# IOT BASED INDUSTRIAL MACHINE PARAMETER MONITORING AND CONTROLLING

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**Abstract-** This project is an IOT based solution to monitor and control parameter of industrial machine using Microcntroller . We are using different types of sensors to sense the parameter according to industry requirement. The parameter being monitored as well as control are vibration, temperature , humidity Current and voltage. New parameter can be added to the system as per the requirement. The data which is being sensed will be sent to cloud platform via Esp32 . Blynk Cloud is the cloud platform being used in this project. The data is being collected on Biynk cloud can be accessed by anyone who has authorization to access the Blynk account. The parameter can be monitored and control from anywhere, anytime over online dashboard by the senior level Professional's who are not present at location at any point of time. Different parameter can be seen on IOT application (cloud platform) on different channels of cloud platform which helps in easy and accurate monitoring of parameters of the machine which can not be accessed by individuals or senior exicuter.

**Keyword -** Internet of Things, Industrial machine, parameter Sensing, parameter controlling

**1.INTRODUCTION -** As world is moving towards digitalization and every industry is being automated thus we are using IOT based platform for monitoring and controlling purpose. This project is design to monitor and control machine parameter such as vibration, temperature , humidity,current and voltage based on IOT. This type of IOT enabled monitoring helps provide insight into the performance, health and status of connected devices to help manufacturer improve resources utilization and prevent unplanned down time. IOT enabled condition monitoring solution give manufacturer the data they need to make smarter decision about a operation by identifying area for the improvement, manufacturer can boost productivity and efficiency while reducing operational cost. Not only does condition monitoring allow you to determine area for improvement, but it can help manufacturer identify problems and takes necessary action before issues occur.

**OBJECTIVE :**

- The objective of this project IOT based machine parameter monitoring project are
- To accurately and effectively monitor the parameter of real time working.
- To study different parameter effects on machine.
- To take guidelines from these study to develop advance and system.
- To develop an economic monitoring system.
- To collect data which can be use to analyze machine health for longer.

Internet of Things for Industrial Monitoring and Control
Applications

**2.LITERATURE REVIEW**

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Industrial Monitoring and Control is essential to collect all the relevan information, statistics and data related to the various industrial processes, motos, machines and devices employed in industry premises. This is a controlled access better productivity and high quality results of industrial products being manifactured. In this new era of technological

developments remote cod and monitoring via communication techniques such as ZigBee, RF, Infrared, sectmoques has been widely used in Industries. However, these wireless communication techniques are generally restricted to simple applications because of their slow communication speeds, distances and data security In addition, they at easly affected by noise and bad weather conditions such as snow, fog and rain in the Present project, a new solution is adopted the traditional monitoring and controle of Industrial applications through the implementation of Internet of things (101) using GPRS enabled high quality communication, low cod and high security without the need for much hardware infrastructure in all the coverage areas of the GSM operator .

2 IOT-Based Wireless Induction Motor Monitoring

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In this study, a factory induction motor (IM) was monitored with wirdless TCPIP protocol in order to detect and predict deviations from normal operating parameters before the occurrence of motor failure in this way, the production process is not impeded and the required maintenance o replacement can be performed with the least possible disruption. In this study, the motor cycle, the coment drawn by the motor and the motor voltage were read by the Hill-effect current sensor and the required power consumption was calculated With this am the designed architecture read the accepted parameters of the motor and reported them to the central management software. The central management software operating in real time was then able to assemble these parameters and form predictive maintenance models.

3. Induction Motor Condition Monitoring and Controlling Based on IOT

V.S.D Rekha P.V.P Siddhantha institute of Technology Dr. K. Srinivasa Ravi KL University

This paper presents a remote control and monitoring system for as action motor based on Internet of Things (IoT) for safe and economic data communication in industrial fields. A module of transducers and sensors menities the parameters like Temperature, external moisture RPM vibrations, ad current and voltage of induction machine and send to the processing un Rophery Pi), which will analyze and display the parameters, here the processing unit also communicates with Gateway modnie to send information to doul database for remote monitoring. The system also presents the Automatic and manual control methods to stop or start the induction machine to avoid we failures. To make the system fast and user friendly it provides an android application

## 3.SYSTEM DESCRIPTION-

BLOCKDIAGRAM

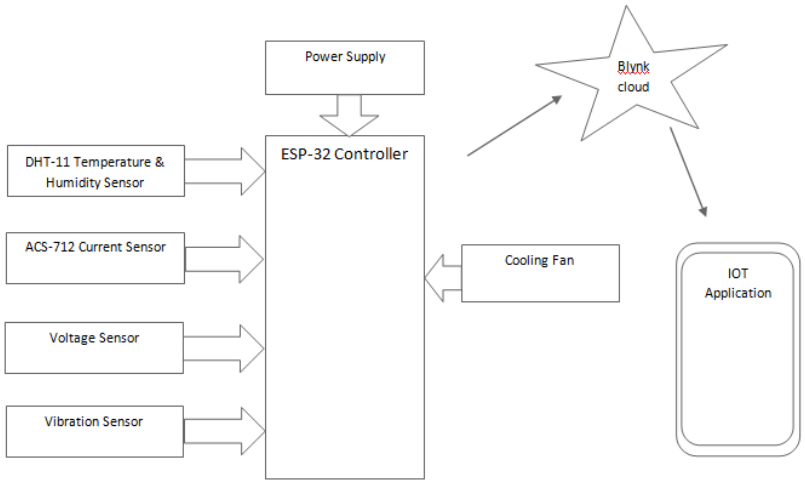


Fig 1) Block Diagram of parameter monitoring and controlling of motor interface with IOT using ESP32

The put of 5V is given to the ESP32 with the help of adapter or laptop/ via B type port. As the Esp32 is the microcontroller due the presence of the analogy pins .When the input is given to the microcontroller the microcontroller is turned ON. When the ESP32 turned on the Sensor ( I.e vibration sensor ,Temperature ,Humidity sensor ,current sensor and voltage sensor) which are connected to the Controller starts working display on the IOT application .Now for the IOT is interfaced to esp32 which is the also wifi module when the all sensor data collect by Microcntroller and it can be transfer to Blink Cloud then the reading show on IOT application. When temperature Is rise cooling fan is automatically on ,the cooling fan is automatically off when the tempeture drop it's normal condition. It can be send notification on IOT application. When the current is rise up to set level it can send the reminder to operater and it can be control by input current. By identifying area for improvement, manufacturer can boost productivity and efficiency while reducing the operational cost. Sensor track changes in vibration, temperature, humidity, voltage and current to detect any issues with corrosion, wear, misalignment, imbalance or lubrication. This module is just a monitoring and controlling module with the help of this module the problem prediction can be resolved, troubleshoot it easy .prevent from losses.

**Software Description -**Blynk is a new platform that allows you to quickly build interfaces for controlling and monitoring your hardware projects from your iOS and Android device. After downloading the Blynk app, you can create a project dashboard and arrange buttons, sliders, graphs, and other widgets onto the screen.Blynk was designed for the Internet of Things. It can control hardware remotely, it can display sensor data, it can store data, vizualize it and do many other cool things. There are three major components in the platform:

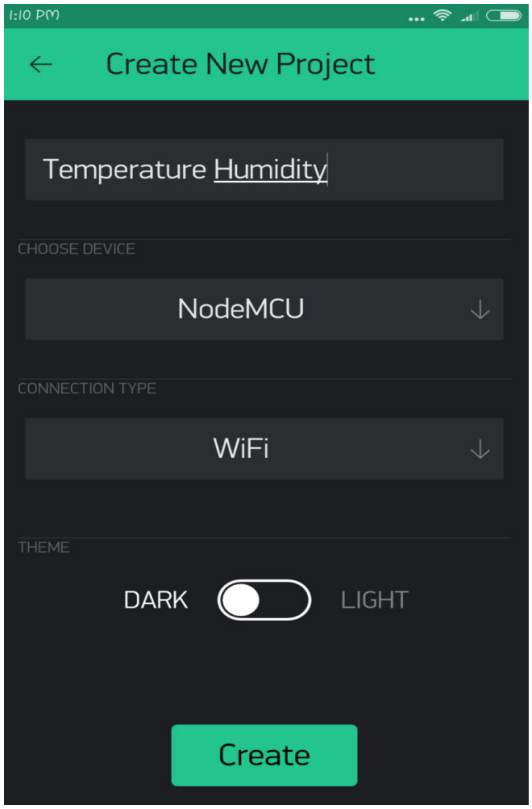
Blynk application can be found from the following links –

1. Android Blynk App

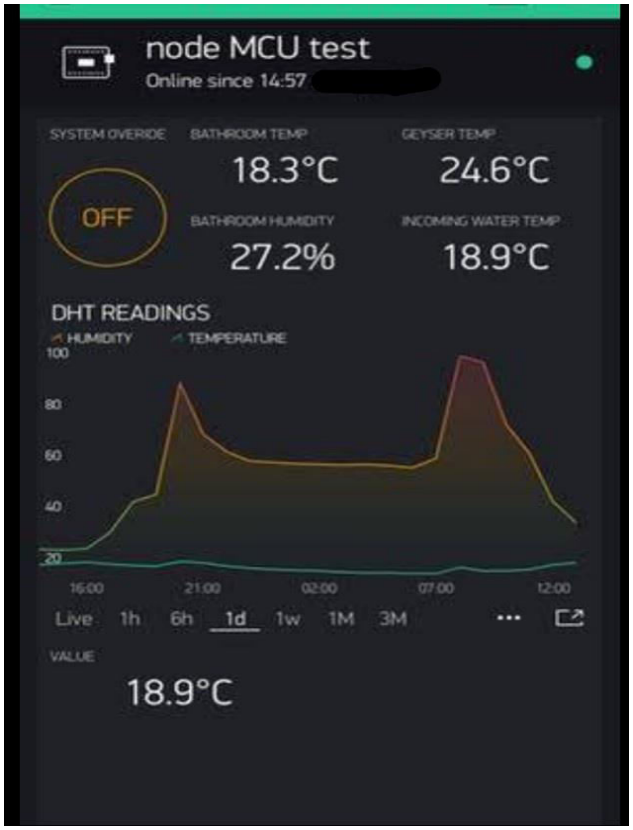
2. IOS Blynk App

After downloading the app, create an account and log in.

Create a New Project in BLYNK app.Write Project name Temperature Humidity and Select NodeMCU from drop down.




After Uploading the Ardunio code IDE. Press the play button on blynk app to show the output.



**TOOLS-**

### Temperature & Humidity Sensor :

In our project we use DHT-11 as a temp & humidity sensor for getting more accurate value for monitoring and controlling the temperature & humidity of machine. Amount of water present in the surrounding in the air is humidity. With the help of humidity sensor we can measure the humidity in dry air as well as wet air at any temperature. It is necessary to take a critical study to identify the effect of humidity so that proper selection could be made for safe operation and for longer life of the equipment. Cause of humidity on the machine are due to presence of water molecule in the surrounding which can corrode the metallic parts of machine and insulation of winding get degraded which will decrease the life of winding and increase in loses which will give improper operation of machine.

DHT-11 Specifications :

- Operating Voltage: 3.5V to 5.5V
- Operating current: 0.3mA (measuring) 60uA (standby)
- Output: Serial data
- Temperature Range: 0°C to 50°C
- Humidity Range: 20% to 90%
- Resolution: Temperature and Humidity both are 16-bit
- Accuracy: ±1°C and ±1%

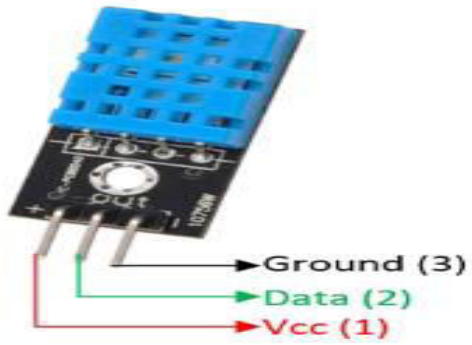



Fig.2 DHT-11 sensor

The DHT11 Sensor is factory calibrated and outputs serial data and hence it is highly easy to set it up. The connection diagram for this sensor is shown below.As you can see the data pin is connected to an I/O pin of the MCU and a 5K pull-up resistor is used. This data pin outputs the value of both temperature and humidity as serial data.

**Vibration sensor** -For vibration sensor, SW-420 is a highly sensitive vibration sensor module and it has two out pins i.e analog and digital. This sensor itself changes its resistance when subjected to vibration. when we going for controlling part then we can use more advance vibration sensor.

SW-420 specifications

- Operating Voltage: 3.3V to 5V DC
- Operating Current: 15mA

- Using SW-420 normally closed type vibration sensor
- LEDs indicating output and power
- LM393 based design
- Easy to use with Microcontrollers or even with normal Digital/Analog IC
- With bolt holes for easy installation
- Small, cheap and easily available

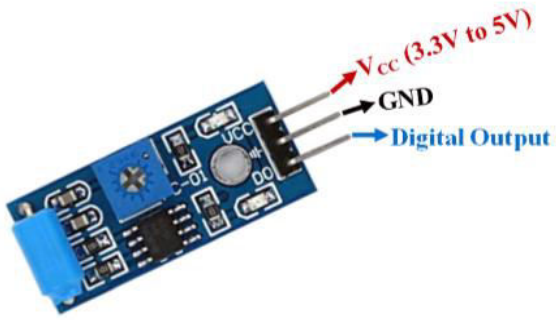



**Fig.3 vibration sensor**

**voltage sensor** - Voltage Detection Sensor Module is a simple and very useful module that uses a potential divider to reduce any input voltage by a factor of 5. This allows us to use the Analog input pin of a microcontroller to monitor voltages higher than it capable of sensing. For example, with a 0V - 5V Analog input range, you are able to measure a voltage up to 25V. This module also includes convenient screw terminals for easy and secure connections of a wire.

Voltage sensor Specifications

- Input Voltage: 0 to 25V
- Voltage Detection Range: 0.02445 to 25
- Analog Voltage Resolution: 0.00489V
- Needs no external components
- Easy to use with Microcontrollers
- Small, cheap and easily available
- Dimensions: 4 × 3 × 2 cm

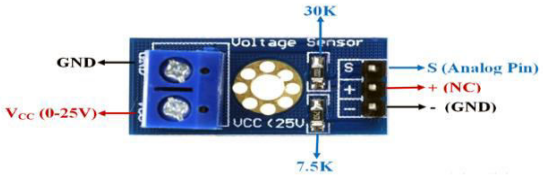



**Fig. 4 Voltage sensor**

**Current sensor-** The ACS712 Module uses the famous ACS712 IC to measure current using the Hall Effect principle. The module gets its name from the IC (ACS712) used in the module, so for you final products use the IC directly instead of the module.

These ACS712 module can measure current AC or DC current ranging from +5A to -5A, +20A to -20A and +30A to -30A. You have to select the right range for your project since you have to trade off accuracy forhigher range modules. This modules outputs Analog voltage (0-5V) based on the current flowing through the wire; hence it is very easy to interface this module with any microcontroller. So if you are looking for a module to measure current using a microcontroller for you project then this module might be the right choice for you.

ACS712 Specifications

- Measures both AC and DC current
- Available as 5A, 20A and 30A module
- Provides isolation from the load
- Easy to integrate with MCU, since it outputs analog voltage
- Scale Factor

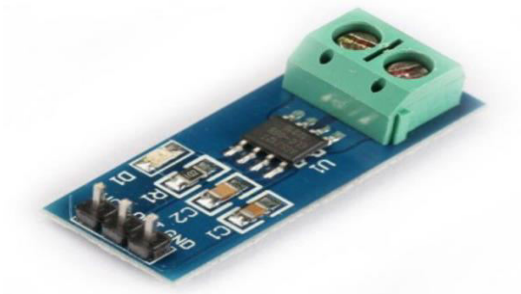


Fig. 5 current sensor

**Microcntroller** -There are totally three ways by which you can power your ESP32 board.Micro USB Jack: Connect the mini USB jack to a phone charger or computer through a cable and it will draw power required for the board to function 5V Pin: The 5V pin can be supplied with a Regulated 5V, this voltage will again be regulated to 3.3V through the on-board voltage regulator. Remember ESP32 operated with 3.3V only.3.3V Pin: If you have a regulated 3.3V supply then you can directly provide this to the 3.3V pin of the ESP32.

ESP-32 specifications

- Microprocessor : Tensilica Xtensa LX6
- Maximum Operating Frequency : 240MHz
- Operating Voltage : 3.3V
- Analog Input Pins. :12-bit, 18 Channel
- DAC Pins :8-bit, 2 Channel
- Digital I/O Pins : 39 (of which 34 is normal GPIO pin)
- DC Current on I/O Pins : 40 mA
- DC Current on 3.3V Pin : 50 mA
- SRAM : 520 KB
- Communication : SPI(4), I2C(2), I2S(2), CAN, UART(3)
- Wi-Fi : 802.11 b/g/n
- Bluetooth : V4.2 – Supports BLE and Classic Bluetooth

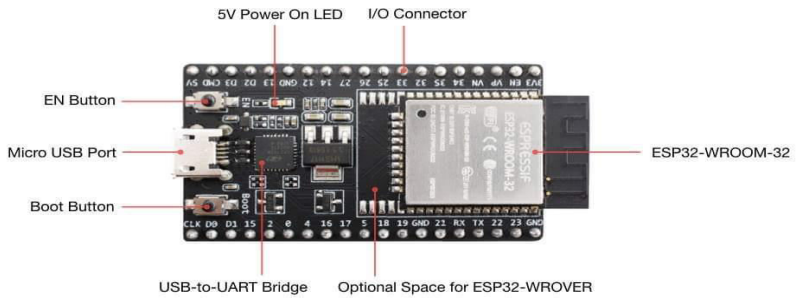



**Fig. 6 Esp32**

**CONCLUSION** - This paper present the concept of IOT for find out the problems and solve this without failures automatically. The system has been designed to combine different parameter to measurements in real time, improving the detectability of different fault. The monitoring of the industrial machine the measurements of different parameter that is temperature, humidity, vibrations, voltage and current. Thus, compared to convectional method that relies solely on all parameters goes to set limit then it can send the msg alert to operater. The concept of IOT is presented here for automatically monitoring and controlling the machine parameter. With the help of device, it is very easy to have the real time parameter of industrial machine which will helps us in various aspects leading to the growth of the industries and increase productivity, health of machines as well as with good efficiency.

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