

## E-Campus Using Super Sensor Nodes

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### ABSTRACT

New technology like (IoT) in recent years rapidly developing in a computing world. The Internet of things will change the real world, activities, and objects from simple to most complex. Beside areas as Business, Cities, Transportation, Healthcare, Agriculture, and different areas, The IoT will also have a major implication in institute/college. In digital era our college campus needs of IoT technology for classy environment to utilize secured & modern technology for e-campus activities in academic course of action. In general, campuses spread over a large area and it's very difficult to control for management to track everything happens. This project focuses on need of adopting IoT technology in campus using Secured for (e-Educational)-Campus academics. In near future drastically make changes for students in highly enabled IoT. Starting from needs and advantages ending with a possible architecture based on smart objects.

**Keywords:** Internet of things; Communication, Smart campus, Arduino, Microcontroller, Sensors

### I. INTRODUCTION

In this research work, an approach to develop a university campus in many ways using sensors is presented. Research work try to figure out many cases related to environmental and physical changes happening in the campus through sensors. The primary motive is to make a prototype to implement it into real time to make our campus a smart campus. Proposed work make use of super-sensors which would sense and detect the environmental and physical conditions and report it through email, SMS, or a notification in website.

Mostly we focused on human comfort in college like security, electricity saving in labs etc... All these can also be applied in a campus and some other aspects such as management, safety, & environmental protection. All these was done by adopting sensors These sensors enable us for more capability of collecting flexible data so that accordingly data can be processed. Also, this research work aims to deploy the proposed super-sensor system in a single class room of the campus. This leads to the adoption of a variety of smart solutions in campus environments to enhance the quality of life and to improve the performance within the campus.

This project uses regulated 5V, 500mA power supply. Unregulated 12V DC is used for relay. 7805 three terminal voltage regulator is used for voltage regulation. Full wave bridge rectifier is used to rectify the ac output of secondary of 230/12V step down transformer.

### II. LITERATURE SURVEY

1.The main contribution of this paper is an original proposal of an application, platform, and data independent model for building the integrated information system that will support educational and other processes at University level. Increased number of students causes a necessity for more precise and efficient approaches of students' authentication and monitoring. based on the affordability and efficiency, the proposed method for students' identification is by using smart cards. The chip on a smart card can store multiple identification factors of a specific user: institution/faculty ID, user ID, password, grades etc. CMS is also used for providing environment, general information about the institution (university/faculties), public news and announcements (on the university/faculty level) etc. However, every user needs to provide a valid authentication data in order to access eLearning. We need to protect content, services, and personal data from outside intruders and also these systems carry a risk of privacy violation from inside staff (administrators and educational staff). One of the solutions can be applying researches from Hippocratic Database (HDB) areas.

2. In this paper author divides the whole system into three layers. The IoT is important part of new information and it connects everything through RFID, sensors QR code and real-time positioning technology and realizes the intelligent identification of location and management for goods, IoT of education fully perceives the workers, resources and equipment's of school in a perceptual layer. Then the network layer is responsible for reliable transmission of information from perceptual layer, then IoT realizes the intelligent analysis, early warnings, and intelligent scheduling in application layer. Here the isolated systems such as educational management system, finance management system and office management system are integrated by IoT technology. This paper concentrates on office management more than on education or research.

3. The author here focuses on the campuses that are spread over large area and it is difficult to control for management to track everything happened. This paper tells us about the need of adopting IoT technology in campus using secured smart system for campus academics. In this system sensors are enabled and network devices work continuously and collaboratively to give humans more comfort. The smart classroom collects information, stores it as digitalized data in a memory of e-campus platform. Here platform is created for fascinating learning by means of smart classroom surroundings and security for e-campus. The paper mainly considers the security aspects leaving behind many other important features.

4. The major issue considered here is how different services can be integrated into our smart campus which is heterogeneity of systems and technologies that they use. The service provided here aim at increasing productivity in campus, saving a lot of time, and making it easy for all people present in campus. Here author proposes a system where smart cards are implemented for access control and payments and data generated is analysed for human behaviour. Smart garbage system is also established using simpler technologies. The proposed system consists of many aspects like smart micro grids, smart lighting, security, and safety but all this are not implemented due cost constraint and other problems.

5. The author here mainly describes IoT enabled classrooms in which data collection can be made possible by using devices for e-learning application. The data is fetched in real time activity. The smart classroom data are stored in digital data eLearning platform. Student outside the classroom can access subject data notes using information sharing display board and it can be controlled by administrators for adding updates. Using IoT learning application provides simple and cost-effective notes to any corner of the world. The author here says the efficient way of designing smart learning through IoT. It thus probable's teamwork to rapidly increasing timely delivery of subject notes, easy way of learning and data reaches speedily. This paper focuses only on enhancing effective way of classroom teaching technique not towards smart campus.

6. The authors objectives are to develop an application that provides a smart and easy way for execution of several academic operations to provide students with information regarding complaints any placement activities or any other event happening in the college. It addresses the problem of students not obtaining correct notifications at correct time, here the gap between college students and administrators are tried to be filled using android application. The main idea here is to design and develop an android-based college management system. It reduces the physical human effort. The proposed system focuses only on education system neglecting other aspects that needs to be addressed to create a smart campus.

7. This paper presents the up-to-date outcomes of research project that is aimed on analysis of students with disabilities & how they might benefit from smart software & hardware systems & smart technology. Smart system integrates voice recognition, computer-vision & other technology. The objectives for this research project include but are not limited to: Identification of smartness levels in a smart education system. Identification of characteristics of students with various type of disability. Identification of software and hardware systems and technology to aid students with disabilities in highly technological SMCS. It indicates the difference between digital campus & smart campus and it connects everything through RFID, sensor, QR code & RT positioning technology & realize the

intelligent identification, location & for goods. The system does not describe many of the aspects that make a complete smart campus .

8. Several classrooms, staff offices and laboratories etc. have been equipped with super sensors featuring temperature and light monitors. The factors like temperature and light can have significant effects on the productivity of office workers as well as students. Also, this helps in reducing power consumption by monitoring the environment condition and controlling the appliances. An IR sensor in each room allows building users to find a meeting room that is currently free. Generally, public meeting rooms should be booked via a shared calendar system. These kinds of Systems are required in the university campus as the area is very large and number of rooms are also large. And human can make mistakes and forget to switch off the appliances when in no use and in this case, these systems are useful in order to increase the power efficiency. The system can be viewed as a future of artificial intelligence. This is a powerful and dependable system. It fulfils the goal of energy saving and helps in achieving the efficient use of energy resources. The paper mainly focuses on the conservation of energy in the campus and not the actual smart campus system .

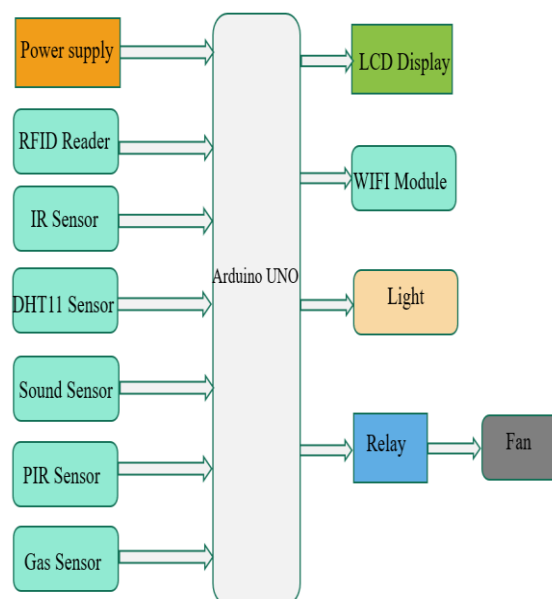
### III. PROPOSED METHODOLOGY

In this proposed method, we are using different sensors such as IR sensor, Gas sensor, Sound sensor, DHT11 sensor and PIR sensor which are connected to Arduino UNO.

These sensors can monitor the data and transfers the data to the wi-fi module.

So that the information will be displayed on the LCD screen and the management will get the alert through Thing Speak website.

#### BLOCK DIAGRAM



#### 1. Power Supply:

Here we are using step down transformer as a power supply.

It is an electrical device by which alternating current of one voltage is changed to another voltage.

#### 2. Arduino UNO:

The Arduino Uno is an open-source microcontroller board based on the microchip ATmega328p microcontroller and developed by Arduino.

#### 3. RFID Reader:

The term RFID stands for Radio Frequency Identification, as the name defines the operation of the device is based on the Radio frequency signals. The RFID system consists of RFID Reader and a tag which is normally used in identification and tracking of objects.

4.WI-FI module:

The ESP8266 Wi-Fi module is a User-friendly module because it can be programmed with the help of Arduino IDE. This module can also be used to build ESP8266 wi-fi module projects.

5.LCD Display:

LCD is a flat panel display technology commonly used in electronic devices for displaying the information.

6.DHT11 Sensor:

DHT11 is a low-cost digital sensor for sensing temperature and humidity. This sensor can be easily interfaced with any micro-controller such as Arduino, Raspberry Pi to measure humidity and temperature instantaneously.

7.IR Sensor:

The IR Sensor Module or infrared (IR) sensor is a basic and most popular sensor in electronics. It is used in wireless technology like remote controlling functions and detection of surrounding objects/obstacles.

8.PIR Sensor:

PIR sensors allow you to sense motion, almost always used to detect whether a human has moved in or out of the sensors range. They are small, inexpensive, low-power, easy to use and don't wear out.

9.Gas Sensor:

Gas sensors are devices that help us understand the amount of gas in the environment and the natural state of its movement. Gas sensors reveal the amount of gas in the environment and the nature of the gas composition with electrical signals and can provide its change.

10.Sound Sensor:

Sound sensors are devices that detect and respond to sound waves. They are commonly used in security systems, doorbells, and other applications where you can easily see and respond to sound.

11.Relay:

API Requests

Write a Channel Feed

```
GET https://api.thingspeak.com/up
```

Read a Channel Feed

```
GET https://api.thingspeak.com/ch
```

Read a Channel Field

```
GET https://api.thingspeak.com/ch
```

Read Channel Status Updates

```
GET https://api.thingspeak.com/ch
```

A Relay is a simple electromechanical switch. While we use normal switches to close or open a circuit manually, a Relay is also a switch that connects or disconnects two circuits.

12.Loads(fan & light):

We are using fan and led light as loads.

Load 1: fan on

Load 2: fan off

Load 3: light on

Load 4: light off

13.Arduino IDE:

The open-source Arduino Software (IDE) makes it easy to write code and upload it to the board. This software can be used with any Arduino board.

#### 14.ThingSpeak:

Thing Speak is an IoT analytics platform service that allows you to aggregate, visualize and analyze live data streams in the cloud. Thing Speak provides instant visualizations of data posted by your devices to Thing Speak.

### V. EXPERIMENTAL RESULTS



The results of this experiment can be seen by the controlling action of the devices. After receiving sensor data, controller decides the action to be taken according to the instructions given. Here from the output of DHT11 sensor and IR sensor, the fans and lights in the room can be automatically turned ON or OFF. Similarly, the RFID sensor detects the details of the persons by scanning their tags which can gives the access to the campus. And we have sound sensor and gas sensor for monitoring the surrounding conditions.



### VI.CONCLUSION

These kinds of Systems are required in the university campus as the area is very large and number of rooms are also large. It fulfills the goal of energy saving and helps in achieving the efficient use of energy resources.it also refers to the smart security system by adopting some sensors which makes very easy to monitoring and controlling every environmental and physical activities that's happened within the campus .it became possible to make power efficient, cost efficient, fully automated system. So, we hope our project will help our campus to became a smart campus.

### VII. FUTURE ENHANCEMENTS

The future research in IoT may concentrate on the challenges and issues discussed in the paper. In future if needed we can also add some features like key management, Smart Library etc.. In future we can deal with the quality of service

The proposed system may get slow down later as many sensors are connected. To overcome this issue, high performance microprocessors should be used in the system for better flexibility

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