

# IOT Based Sugar Industry Real Time Parameters Monitoring by Using Esp32

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## ABSTRACT

Today's world is internet world; Internet of Things (IoT) is expanding at rapid rate increasing technology. A network of connected computers hidden in every corner of our life monitoring and controlling things with minimal IOT supports to connect hard ware devices to the internet to process the data for monitoring and security. This system uses ESP32 and sensors helps to monitor the different parameters of big sugar industry like AC load, DC load, and temperature, level, Fan speed etc. are accessed and monitored from remote area by using My SQL and publish on webpage automatically. This system is very useful for small scale industry for to achieve maximum throughput and to avoid from accidents by it is a simple, smart monitoring and security system and also tells the importance of IoT in industrial applications. Proposed method very well suitable for small scale industries monitoring and controlling.

**Keywords** — IOT, Wi-Fi, ESP32, MYSQL, Web Page;

## INTRODUCTION

Now a day's intelligent monitoring system playing a major role in present day to day life. IoT playing a vital role in designing smart and intelligent system in industrial and information technology applications. IoT is a combination of embedded and communications system which interconnects hardware devices to the internet. Industrial monitoring is used to know dynamic condition of industrial devices or machines.

monitor several common parameters used in industries applications such as Smoke, Gas, Fire, Humidity and machine control using IoT. In this proposed system ESP32 Wi-Fi module is used for collecting data from equipment's and transfer it into a wireless internet, parameters are uploaded in the MYSQL database and continuously monitored on webpage. ESP32 is the most advanced integrated circuit with Wi-Fi module in the industry; it consists of inbuilt microcontroller and antenna with less expense. Hence this helps to transfer of data, statistics, logs and various other parameters information among various devices to improve performance, of the system. Sugar industry real time parameters Monitoring system consists of Monitoring, Ac Load, DC load, Temperature, Level, Fan speed and also control the water level and Temperature control system.

### Trends driving IoT:

1. Moore's law
2. Connectivity

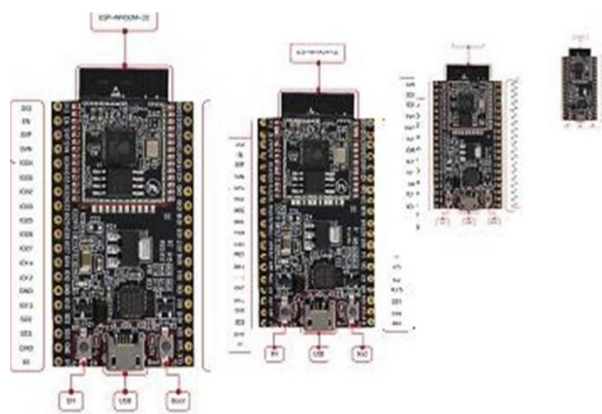


Fig 1: shows Moore's law.

In this paper IoT application was implemented to

1. Moore's law: Exponential increasing power

consumption because of number of transistors in a chip doubled and tripled for every 18-24 months due to evolution in VLSI technology. The Moore's theory predicts that processors and electronic devices used in the IoT applications will become powerful, cheaper and smaller. Sinking of Integrated circuits.

2. Connectivity: By 2020-20 it is expected there will be 30-50 billion connected devices in worldwide,

**Fig 2: Shows IoT connectivity.**



**Fig: Shows function of Sensors and motors.**

Sensors: Detects what happening in the world  
 Processor: Analyze and process digital data, and sends commands to the actuators.

Actuators: Transforms the data into useful output (Visualization/action/response)

Proposed paper consists of 5 modules, II represents related work, III represents proposed method IV related to design and implementation, V and VI describes results and conclusion.

**RELATED WORK**

Different IoT based applications are used for monitoring and control the systems parameters, whereas the communication between module and a user is realized via wireless communication techniques these communication techniques are restricted to simple applications because of their slow communication speeds, distances and low data security because of full range of encryption techniques are not available. Nowadays, timer- controlled systems have been easily replaced with remote controlled systems after the internet became widespread. In these systems, it is known as an important issue to get information about not only the control, but also the conditions of the machines or devices through internet. In accordance with this need, there are some works about implementation of condition monitoring of system through internet and development of internet-based remote controlling or monitoring practices.

Previous implementation “Industrial monitoring system using ESP8266” explains about liquid level monitoring, DC motor speed control, color mixing and energy monitoring using PLCs [3]. “Industrial process monitoring using Raspberry” implemented to measure of light intensity, temperature, liquid level monitoring, system and user is connected by using Wi-Fi module

[5].

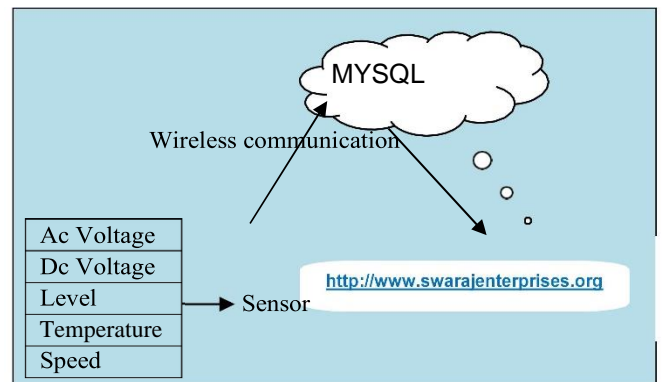
“Industrial automation using Zigbee” Zigbee system is based on wireless sensor network used for regulating and supervising different processes in industries without distracting other processes [7].

Paper on home atomization using IoT. IoT is fore part of this system to minimize human efforts. The main aspect of this system to monitor and control the home appliances proposed paper was implemented using ESP32.

ESP32 is the advanced device suitable for IoT applications in terms of properties and price. ESP32 available in various versions and user-friendly even students can connect it on bread boards easily for laboratory applications. ESP32-Dev kit is perfect solution for implementation of different education application [1].

In the proposed system related work implemented in smarter way with module using ESP32- Dev module which consists of in-built Wi-Fi Blue tooth module no need to connect external board to provide Wi-Fi, and also consists of inbuilt temperature, Ac Load, DC load, Temperature, Level, Fan speed on webpage.

I.



II.

**PROPOSED WORK**

This system is implemented with ESP32-DEV module by interconnecting DC motor and distinctive sensors like Ac Load, DC load, Temperature, Level, Fan speed on web page. The sensor parameter variation is uploaded to the webpage. Through the Cloud all sensors in the industrial applications are monitored easily and efficiently. If the sens opera meters limit exceeds than specified limit motor or load which is connected to the load automatically triggered and in formed through SMS or electronic mail to the registered users such application very uses full for small scale industry. In this system, industrial processes like energy meter monitoring, DC speed control, Temperature, Humidity, Gas

levels and Fire accidents if any are monitored through android mobiles, and parameters data can be

updated periodically by using cloud.

The basic block diagram for industrial process monitoring using IoT as shown in figure:

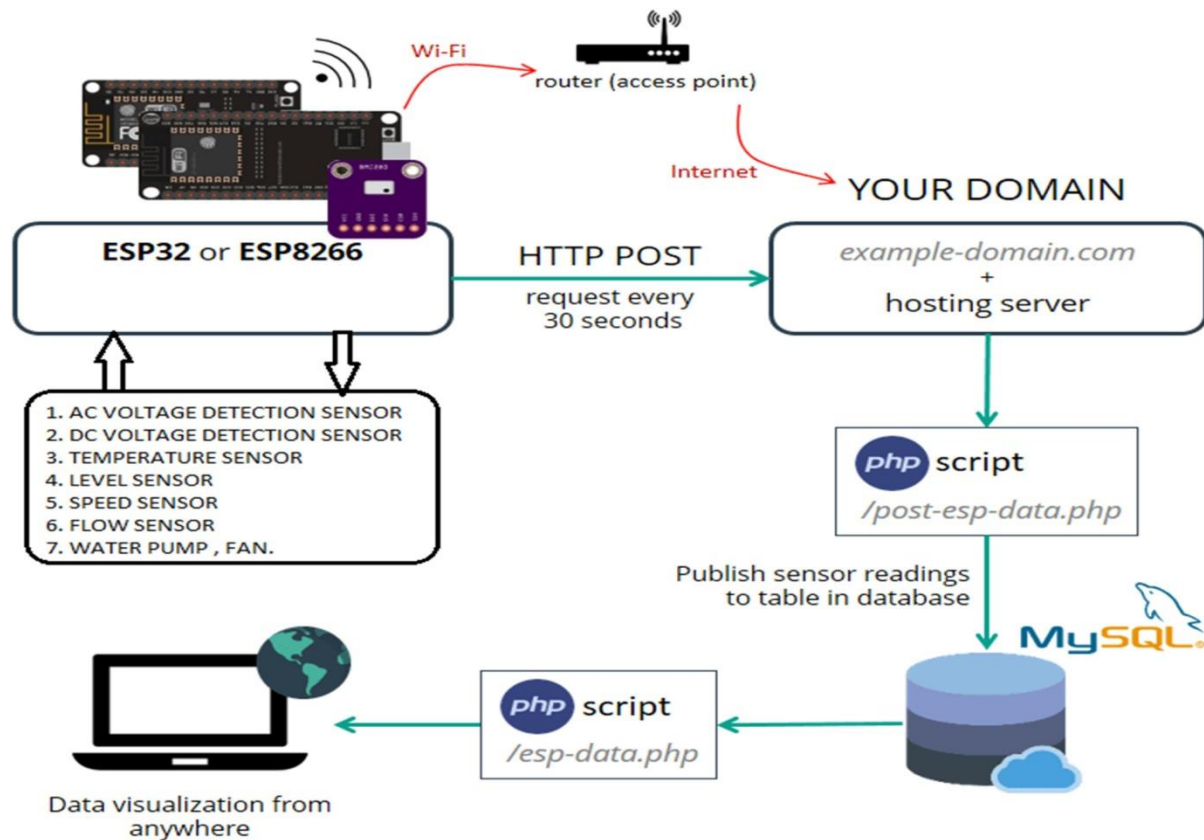


Fig: Shows interconnection of sensors to the ESP32 module.

## DESIGN AND IMPLEMENTATION RESULTS

Hardware and software requirement for prototype module implementation:

- i. ESP32
- ii. DC motor
- iii. LM35 sensor
- iv. Level sensor
- iv. Speed sensor
- v. Voltage sensor
- Vii. 6 channel Relay.
- viii. Webpage domain.

**ESP32:** ESP32 is a series of low-power, low-cost system on chip. The microcontrollers with pack of Wi-Fi and dual-mode Bluetooth. The ESP32 series employs a microprocessor of type Tensilica Xtensa LX6 available in both single core and dual core variations and includes in-built sensors, antenna switches, RF balun, low noise, power amplifier

receiver amplifier, filters and power-management modules. ESP32 is created and developed by Express if systems, a Shanghai-based Chinese company, and is manufactured by TSMC using their 40nm process. It is a successor to the ESP8266 microcontroller.

### Module Working:

All the components are placed and assembled accordingly. By using the My SQL database, the hardware components are interfaced with webpage. By using proposed system, the changes in the industrial parameters are monitored. Thereby we turn on the Relay switch by level and temperature set point to turn on the cooling fans. The main advantage of this concept is that we can monitor the changes in the industry from anywhere easily without requirement of human beings. Proposed module connected to the MYSQL database through in-built Wi-Fi module of ESP32 distinct parameters

of the sensors are computed to the database, updated values are monitored through smartphone using webpage.

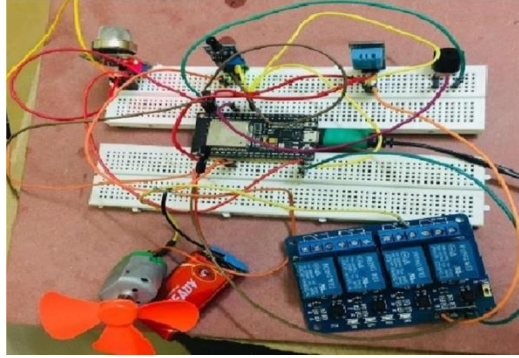


Fig 9: Shows industrial process parameters.

ID	PARAMETERS	VALUE	TIME
1	AC VOLTAGE	62.00	2021-12-20 12:42:30
2	DC VOLTAGE	5.79	2021-12-20 12:42:30
3	TEMPERATURE	24.79	2021-12-20 12:42:30
4	LEVEL	0.00	2021-12-20 12:42:30
5	FAN SPEED	0.00	2021-12-20 12:42:30
6	FLOW	0.00	2021-12-20 12:42:30
7	LEVEL MOTOR (1=ON,0=OFF)	1	2021-12-20 12:42:30
8	FAN MOTOR (1=ON,0=OFF)	0	2021-12-20 12:42:30



Proposed module implemented with DC motor and distinct sensors by connecting to the ESP32Dev at different conditions and displayed and stored in the cloud, monitored and controlled by the industrialist even from remote areas. For example, if industry caught with any fire accident based on the updating values of the sensors (smoke, temperature values exceeds specified limit), machinery or production automatically stopped from the remote area by the responsible person of the industry. These results in the correctness working of the system at every instant of time the values are automatically updated in the cloud.

## CONCLUSION

The proposed system, presents the advancement of Internet technology in day to day life. The system is suitable for real time small scale industrial process monitoring and controlling applications. Proposed module implemented on ESP32, one of the best solutions to implement IoT applications. The module outline was tried, actualized and the

accuracy and working of the system was verified.

## Benefits of use IoT in industry:

Elimination of long wiring Web based remote monitoring immediate action on failures. Ease of maintenance.

## REFERENCES

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