

## Industrial Automation Over IoT using Aurdino

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**Abstract:** IoT or internet of things is a technology that makes use of control systems such as computer to control the physical devices over the internet. Here we propose efficient industry automation system that allows user to efficiently control industry appliances/machines over the internet. We use four loads as industrial appliances or machines and a motor to demonstrate as an industrial motor.

**Keywords:** Smart Home, IoT, WiFi.

### I. INTRODUCTION

The AVR family microcontroller is used by our system for processing all user commands. For the connection to the internet and to receive the user commands a Wi-Fi modem is used. WIFI modem receives the commands which are sent through the internet. The received information is decoded by the WiFi modem and passed to the microcontroller. The microcontroller then takes necessary actions as per user's commands. The state of the system is displayed on the LCD display. Thus the entire industry is automated using online GUI for easy industry automation. Since today is the generation of smart phones, people prefer smart work. Same goes with the industries. The term automation has led to a great change in the world of industries. Some industries are fully automated while other are partially automated. In short automation has become an important term, whether at home or the industries. Our project focuses on the industrial automation. The machines can be controlled manually from long distance as well.

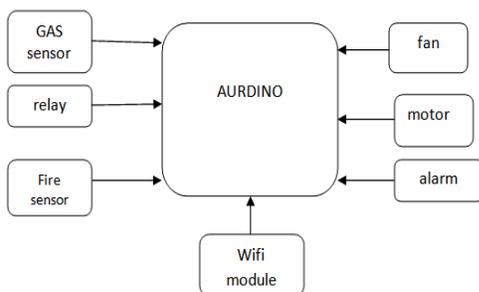


Fig1. Block diagram of Industrial automation system.

### II. INDUSTRIAL AUTOMATION SYSTEM

Industrial Automation using sensing based application-The system makes use of microcontroller and various sensors to

control the industrial devices using IOT. Industrial Automation using Internet of Things-The industrial devices are controlled using cloud server which alerts the admin about uneven conditions. Industrial Automation Using Internet of Things (IOT) in this paper, they are developing a system which will automatically monitor the industrial applications and generate Alerts/Alarms or take intelligent decisions using concept of IOT.

### II. HARDWARE DETAILS

#### A. Power Supply

In this project circuits and motor are used which require +12V & +5V (DC) supply, to fulfill this requirement we have used following circuit of power supply which provides regulated +12V & +5V(DC).

#### B. Working

Four diodes (IN4007) are connected to secondary of transformer in bridge for rectifying AC into DC Capacitor 1000 mf & 1mf are used as a filter red led shows that rectification and filtering is ok. 7805 IC is used as a 5V regulator it converts 12V into regulated +5V DC green led shows that output of 7805 is ok.

#### C. Aurdino

A microcontroller board on which the Arduino Uno is based is ATmega328P. The microcontroller has 14 digital input/output pins of which 6 can be used as PWM outputs, 6 analog inputs, a 16 MHz quartz crystal, a USB connection, a power jack, an ICSP header and a reset button. ATmega328P contains everything needed to support the microcontroller. It is connected to computer using a USB cable or given a power supply with AC-to-DC adapter. In case of any severe damage, it can be replaced with a new chip. The meaning of word "Uno" is one in Italian and was chosen to mark the release of Arduino Software (IDE) 1.0. The reference versions of Arduino were the Uno board and version 1.0 of Arduino Software (IDE). The Uno board is the reference model and first in the series of USB Arduino boards, for an extensive list of current, past or outdated boards.

#### D. Wifi Module

This is reliable and ultra-low cost module that is based on ESP8266 chipset and easy to use. It is used along with a

microcontroller that configures and communicates through AT commands. The embedded Wi-Fi solutions were a bit pricey to implement for hobbyist. This WiFi module has wide working range and many applications.

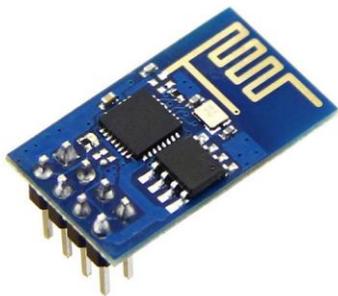


Fig2. Wifi Module.

#### E. Applications:

- Internet of things
- Wireless remote control
- Smart plug and lights
- Wireless UART
- IP Cameras
- Wireless sensor networks

#### III. FEATURES

- Built inclient-server mode
- Integrated 10bit ADC
- 400 Meters working distance
- Integrated TCP/IP protocol stack
- On board 2.4Ghz ceramic antenna

Microcontroller access to the Wi-Fi network is given by the ESP8266 which has self-contained SOC with integrated TCP/IP protocol stack. Hosting an application or offloading all Wi-Fi networking functions from another application processor is the function of this module. Every ESP8266 module is pre-programmed with an AT command set firmware. With a huge, and ever growing, community this module is extremely cost effective. This module can be integrated with the sensors and other application specific devices due to its powerful enough on-board processing and storage capability through its GPIOs with minimal development up-front and minimal loading during runtime. Minimal external circuitry, including the front-end module, is allowed by its high degree of on chip integration is designed to occupy minimal PCB area. APSD for VoIP applications and Bluetooth co-existence interfaces; is supported by the ESP8266. Its ability to work under all operating conditions, and require no external RF parts is due to a self-calibrated RF. The amazing community support provides all the information for ESP8266.

Note: The ESP8266 Module is not capable of 5-3V logic shifting and will require an external Logic Level Converter. Please do not power it directly from your 5V dev. board.

#### A. GAS sensor

TGS 813 is a general purpose Sensor that has good sensitivity characteristics to a wide range of gases. This

device is designed to operate with a stabilized 5V heater supply and a circuit voltage depends up the design. The most suitable application for the TGS 813 is the detection of methane, propane and butane, which makes it an excellent Sensor for domestic gas, leak detectors.

- High sensitivity to LPG, natural gas , town gas
- Small sensitivity to alcohol, smoke.

#### IV APPLICATIONS

They are used in gas leakage detecting equipments in family and industry, are suitable for detecting of LPG, natural gas , town gas, avoid the noise of alcohol and cooking fumes and cigarette smoke.

##### A. Temperature sensor

The LM35 series are precision integrated-circuit temperature sensors, whose output voltage is linearly proportional to the Celsius (Centigrade) temperature. The LM35 thus has an advantage over linear temperature sensors calibrated in° Kelvin, as the user is not required to subtract a large constant voltage from its output to obtain convenient Centigrade scaling. The LM35 does not require any external calibration or trimming to provide typical accuracies of  $\pm 1/4^{\circ}\text{C}$  at room temperature and  $\pm 3/4^{\circ}\text{C}$  over a full  $-55$  to  $+150^{\circ}\text{C}$  temperature range. Low cost is assured by trimming and calibration at the wafer level.

##### B. Fire sensor

The methods of temperature measurement may be divided into two main classes according as the exchange of heat between the testing body and the hot system takes place by contact or by radiation across a space. In the contact methods, thermometers or thermocouples are used and they are immersed in solids or liquids. The thermodynamic equilibrium between the hot body and the testing body is established by material contact. In the non-contact methods, the thermodynamic equilibrium is established by the radiation emitted as excited atom and molecules in the hot body return to the ground state.

- Calibrated directly in ° Celsius (Centigrade).
- Linear + 10.0 mV/°C scale factor.
- 0.5°C accuracy guarantee able (at +25°C).
- Rated for full -55° to +150°C range.
- Suitable for remote applications.
- Low cost due to wafer-level trimming.

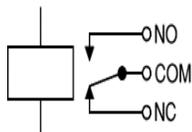
##### C. Relay

A relay is an electrically operated switch. Current flowing through the coil of the relay creates a magnetic field which attracts a lever and changes the switch contacts. The coil current can be on or off so relays have two switch positions and they are double throw (changeover) switches. The relay's switch connections are usually labelled COM, NC and NO:

- COM = Common, always connect to this, it is the moving part of the switch.
- NC = Normally Closed, COM is connected to this when the relay coil is off.
- NO = Normally Open, COM is connected to this when the relay coil is on.

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Relays allow one circuit to switch a second circuit which can be completely separate from the first. For example a low voltage battery circuit can use a relay to switch a 230V AC mains circuit. There is no electrical connection inside the relay between the two circuits, the link is magnetic and mechanical.



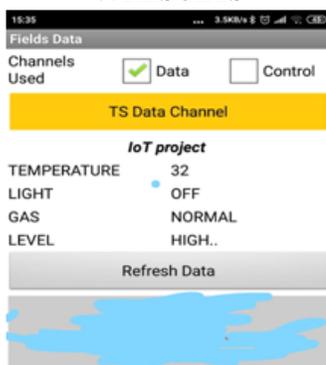
**Fig3. Basic Circuit For Relay.**

Procedure for execution:

1. Initialize ESP8266 WiFi module.
2. Open the Aap and monitoring the parameters and control the loads.
3. Wait for the Aap to open, it will look something like this.
4. Press the buttons to control any device.

Using port forwarding method, the concept of IOT will be implemented.

### V. RESULTS



**Fig4. Results.**

### VI. CONCLUSION

The goal of the project was to design a system, which should be easy to implement, and short ranged. The paper is implemented through onboard Wi-Fi, which is inbuilt in the mobile phones having an Android as its system. Here we propose efficient industry automation system that allows user to efficiently control industry appliances/machines over the internet. We use four loads as industrial appliances or machines and a motor to demonstrate as an industrial motor.

### VII. REFERENCES

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