

Wireless Industrial and Home Automation using Internet of Things

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Abstract: Automation makes the life easy and simple, which overcomes the drawbacks of manual system. Industrial and Home Automation system is a new trade of modern system. Internet of things (IoT) is the latest and emerging internet technology and useful for transferring information and complete tasks while you are busy with other activities. This system uses computers or mobile devices to control basic home as well as your office probably shop floor or company functions and features automatically through internet from anywhere around the world.

Keywords: Industrial and Home Automation system, manual system, Internet of things (IoT).

I. INTRODUCTION

Nowadays home and industrial automation systems are used more and more. These types of systems are useful not only to increase comfort, but also allow centralized control of heating, ventilation, air condition and lighting. Similarly Wireless technologies are becoming more popular. Wireless technology gives relieve from cabling system [1]. There are different wireless technologies like GSM, Bluetooth, Wifi, IoT etc. are mostly used in the automation system. Use of Internet is growing platform for automation system provides easily monitor as well as control through internet, also provides live data monitoring. This type of system provides the security to those employ working within those industries [2]. In this paper we present a low cost secure flexible industrial and home automation system.

II. LITERATURE SURVEY

Bhosale Kiran Uttam et al. [2] present a system which will automatically monitor the industrial applications and generate Alerts/Alarms or take intelligent decisions using concept of IoT. This system provides safety from leaking of raw gas, fire and gives the signals in terms of alarm. This system access the live data and also control the device interaced with our system. Ashwini Deshpande et al. [3] present the IOT based industrial automation system, which will automatically monitor the industrial applications and generate Alerts/Alarms or take intelligent decisions with the help of Artificial Intelligence.

Mahesh N. Jivani [4] developed GSM (Global System Messaging) based secured device control system using App Inventor for Android mobile phones, GSM Home Appliance System (GHAS) is to use mobile phones inbuilt SMS facility and GSM Modem for automation of Home Appliances. Sougata Das et al. [5] developed system for household appliance control using cell phone through global system for mobile communication (GSM) technology. This proposed system allows the home owner or user to monitor and control the home appliances via mobile phone set by sending commands in the form of SMS messages.

III. Objectives of Project

The main objective behind developing an automation system is,

- To develop a home and industry automation system based on IoT platform for operating household operations and controlling industrial relays.
- To develop a user friendly interface for the system to operate equipments on internet.
- To develop cost effective, compact and user friendly IoT based Home and industry Automation System.

IV. System Working

Figure 1 shows the block diagram of system, system consist of two nodes i.e. Node1 and Node2 each attached with its respective node MCU controller and Wi-Fi Module attached with it.

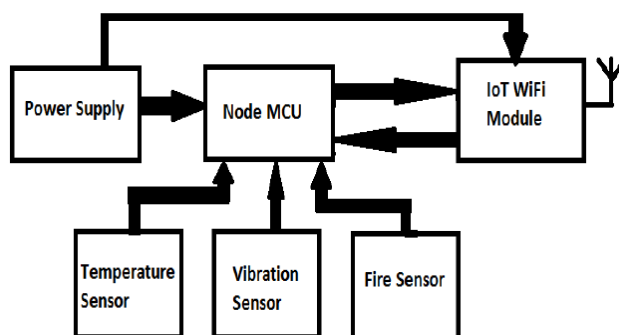


Figure 1a System Architecture Node1 Trans-receiver

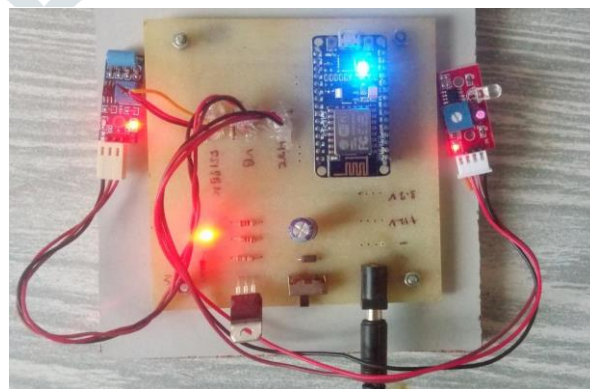


Figure 1 b Actual Node 1 Transceiver

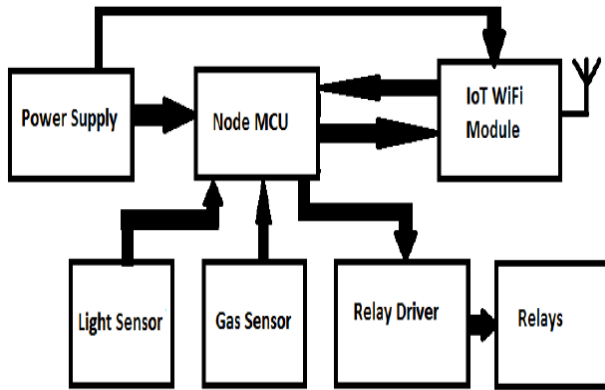


Figure 1a System Architecture Node2 Trans-receiver

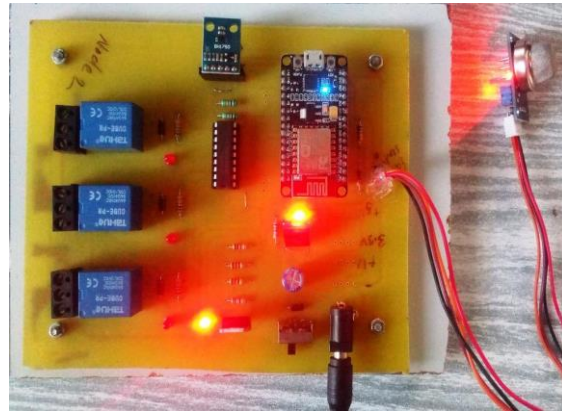


Figure 1 b Actual Node 1 Transreceiver

a. Node 1

This trans-receiver consists of DC power supply as an input which will be applied from DC input with a voltage regulator circuitry. This supply is applied to controller and Wi-Fi module. There are three sensors attached to node1 controller. To detect room atmosphere temperature sensor is connected at respective location. To detect vibrations additional sensor is attached to node controller and to detect fire additional fire sensor is connected in a system. The data will be collected by all three sensors and same will be given as input to the controller. The controller is online with the help of Wi-Fi module attached with it. Any change in desired parameter related to these sensors will be detected by the controller and accordingly corrective action will be executed by it for turning on the fire alarm or to indicate the vibrations.

b. Node 2

This trans-receivers consist of DC power supply as a input which will be applied from DC input with a voltage regulator circuitry. This supply is applied to controller and Wi-Fi module. There are two sensors attached to node2 controller. To detect gas leakage at home, gas sensor is connected at respective location. To detect intensity of light in room light sensor i.e. photo diode is attached to node controller. The data will be collected by these sensors and same will be given as input to the controller. The controller is online with the help of Wi-Fi module attached with it.

Any change in desired parameter related to these sensors will be detected by the controller and accordingly relay will be turned on or off to control fans and light at home.

Node 1 system will be present at industry and Node 2 system will be present at home. These two systems are interconnected with each other over the internet and it can communicate with each other. Both system will take power from the 230V AC supply and will convert in to DC for utilization. Instead of adaptor of DC supply alternate solution is to use battery source. All sensors are operating on battery source.

c. Node MCU

Lolin Node MCU V3 is an open source IoT platform. It uses the Lua scripting language. The eLua project is the basis of board, and built on the ESP8266 SDK. Node MCU uses many open source projects, such as lua-cjson, and spiffs. The Node MCU runs on the ESP8266 Wi-Fi SoC and hardware which based on the ESP-12 module. The Lolin NodeMCU V3 board ads USB/UART converter chip as well as decoupled LDO power supply. Figure 3 shows the Node MCU.

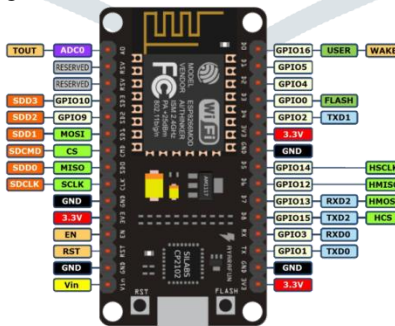


Figure 3 Node MCU

V. Result

The developed system is tested for its functionality and it has been observed that all sensors are interacting with the Node MCU properly. The desired operation of tripping respective relay is achieved. Figure 4 shows the Adafruit Dashboard of the system. Following are the observations and action for respective sensors.

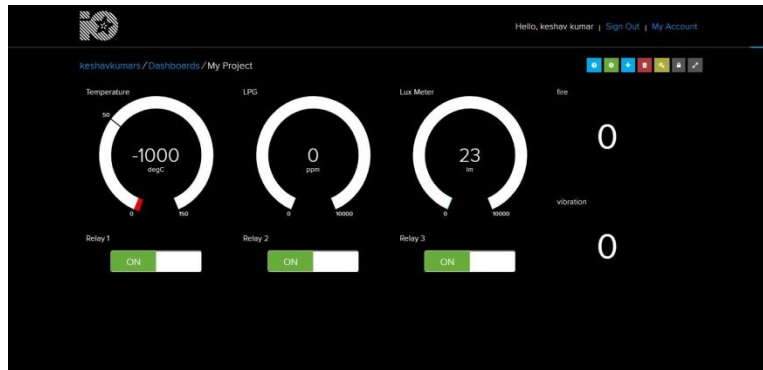


Figure 4 Adafruit Dashboard

a. Light sensor observations

Table 1 Light Sensor outputs

| ID | Value | Feed id | Created at |
|-----------------------------|-------|---------|-------------------------|
| 0E5E24KBYSZZSF9QARV69SSQSB | 0 | 797561 | 2019-05-16 11:36:20 UTC |
| 0E5FN1B35AZXM0B WQYT66ZGES7 | 53 | 797561 | 2019-05-18 11:02:46 UTC |
| 0E5FN1FSYEX4JFMQVVSFGFT9QN1 | 28 | 797561 | 2019-05-18 11:03:01 UTC |
| 0E5FN1NG2SSFSZ4N88Q81T2XYH | 21 | 797561 | 2019-05-18 11:03:20 UTC |
| 0E5FN1T6TMEJAGQP03S5EZQYD3 | 1502 | 797561 | 2019-05-18 11:03:35 UTC |

b. Fire sensor

Table 2 Fire Sensor outputs

| ID | value | Feed id | Created at |
|-----------------------------|-------|---------|-------------------------|
| 0E5E0ZJ4WDTM6YNS5FPNAPVP1E | 1 | 797604 | 2019-05-16 10:31:36 UTC |
| 0E5E0ZN9RPST3FFX920MT4JYYX | 1 | 797604 | 2019-05-16 10:31:47 UTC |
| 0E5E0ZREK6FB5EWRFA YNRWTJZA | 1 | 797604 | 2019-05-16 10:31:57 UTC |
| 0E5E0ZVKBAWG2MD31SHNZOVCGW | 1 | 797604 | 2019-05-16 10:32:07 UTC |
| 0E5E0ZYR3JJGRM9MVTJ5YJM3SM | 1 | 797604 | 2019-05-16 0:32:17 UTC |

c. Temperature sensor

Table 3 Temperature Sensor outputs

| ID | value | feed id | created at |
|------------------------------|-------|---------|-------------------------|
| 0E5DYWM6DK3N0V6DZ3F9T85QGJ | 35 | 797607 | 2019-05-16 08:34:37 UTC |
| 0E5DYWQCBRDPKS5YP02S78NF0H | 34 | 797607 | 2019-05-16 08:34:48 UTC |
| 0E5DYWTJ1IQRWDBN3M4W70CJ8X | 32 | 797607 | 2019-05-16 08:34:58 UTC |
| 0E5DYWXS8JJ4C1F9YTG0K9RM8X | 39 | 797607 | 2019-05-16 08:35:09 UTC |
| 0E5DYX0ZSS773NWA VSA A7XD1R0 | 40 | 797607 | 2019-05-16 08:35:19 UTC |

d. Vibration sensor

Table 4 Vibration sensor outputs

| id | value | Feed id | Created at |
|----------------------------|-------|---------|-------------------------|
| 0E5E13H3MKKRS7F10ZW695PYNK | 1 | 801724 | 2019-05-16 10:38:32 UTC |
| 0E5E13ME13VRKWD3WN1TBK8QHZ | 1 | 801724 | 2019-05-16 10:38:43 UTC |
| 0E5E140RRF6N8MZFWD3044JTH | 1 | 801724 | 2019-05-16 10:39:24 UTC |
| 0E5E1460YRWHWCSBVG10GV430 | 0 | 801724 | 2019-05-16 10:39:41 UTC |
| 0E5E149DT1H14314DASEQAHTY | 1 | 801724 | 2019-05-16 0:39:52 UTC |

e. Gas sensor

Table 5 gas sensor outputs

| ID | value | Feed ID | Created at |
|-----------------------------|-------|---------|-------------------------|
| 0E5DYWYGJ0DW8E7KR7QB95VSDM | 79 | 797564 | 2019-05-16 08:35:11 UTC |
| 0E5DYX376C4FPGNAE61TWVBHWC | 44 | 797564 | 2019-05-16 08:35:27 UTC |
| 0E5DYX7XT7WS8YTG NHBKZBN4AS | 31 | 797564 | 2019-05-16 08:35:42 UTC |
| 0E5DYXCMEXTZVMJ62HXNWFZB0C | 25 | 797564 | 2019-05-16 08:35:58 UTC |
| 0E5DYXHB3SNS34Y1P94AHS6J26 | 22 | 797564 | 2019-05-16 08:36:13 UTC |

VI. Conclusion

A wireless industrial and home automation using internet of things and Arduino is developed with provision of relays for controlling operations. The overall developed system is interactive and user friendly and can control home as well as industrial appliance & load. The implemented system is quite cost effective, compact and user friendly. This system reduces the work of the industry person to a great extent. It also reduces the difficulty faced by the old age people, physically disabled peoples and when they are alone at home. The implemented system is a prototype of the proposed system and more cost reduction and reduction of size of the system is possible when it is developed as a product on a large scale.

References

- [1] R.Piyare and M.Tazil, "Bluetooth Based Home Automation System Using Cell Phone", 15th International Symposium on Consumer Electronics, IEEE, 2011.
- [2] Bhosale Kiran Uttam, Galande Abhijeet Baspusaheb, Jadhav Pappu Shivaji, Prof. Pisal R. S., "Industrial Automation using IoT", International Research Journal of Engineering and Technology (IRJET), Volume 04, Issue 06, June-2017.
- [3] Ashwini Deshpande, Prajakta Pitale and Sangita Sanap, "Industrial Automation using Internet of Things (IOT)", International Journal of Advanced Research in Computer Engineering & Technology (IJARCET), Volume 5 Issue 2, February 2016.
- [4] Mahesh N. Jivani, "GSM Based Home Automation System Using App-Inventor for Android Mobile Phone", International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering, Vol. 3, Issue 9, September 2014.
- [5] Sougata Das, Nilava Debabhuti, Rishabh Das, Sayantan Dutta and Apurba Ghosh, "Embedded System for Home Automation Using SMS", First International Conference on Automation, Control, Energy and Systems (ACES), IEEE, 2014.

