

IOT BASED SMART BUILDING MANAGEMENT SYSTEM

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Abstract : Central controlling facility mechanize and take control of various operations, manages all the systems which co-ordinates various systems to provide a comfortable working environment in an efficient way.

The purpose of the smart building system is to control, monitor and optimize building services e.g., lighting; door gate open close security ; audio-visual and entertainment systems; ventilation and climate control; time attendance control and reporting. Intelligent building adjusts the inside practical aspects such as lighting, ventilation, air conditioning, etc. automatically with the changes in ecological circumstances controlled by computer. In ordinary building there will be different room circumstances depending on the changes in the environmental conditions. While planning an intelligent building, a Building service engineer, an Architect, Hardware Engineer is required. But in case of ordinary building, a Building service engineer and an Architect is enough.

In an Intelligent Building, the security system, communication system, etc. are coordinated and automatically controlled by processor work station. The cost of building of Intelligent Building is very far above the ground as compared to an ordinary building.

IndexTerms - Arduino, Fire sensor, IR sensor, RFID, LCD, Keypad

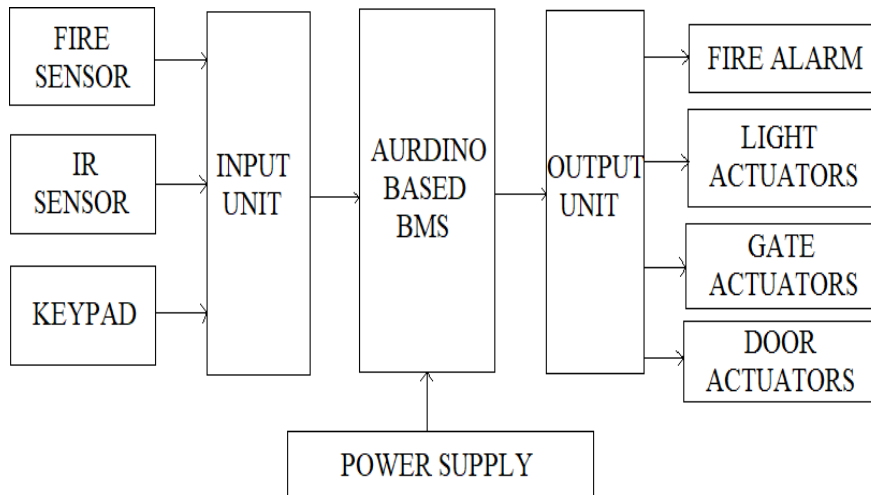
I. INTRODUCTION

Automation in buildings began long before recorded time, with the help of microprocessors. The use of dedicated software for safety and control applications began with the scientific advancement. The scheming unit in building management system mechanization is a PLC. In the comfort way of human lifestyles in the building there are many system has automated, with increase the almost all the facility to throughout all the mechanism with less economics introduces. Car parking facility, light control, fire system, gate open close, door control proposed here. Almost everywhere the parking problem is a big issue in the urban state. In this the parking ability has introduced, by automated.

Light control also the big issue, Less expenditure of the energy in the overall building as external light by automated has introduced. Keeping in the mind internal facility has also automated, controlling light in buildings be supposed to be necessary. Keeping all the belongings in the mind all the system are introduced automated here.

II. METHODOLOGY

It is important to think the project thoroughly from the beginning of the first stage towards the end of its production. Type of methodology chosen and techniques justification, hardware or software requirement and project planning will be discussed in developing of project. The success of the project will depend critically upon the effort, care and skill that apply in its initial planning. The proposed project will be developed using waterfall model whether project will be constructed following the preliminary investigation phase, analysis phase and requirement phase, system design phase, development and implementation phase, system testing phase and operation and maintenance phase.

III. SYSTEM ARCHITECTURE:**Description:**

1. Fire Sensor : The Fire sensor is second-hand to detect fire flames . The unit makes use of Fire sensor and comparator to observe fire up to a series of 1 meters.

2. IR Sensor : An infrared sensor is an electronic device, that emits in command to sense some aspect of the surrounds. An IR sensor can measure the heat of an entity as well as detects.

3. LCD Display : LCD (liquid crystal display) is the information used for display in notebook and other smaller computers. Like light-emitting diode (LED) and gas-plasma technologies, LCDs allow display to be much thinner than cathode ray tube (CRT) technology. LCDs consume a good deal less power than LED and gas-display displays because they work on the standard of blocking light rather than emitting it.

4. Aurdino : Arduino is an open-source electronics platform based on user-friendly hardware and software. Arduino boards are able to read input - light on a sensor, a finger on a but- ton, or a Twitter communication - and turn it into an output - activating a motor, turn-off on an LED, publishing a little online. You can tell your board what to do by sending a set of commands to the microcontroller on the board. To do so you use the Arduino programming language (based on Wiring), and the Arduino Software (IDE), based on handing out.

IV. IMPLEMENTATION:**Gate open:**

In this system firstly user uses the RFID card for the gate open and close. When the peoples entering into the building RFID card is required. EM18 reader module used to read RFID card. .Unauthorized people cannot enter without RFID card in the building.

Light model:

The light dependent on the persons availability . When person move from corridor then light will be ON/OFF

Door lock system model:

The next system is, user can set the door lock password using PIN to open the door. Unauthorized person cannot open the door.

Smoke alarm system:

When sensor detects the smoke or fire that time it gives alert to main system using MQ3 sensor

V. ALGORITHM*Algorithm 2 :*

Step 1: Start
 Step 2: Check PIR state.
 Step 3: If PIR = 1 then LIGHT will be ON. Step 4:
 ELSE LIGHT will be OFF.
 Step 5: go to step 2.
 Step 6: Stop.

Algorithm 3 :

Step 1: Start
 Step 2: Save PIN number in system. Step 3: Enter
 PIN number on keypad.
 Step 4: If valid PIN is entered then door will be open. Step 5: ELSE go
 to step 1.
 Step 6: Stop.

Algorithm 4 :

Step 1: Start
 Step 2: Set MQ3 sensor level for BUZZER. Step 3:
 Check MQ3 level.
 Step 4: If MQ3 level is HIGH buzzer will beep.
 ”

VI. MATHEMATICAL MODULE:

1. Input feedback
 RFID card = $C = C_1, C_2, C_3, C_4, \dots, C_n$
 where C_1, C_2, C_3 is the input RFID cards
2. Identify RFID cards $IR = I_1, I_2, I_3, I_4, \dots, I_n$ where IR is
 RFID reader
 I_1, I_2, I_3, I_4 are the identify the RFID details
3. Input features
 PIR motion detection = P $P = P_1, P_2, P_3, P_4, \dots, P_n$
 where P_1, P_2, P_3 are input string like people motion
4. Output feature
 Light will ON and OFF, $L = L_1, L_2, L_3, \dots, L_n$
 i.e. $P_1 = L_1$ $P_2 = L_2$
 $(P = L)$
5. Input feedback
 Keypad for PIN generation $PIN = Digit Door(D_1, D_2, D_3, \dots, D_n)$
 validate digit = $D_1 = X_1$ where
 X_1 is input PIN
6. Fire detection and alert $F = F_1, F_2, F_3$
 where F is Fire, Smoke and Alcohol detected F_1, F_2, F_3 is alert
 system

VII. HARDWARE REQUIREMENT:

Controller – Aurdino
 RFID module - serial communication with system(EM18 Reader, RFID card)
 MQ3 – alchohol/ smoke & fire detection
 Keypad - for opening and closing doors(for generating pin)
 PIR - motion detectors for on and off(LED)
 Buzzer - provide alert system
 Motor – 30RPM to 60RPM
 Motor Driver IC(L293D)
 LCD Display -16/2 Display unit
 GSM – sim 800
 RAM 2 GB and Hard Disk 100 GB

Working of Hardware:**Arduino :**

Arduino is an open-source electronics platform based on easy-to-use hardware and software. Arduino boards are able to read inputs - light on a sensor, a finger on a button, or a Twitter message - and turn it into an output - activating a motor, turning on an LED, publishing something online.

Fire Sensor :

The Fire sensor is used to detect fire flames. The module makes use of Fire sensor and comparator to detect fire up to a range of 1 meters.

PIR Sensor :

An passive infrared sensor is an electronic device, that emits order to sense some aspects of the surroundings. PIR sensor can measure the heat of an object as well as detects the motion.

LCD Display :

LCD (liquid crystal display) is the technology used for display. LCDs allow displays to be thinner than cathode ray tube (CRT) technology.

Fire Alarms :

An Fire alarm electronic device it may be activated automatically from smoke detectors and heat detectors. Fire alarm sounders can be set to certain frequencies.

RFID tag:

RFID tagging is an ID system that uses small radio frequency identification devices for identification and tracking purposes.

DC Motor:

DC Motors are electromechanical devices which use the interaction of magnetic fields and conductors to convert the electrical energy into rotary mechanical energy.

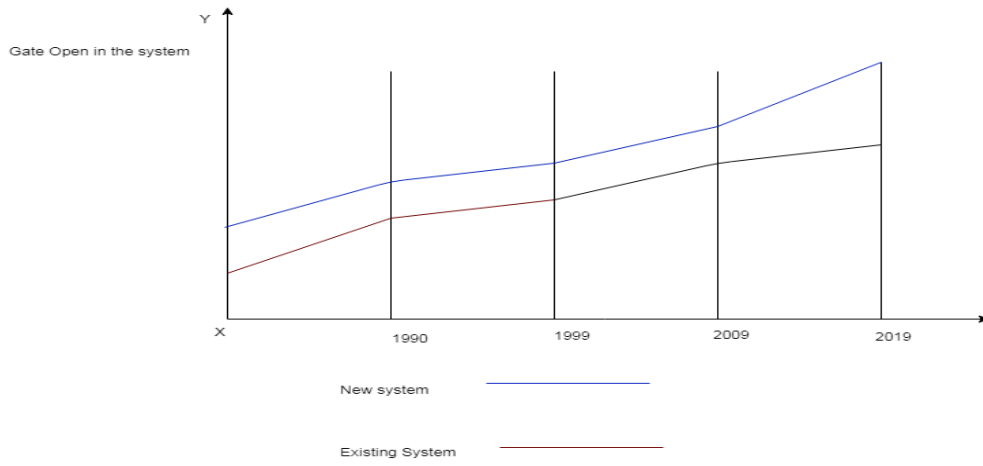
Keyboard:

Keypad library is part of the Hardware Abstraction libraries. It improves readability of the code by hiding the pin Mode and digital Read calls for the user.

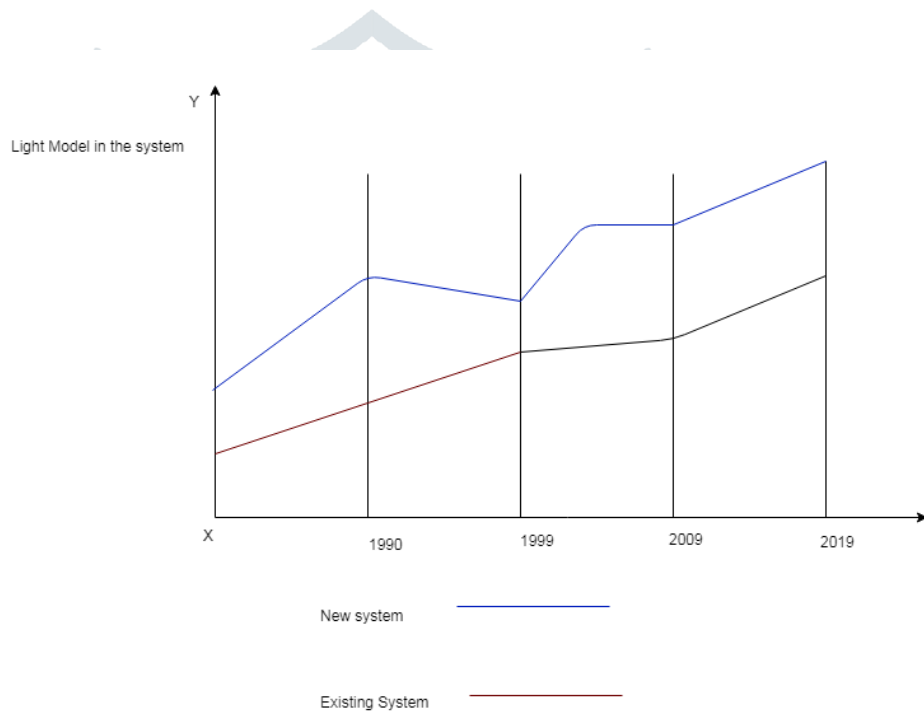
VIII. OUTCOME;

The proposed system implements RFID based gate automation system, Fire detection using IR sensor with the help of IOT technology. This kind of a system can provide good monitoring. These can be mainly used in Industrial areas, Military areas and apartments, as these places need more security. A framework of intelligent building engineering information management system is proposed here and then develop a application system.

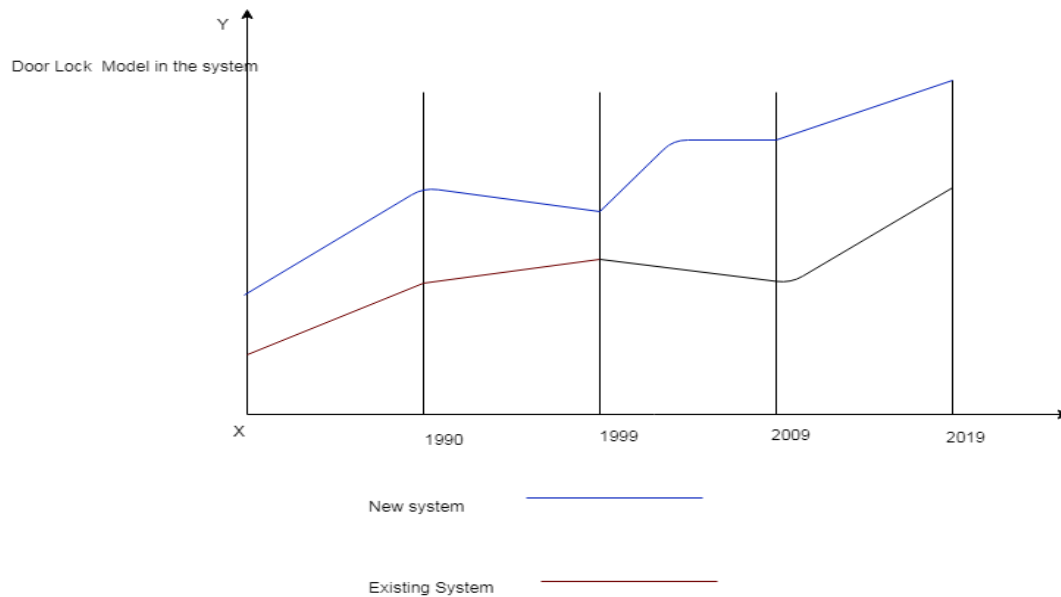
Graph of Existing and New system
 Gate open in the system



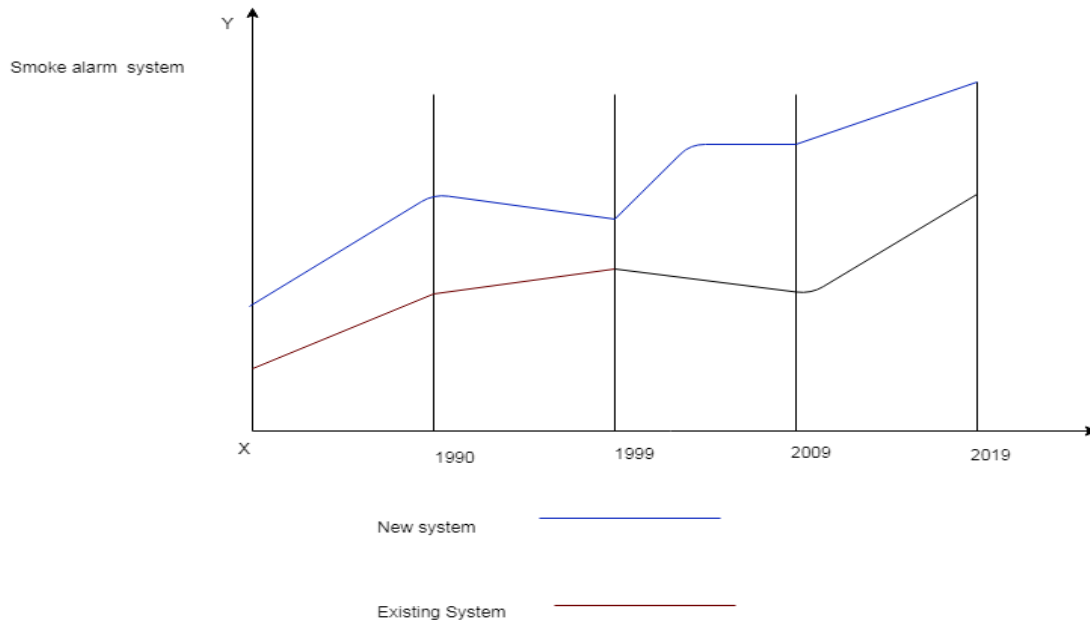
Light model in the system



Door lock model System



Smoke Alarm system



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IV. CONCLUSION

The aim of this proposed work is to provide an intelligent IoT-based building management system, facilitating a number of advanced smart building applications. Such an architecture can provide extra advantages to all- applications due to its characteristics for trustworthy and reliable exchange of data between devices and the applications, as well as due to its advanced intelligence that is brought to the system by the Automation layer.

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V. REFERENCES

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VI. SCREEN SHOTS

