International Journal of Trend in Scientific Research and Development (IJTSRD)
International Open Access Journal
ISSN No: 2456 - 6470 | www.ijtsrd.com | Volume - 2 | Issue – 3

Building a Smart Enterprise using Internet of Things

N Keerthanaa, M Logeshwari, N Aghila

Student, Department of CSE, Sri Muthukumaran
Institute of Technology, Chennai, Tamil Nadu, India

ABSTRACT

Making everything simplified is the work of an engineer, our motive of this project is to build a smart enterprise. It is preceded by using the domain Internet of Things by conducting an analysis on context of the Enterprise and mobilizing information. The Internet of Things (IoT) is dynamic global information network consisting of Internet connected objects. This project is intended to serve us a smart way to regularize a business concern. Device that runs M2M applications using M2M service capabilities.M2M devices connect to network domain and Gateway as a The M2M device connects to the network domain via an M2M gateway. M2M devices connect to the M2M gateway using M2M are a network. The M2M gateway acts as a proxy for the network domain towards the M2M devices that are connected to it. Using Internet of Things (IoT) to connect things, service, and people for intelligence operations has been discussed and deployed in many Industry domains such as Smart City, Smart energy, Health Care, Food and Water tracking, Logistics and Retail, and transportation. However, Scares information is available for IoT usage in Industrial Automation domain for Reliable and Collaborative automation. In this paper, we will clarify the specific quality attribute constraints within industrial automation, present specific industrial IoT challenges due to these constraints, and discuss the potentials of utilizing some technical solutions to cope with these challenges.

Keywords: *Arduino, Displays, NodeMCU8266, Relay, Sensors*

I. INTRODUCTION

The Internet of Things (IoT) is a recent communication paradigm, to envision the near future, in which the objects of everyday life will be equipped with microcontrollers, transceivers and sensors for digital communication, and suitable protocol stacks that will make them able to communicate with one another and with the users, becoming an integral part of the Internet. The IoT concept aims at making the Internet immersive and pervasive more than the present structure. It encompass various devices like surveillance cameras, monitoring sensors, actuators, displays, vehicles, and so on, the IoT will encourage the development of a number of applications that make use of the potentially enormous amount and variety of data generated by such objects to provide new services to people in the building. The Internet is evolving from connecting computers and dedicated terminals to a quintessential medium that can engulf a plethora of ‘‘smart’’ devices like mobile phones, electronic meters, location sensors, etc. The reducing size of silicon on chip and continuously declining price of components have increased the ease of integration of ‘‘smart’’ sensing and decision-making devices into everyday objects, leading to the emergence of the Internet of Things (IoT). The IoT relies on advancements in different fields such as communication technologies, microelectronics, data mining, big data handling, etc. In this work, we focus on the physical layer communication mechanisms for IoT devices. One of the prominent solutions for IoT is the Machine- to-Machine Communications (M2M) or Machine Type Communications (MTC), which involves the definition, design and development of communication and service mechanisms that assist in

the connectivity of different IoT devices. Wireless venture security and venture automation are dual aspects of this project. The provision for sending alert messages to concerned security personnel in case of critical situation is also built into the system. On the other hand if the owner identifies that the person entering his venture is not an intruder but an unexpected guest of his then instead of triggering the security alarm, the user/owner can make arrangements such as opening the door, switching on various appliances inside the venture, which are also connected and controlled by the micro-controller in the system to welcome his guest. The same can be done when the user himself enters the room. At the top level of this hierarchy, the management level acts as an interface to venture management and enterprise applications.

II. SMART ENTERPRISE CONCEPT AND SERVICES

Building automation is the automatic centralized control of heating, ventilation, air conditioning. Lighting and other systems through a building management system or building automation system (BAS). The objectives of building automation are improved occupant comfort, efficient operation of building systems, reduction in energy consumption and operating costs, and improved life cycle of utilities in our project we control the different electronic devices.

III. ARCHITECTURAL DIAGRAM

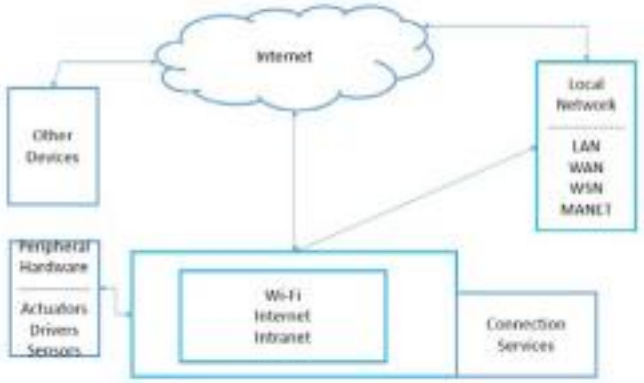


Fig.3.1 Architectural diagram for smart building

IV. CONTROLLING DEVICES

Connecting everyday objects like smart-phones, electrical devices, sensors and actuators to the Internet where the devices are intelligently linked together enabling new forms of communication between things and people, and between things themselves. Now anyone, from anytime and anywhere can have connectivity for anything and it is expected that these connections will extend and create an entirely advanced dynamic network of IoT. IoT technology can also be applied to create a new concept and wide development space for smart homes to provide intelligence, comfort and to improve the quality of life. In this paper, we present a low cost and flexible building control and monitoring system using an embedded microweb server, with IP connectivity for accessing and controlling devices and appliances remotely using Android based Smart phone app. The proposed system does not require a dedicated server PC with respect to similar systems and offers a novel communication protocol to monitor and control the building environment with more than just the switching functionality. We have utilized Web services as an interoperable application layer that can be directly integrated into other application domains like health care services, utility, distribution, or even vehicular area networks (VAN).

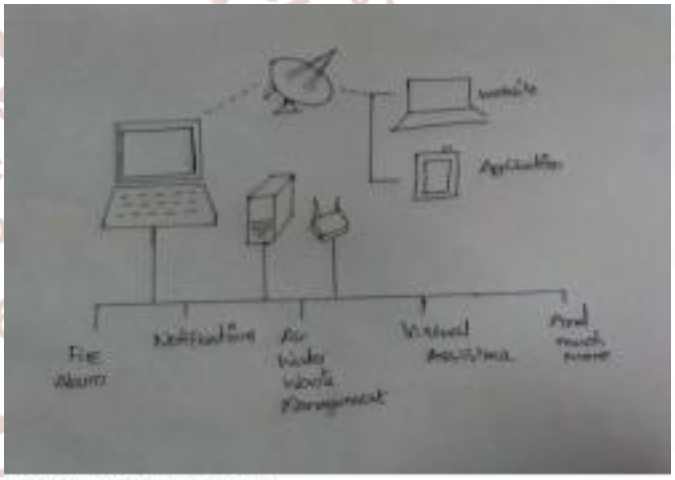


Fig.4.1. Flow of control.

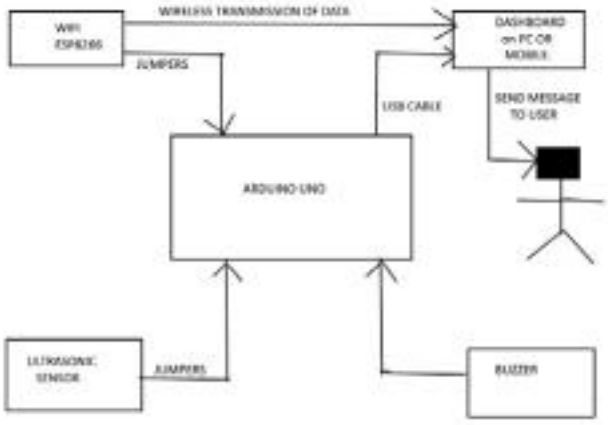
V. NOTIFICATION ACCESS

Divide the system into two different steps. The first step is configuring the notification system so that the ESP program can invoke an API and trigger the process of sending the notification. I suppose you already know the Push bullet cloud platform and you have already an account. If not, you can register for free and activate your account. In order to receive the notification, you have to install the Push bullet app on the device you want to use. You can receive the same notification on different devices at the same time. For example, if you want to receive the notification on your Android smartphone, you have to install the Push bullet app from the Google Play store. Once

your account is ready, you can go to the dashboard and get your API key. Configure the pushing box in order to receive the notification call from ESP and trigger the notification. Using an Android/Windows phone, a person will be able to find paired Bluetooth device, connect to the desired device and be able to turn fan/heater on/off from it. It can also be used to turn coffee machine on when you wake up.The phone communicates with JY-MCU Bluetooth shield that is connected to Arduino. Arduino listens to the on/off commands and activates its GPIO accordingly. This effectively turns the power relay on/off. You can connect any appliance such as fan/heater/coffee machine to it.It requires assembly of the hardware and an app. The App can be downloaded for Android or for Windows Phone. For those want to build it themselves. Take a power cord and cut one of its wires to connect to relay. Connect one end to the common terminal of the relay and other to the NO (Normally Open) terminal of the relay. Be careful that the strands do not touch any other parts. Connect relay to Arduino as per schematics. Ensure that Relay is on non-conductive surface and preferably in non-conductive enclosure. This is important because the bottom part of the RELAY exposes HIGH VOLTAGE FROM the main electrical line. DO NOT Connect cord to main yet

VI. INTRUDER ALERT

To create an intruder alarm that sends you text message alerts when motion is detected. This may sound complicated but I am pretty confident any beginner with electronics should be able to do this just fine. The range sensor senses motion and tells your Arduino board to send the text. So you can leave the intruder detector at home, connected to your network, and still receive the SMS alerts, no matter where you are, as long as you have cell phone service.This is a pretty quick and easy project, it takes maybe 45 minutes to complete. Parts can be had on if you don't mind waiting from AliExpress.com. The main cost is an Arduino board with WIFI capabilities, however once you that it can be used in tons of other projects and much more fun can be had. Using the Arduino MKR1000 board, Adafruit. The project is able to fit on a half breadboard, use 3M VHB tape to secure your battery to the bottom of the breadboard.To use a larger if necessary, the one included in the instructions will produce a modest alarm. Connecting the MKR1000 to the cloud will allow for push notifications to be sent to your phone immediately upon activation.



VII. VOICE RECOGNITION

CC3000 which is then allowing us to send parameters in this case "speech words" using mobile App which in this case is above is a hosting platform. The mobile device sends information "lowercase text string type" to the IOT "CC3000" which is interfaced with the Arduino Micro, the Servo Motor and led lamp, this information is obtained from the mobile application when the user speaks with the microphone that the application recognizes the word and sends the text match or matches "you can select that on the app", to the Arduino Micro via a UDP or TCP client "you can set on the app" that runs on the mobile application and with the help of the CC3000, so the micro Arduino can either power the servomotor or turn off the led lamp.

VIII. VIRTUAL ASSISTANCE

The AI Virtual Assistant works using an android app which is installed on the user's android phone. The android app is connected to the Arduino 101 via Bluetooth which is inturn connected to the relay and hence the electrical appliances. All the components are giving readings to the Arduino, where we are converting these readings into character code in order to send the bytes efficiently and quickly to the computer. Inside a never ending loop, every reading corresponds to a character. A code should run on the computer in order to receive the data that is being sent by arduino via serial ports. For developing the android app we are using android studio and to convert voice to text we are using the standard googleapi. For speech recognition we are using acoustic- phonetic speech parameters for speaker-independent speech

recognition in the android app. We have the AI (artificial intelligence) virtual assistant which uses deep learning techniques like CNN (Convolutional Neural Network) using python to implement the natural language processing. For the augmented reality app we are using Unity IDE and VuforiaSDK (It is an Augmented Reality Software Developments Kit (SDK) for mobile devices that enables the creation of Augmented Reality applications).

IX. AIR AND WATER QUALITY MANAGEMENT

To ensure the safe supply of the drinking water and to breathe an harmless air needs to be monitor in real time. we present a design and development of a low cost system for real time monitoring of the water and air quality in IOT(internet of things).The system consist of several sensors is used to measuring physical and chemical parameters of the water and air. The parameters such as temperature, PH, turbidity, conductivity, dissolved oxygen of the water can be measured. The measured values from the sensors can be processed by the core controller. The ARDUNIO board used as a core controller. Finally, the sensor data can be viewed on internet using cloud computing.

X. WASTE MANAGEMENT

An **Ultrasonic Sensor** is used for detecting whether the trash can is filled with garbage or not. Ultrasonic Sensor is installed at the top of Trash Can and will measure the distance of garbage from the top of Trash can and we can set a threshold value according to the size of trash can. If the distance will be less than this threshold value, means that the Trash can is full of garbage and we will print the message "Basket is Full" on the webpage and if the distance will be more than this threshold value, then we will print the message "Basket is Empty". Here we have set the Threshold value of 5cm in the Program code.

XI. HEAD COUNTS

High end counters use sophisticated hardware for counting process. Our project is a simple objects counter based on Arduino and two IR sensors. More in details, it is a 0 to 9 counter in which the first sensor is used to count ingoing people, the second those outgoing. The difference (IN - OUT) is shown on a 7-segments display.Focusing on the *7-segments display***SMA42056,** this is an electronic component designed to for display numbers and often used in digital clocks, electronic meters and other kind of numeric displays.The SMA42056 model is a common cathode 7-segments display with eventually an additional segment called decimal point or simply dot, represented by the P letter (See Fig.2), which is used for displaying non-integer numbers. Each segment is just a simple LED, and is often represented by the letters from A to G. The 7-segment display doesn't embed a series resistor for each LED and driving them with a constant DC voltage can permanently damage junctions: to avoid this we will use a series resistor of 220Q for each LED. Improve parking systems. It guides driver to find nearest parking slots.

XIII. HEALTH CARE EMERGENCIES

The scope of the "emergency call" is to call and as well as message the present location where we are, to the nearby hospitals by activating sensors either by sound inputs or pressing the buttons present in the building. Another aim is to repeat the same process i.e. calling and message sending after 15mins to the other contact. Message in the form of SMS i.e. the location will be sent to every number. This will help when the previous call is disconnected or does not respond after 15mins it will be connecting to the e other contact selected and followed by location in the form of SMS.

XIV. FIRE ALERT

Autonomous fire alert system is designed, It has fire sensors interfaced in its control circuitry which senses the presence and intensity of fire and take the responsive action accordingly. The device is designed to detect intensity of fire and operate first at place where the intensity of fire is more. It is also an automatic device as it does not need to be operated from any remote control. The control circuitry of the device is built on Arduino. There are fire sensors all around the building which detect the fire and send message to the nearby fire station for the arrival of the rescue team and the fire extinguisher stations will also be telecasted by the voice assistance. The Arduino sketch is written and compiled using Arduino IDE.

XV. PARKING GUIDANCE

In a smart enterprise, parking is a important thing to control congestion in a smart way. Here we uses cloud based architecture using Internet of Things (IOT). This system helps to find the inefficient use of parking space and uneven distribution of traffic which leads to congestion in vehicular traffic. This paper

introduces a novel technique based on Internet of Things platform to

XVI. CONCLUSION

Thus a Smart Enterprise is designed by The IoT landscape is moving from higher level, cloud based processing to a intelligence model in which data driven decision making is migrating towards the edge nodes(things).The processing at the end node level is promoted as the devices have most sophisticated processing power and the ability to communicate important trends or differentials.Predictive data at the finger tips enable better, faster and empowered solution.

REFERENCES

1. Ahmed ElShafee, Karim AlaaHamed," Design and Implementation of a WiFi Based Home Automation System", International Journal of Computer, Electrical, Automation, Control and Information Engineering Vol: 6, No: 8, 2012.
2. HayetLamine and HafedhAbid , "Remote control of a domestic equipment from an Android application based on Raspberry pi card", IEEE transaction 15th international conference on Sciences and Techniques of Automatic control & computer engineering - STA'2014, Hammamet, Tunisia, December 21-23, 2014.
3. Amir Rajabzadeh, Ali Reza Manashty, and Zahra ForootanJahromi (2010) 'A Mobile Application for Smart HouseRemote Control System' -An International Journal.
4. Rita Yi Man Li (2013) 'The usage of Automation System in Smart Home to provide a Sustainable Indoor Environment: A Content Analysis in Web 1.0'- International Journal of Smart Home Vol. 7, No. 4, July, 2013. Rita Yi Man Li.
5. Rajeev Piyare(2013) 'Internet of Things: Ubiquitous Home Control and Monitoring System using Android based Smart Phone'-International Journal of Internet of Things 2013, 2(1): 5-11).
6. Amir Rajabzadeh, Ali Reza Manashty, and Zahra ForootanJahromi (2010) 'A Mobile Application for Smart HouseRemote Control System' -An International Journal.
7. Rita Yi Man Li (2013) 'The usage of Automation System in Smart Home to provide a Sustainable Indoor Environment: A Content Analysis in Web 1.0'- International Journal of Smart Home Vol. 7, No. 4, July, 2013. Rita Yi Man Li.
8. Rajeev Piyare (2013) 'Internet of Things: Ubiquitous Home Control and Monitoring System using Android based Smart Phone'-International Journal of Internet of Things 2013, 2(1): 5-11).
9. Kim Baraka, Marc Ghobril, Sami Malek, RouwaidaKanj, AymanKayssi ,"Smart Power Management System For Home Appliances And Wellness Based On Wireless Sensors Network And Mobile Technology", ,2015 XVIII AISEM Annual Conference, 978-1-4799-8591-3/15©2015 IEEE.
10. Shiu Kumar," UBIQUITOUS SMART HOME SYSTEM USING ANDROID APPLICATION ", International Journal of Computer Networks & Communications (IJCNC) Vol.6, No.1, January 2014.
11. Teymourzadeh, Rozita, et al. "Smart GSM Based Home Automation System." *Systems, Process & Control (ICSPC), 2013 IEEE Conference on.* IEEE, 2013.
12. *Singh, Navab, et al. "Remotely controlled home automation system. "Advances in Engineering and Technology Research (ICAETR), 2014 International Conference on. IEEE, 2014.*
13. PavithraD,IoT based Monitoring and Control System for Home Automation,Proceedings of 2015 Global Conference on Communication Technologies(GCCT 2015)
14. Wenbo, Yan, Wang Quanyu, and GaoZhenwei. "Smart home implementation based on Internet and WiFi technology." *Control Conference (CCC), 2015 34th Chinese.* IEEE, 2015.
15. *Gurek, Alper, et al. "An android based home automation system." High Capacity Optical Networks and Enabling Technologies (HONET-CNS), 2013 10th International Conference on. IEEE, 2013.*
16. Bhide, VishwajeetHari, and SanjeevWagh. "i-learning IoT: An intelligent self-learning system for home automation using IoT." *Communications and Signal Processing (ICCSP), 2015 International Conference on*. IEEE, 2015.
17. Gamba, Mattia, Alessandro Gonella, and Claudio E. Palazzi. "Design issues and solutions in a modern home automation system." *Computing,*

Networking and Communications (ICNC), 2015 International Conference on. IEEE, 2015.

18. Gubbi, Jayavardhana, et al. "Internet of Things (IoT): A vision, architectural elements, and future directions." *Future Generation Computer Systems* 29.7 (2013): 16451660.
19. Karimi, Kaivan, and Gary Atkinson. "What the Internet of Things (IoT) needs to become a reality." *White Paper, Free Scale and ARM* (2013).
20. Stankovic, John. "Research directions for the internet of things." *Internet of Things Journal, IEEE* 1.1 (2014): 3-9.F
21. "Understanding the Internet of Things (IoT) ", July 2014. Gubbi, Jayavardhana, et al. "Internet of Things (IoT): A vision, architectural elements