broader Internet of Things (IoT) research area aiming at enabling communication with and among smart objects, leveraging Internet standards and technologies [1]. As argued by the European Expert Group on Services in the Future Internet [2], huge research and development efforts have focused on lower level networks and software technologies, while “there is currently little experience with building applications for this new, emerging ecosystem of IP-enabled devices and objects.” As the Web facilitated both application development and use for the traditional Internet, it is now expected to “unleash the potential of the IoT by making it accessible and programmable by developers who are not necessarily experts in ubiquitous computing”.

A. Detailed problem definition

Management of college campus can be tough because of the huge campus area .Thus automation is necessary for management of resources and control over the power management. Automation is required to overcome ever increasing manpower requirement. Thus a centralized control is established over the campus for efficient management, thus decreasing the workload. This is possible due to Arduino and

IOT .The REST server is used for communication and data transfer between the devices on respective location.

The students and Administration both are benefited by this automaton for 3 obvious reasons

- Centralized control from any remote location.
- Continuous monitoring and access of resources .
- Interaction in dynamic way and reduction in energy resources.

Ease in user interaction.

Development and use for the traditional Internet, it is now expected to “unleash the potential of the IoT by making it accessible and programmable by developers who are not necessarily experts in ubiquitous computing”

College Management System deals with all kind of student details, academic related reports, college details, course details, curriculum, batch details and other resource related details too. It tracks all the details of a student from the day one to the end of his course which can be used for all reporting purpose, tracking of attendance, progress in the course, completed semesters years, coming semester year curriculum details, exam details, project or any other assignment details, final exam result; and all these will be available for future references too.

- The College management system is an automated version of manual Student Management System. It can handle all details about a student. The details include college details, subject details, student personnel details, academic details, exam details etc... In case of manual system they need a lot of time, manpower etc.Here almost all work is computerized. So the accuracy is maintained. Maintaining backup is very easy. It can do with in a few minutes.
- In order to solve daily problems faced in the college, a new system has been created, that attempts to operate the whole procedure considering the IOT based automated approach: Several controls help the application to be friendly to the users. The entire project maintenance is made simpler and more adaptable. Interaction in dynamic way and reduction in energy resources It offers great degree of security employing various protocols.

B. Justification of Problem

- To create and implement smart college automation system using Arduino on IOT platform.
- Generating web service using REST server by passing JSON objects.
- Implementing Web platform using MEAN stack.

C. Purpose of Your System

- To achieve a significant reduction in energy consumption, through the installation of Internet of Things based services at college campus.
- To actively interact, in a dynamic way with the buildings energy management systems.

- To allow the users the environments as per the work spaces using the controllers like the mobile phones, laptops.

D. Literature Survey

Based on the construction of Shandong Normal University's smart model, this paper researches the key technologies of OAuth authentication and data analysis. Through the analysis of the design, and implementation procedure of the smart campus platform, this paper summarizes the research methods of building the smart campus application system with existing educational resources. Also, it provides a universal reference to the construction of an urban intelligence system. Smart campus refers to integrating all kinds of application service systems, setting up a wise, intelligent teaching, learning and living environment, which is suitable for: management, teaching, scientific research, and campus life unity, as well as based on the Internet of things, forming an integrated system with cooperation and self-adjustment capability.

The Web of Things is an active research field which aims at promoting the easy access and handling of smart things' digital representations through the adoption of Web standards and technologies. While huge research and development efforts have been spent on lower level networks and software technologies, it has been recognized that little experience exists instead in modeling and building applications for the Web of Things. Although several works have proposed Representational State Transfer (REST) inspired approaches for the Web of Things, a main limitation is that poor support is provided to web developers for speeding up the development of Web of Things applications while taking full advantage of REST benefits. In this paper, we propose a framework which supports developers in modeling smart things as web resources, exposing them through RESTful Application Programming Interfaces (APIs) and developing applications on top of them. The framework consists of a Web Resource information model, a middleware, and tools for developing and publishing smart things' digital representations on the Web. We discuss the framework compliance with REST guidelines and its major implementation choices. THE WEB OF Things is an active research area that focuses on the specific challenge of making smart things accessible and manageable through open Web standards. This vision is correlated with the broader Internet of Things (IoT) research area aiming at enabling communication with and among smart objects, leveraging Internet standards and technologies. This paper examines the components of the MEAN development stack (MongoDb, Express.js, Angular.js, Node.js), and demonstrate their benefits and appropriateness to be used in implementing RESTful web-service APIs for Internet of Things (IoT) appliances. In particular, we show an end-to-end example of this stack and discuss in detail the various components required. The paper also describes an approach to establishing a secure mechanism for communicating with IoT devices, using pull-communications.

II. ARCHITECTURE DIAGRAM

The sensors are installed on the required environment depending upon the purpose. These sensors are used to gather information and then transfer them using Arduino board which is connected to the sensors. The Arduino board is connected to the REST server which is used to transfer data. The REST server use JSON objects for responding to the user request and act upon. The Arduino micro-controller is connected to the End user using Socket IO. The user interface is provided by using a web application and mobile application. The user has centralized control over the system. The automation is achieved by above architecture. Regerstation system uses RFID system where RFID tag are located on desired location and RFID tag is given to the user for once and final registration which can be used everywhere in the campus to utilize the resources. The architecture makes the system platform independent hence it can be used on any operating system and data redundancy is reduced.

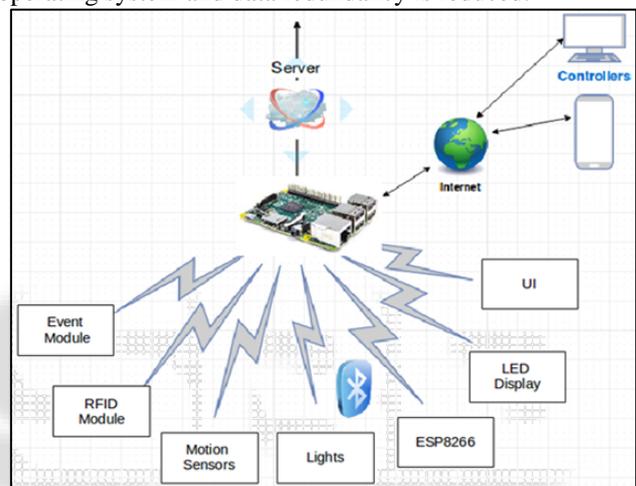


Fig. 1: Architecture Diagram

III. CONCLUSION

The result of proposed system is that the college campus management has become more efficient by using automation (having the plus point that it can be implemented on across all platforms), the control is centralized and can be used from remote location using web or application platform which also solves the problem of optimization of power and increase in requirement of man power. By using Existing System accessing information from files is a difficult task and there is no quick and easy way to keep the records of students and staff. Lack of automation is also there in the Existing System. The aim of Our System is to reduce the workload and to save significant staff time. This System provide the automate registration no manual processing is required

REFERENCES

- [1] Research on the Application System of Smart Campus in the Context of Smart City. Author: - Shouyan Du, Fansheng Meng, Baozhong Gao. This paper researches the key technologies of OAuth authentication and data analysis. Through the analysis of the design, and implementation procedure of the smart campus platform, this paper summarizes the research methods of building

the smart campus application system with existing educational resources.

- [2] A Research Paper on College Management System. Lalit Mohan Joshi, International Journal of Computer Applications (0975 –8887) Volume 122 – No.11, July 2015. This paper is aimed at developing an Online Intranet College Management System (CMS) that is of importance to either an educational institution or a college. The system (CMS) is an Intranet based application that can be accessed throughout the institution or a specified department.
- [3] Using the MEAN stack to implement a RESTful service for an Internet of Things application Author: - Andrew John Poulter, Steven J. Johnston, Simon J. Cox. Restful web services are used to use the native operations of http Get, Post, Put, Delete to map database operations create, read, update, and delete. MEAN is an open source platform to develop RESTful web Services.

