**IOT(internet of things)**

**PROJECT ON PREDICTIVE MAINTENANCE OF INDUSTRAIL MOTORS USING IOT**

**by team 17**

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**TABLE OF CONTENTS:**

**1 INTRODUCTION**

**1.1 Over view**

**1.2 purpose**

**2 LITERATURE SURVEY**

**2.1 Existing problem**

**2.2 proposed solution**

**3 THEORITICAL ANALYSIS**

**3.1 Block diagram**

**3.2 Hardware/software designing**

**4 EXPERIMENTAL INVESTIGATION**

**5 FLOWCHART**

**6 RESULT**

**7 ADVANTAGES & DISADVANTAGES**

**8 APPLICATIONS**

**9 CONCLUSION**

**10 FUTURE SCOPE**

**11 BIBILOGRAPHY**

APPENDIX

A.SOURCE CODE

**1.INTRODUCTION**

***1.1 OVERVIEW***

For years, manufacturers have been practicing a time-based approach to the equipment maintenance. They used to take the age of machinery as the factor for planning the maintenance routine.

Implementing industrial IoT technologies to monitor asset health gaining real-time alerts to operational risks.

Before going into technical details, it is important to identify key variables which determine the health of a battery. They are temperature, voltage and discharge. Once the variables are identified, batteries get equipped with sensors to gather the data about these parameters and relay it to the cloud for processing.

For predictive maintenance to be carried out on an industrial asset, the following base components are required.

* Sensors
* Data communication
* Central data store
* Predictive analytics
* Root cause analysis

***1.2 PURPOSE:***

This is used for preventing asset failure by analyzing production data to identify patterns and predict issues before they happen.

Implementing industrial IoT technologies to monitor asset health, optimize maintenance schedules, and gaining real-time alerts to operational risks, allows manufacturers to lower service costs, maximize uptime, and improve production throughput.

***2* LITERATURE SURVEY :**

***2.1 EXISTING PROBLEM :***

The major operating parameters which influence the predictive maintenance of industrial motors are

* Power supply problems
* Stator isolation problems
* Rotor imbalance
* Hard to staff vibration analysts on each site
* Unplanned downtime from infrequent data collection
* Operational problems: overload, abnormal process, performance loss

***2.2 PROPOSED SOLUTION :***

This Project examines and compares some IOT regression

methods .

* Predictive maintenance requires the ability to process large amounts of data and run sophisticated algorithms, which cannot be achieved with local implementation within SCADA.
* For a robust IoT-based predictive maintenance solution, a thought-through architecture is a must.Let’s see which components make predictive maintenance work.

1. Sensor data cannot pass directly to the cloud – it goes through gateways. Field gateways are physical devices that filter and preprocess the data
2. A cloud gateway ensures safe data transmission and provides connectivity via various protocols, which allows connecting various field gateways.
3. sensor data enters the cloud part it “lands” on a streaming data processor. Its purpose is to allow continuous flow of data and quickly
4. A data lake stores the data gathered by sensors.
5. The predictive models used for predictively maintaining industrial batteries are built based on two approaches:

* Classification approach
* Regression approach

**3.THEORITICAL ANALYSIS :**

***3.1 BLOCK DIAGRAM :***

***Fig:Block diagram of predictive maintenance of industrial motors using iot***

**3.2 HARDWARE /SOFTWARE DESIGNING :**

***SOFTWARE DESIGNING* :**

By using

* Python
* IOT Open Hardware Platforms
* IOT Application Development
* IOT Cloud Platform
* IOT Communication Technologies
* Industrial data integration

**4*.* EXPERIMENTAL INVESTIGATION:**

The term “IoT” stands for the internet of things, can be defined as the interconnection between the individually identifiable embedded computing apparatus in the accessible internet infrastructure.

The ‘IoT’ connects various devices and transportations with an help of internet as well as electronic sensors. Please refer to this link to know more about Experts Opinion on Application of Internet of Things (IoT) in Future.

The Smart predictive maintenance of industrial motors is an IoT based device which is capable of automating the motors with respective temperature, humidity, vibrations values in a particular values .Also the data of sensors will be displayed in graphical form on IBM cloud page

**5.FLOWCHART :**

***6.RESULT:***

This system also allows controlling of industrail motors and their respective values under particular weather conditions by monitoring humidity,vibrations and temperature.

**7.ADVANTAGES AND DISADVANTAGES:**

***Advantages:***

Manufacturers and their customers get a range of business benefits from predictive maintenance. The advantages of PdM include:

* Reduced maintenance time
* Increased efficiency
* New revenue streams
* Improved customer satisfaction
* Competitive advantage

***Disadvantages:***

* There could be wrong Analysis of Weather Conditions
* No feedback loop
* Difficult in case of failure og GSM modem
* Cumbersome and time-consuming

**8.APPLICATIONS*:***

* Discrete manufacturing
* Process manufacturing
* Oil and gas
* Electric power industry
* Railways

**9.CONCLUSION:**

IoT is proving to be a game-changer for many companies as a variety of industries begin employing IoT-enabled architectures and experimenting with how IoT solutions can bring new benefits. From self-driving cars to smart homes filled with voice activated devices, the innovation of IoT’s connectivity never fails to impress,many of the machines used in skilled trades or manufacturing are still not connected to IoT platforms because they lack sensors, software and connections to IT systems.In this context, the paper presented a new and simple method for on-line monitoring and predictive maintenance of industrial equipment. This method is based on an integration of devices with software and it contains a procedure to translate different industrial equipment language into web protocols, thus creating a way to efficiently implement predictive maintenance in industrial systems. In order to demonstrate the feasibility of the developed method, a case study is presented. The operating parameters of an automatic polishing and sanding machine for high gloss lacquered furniture components were monitored and a threshold alert was defined. In a similar way, using the presented method, an on-line monitoring and predictive maintenance system can be easily developed for any type of industrial equipment.

**10.FUTURE SCOPE:**

The proposed work discusses IoT based predictive maintenance and implements it using a case from the manufacturing industry. Data collected from sensors can be leveraged by manufacturing organizations to predict machine failure. Opportunities in IoT and implementation of Predictive maintenance in industries will be huge. The ability to predict failure in advance will help organizations increase productivity, reduce equipment costs, improve working conditions and work environment safety, better product quality, reduced waste in terms of consumables and energy savings. On average, the industry has seen a 70%-75% reduction in machine downtime.With wireless sensors and machine learning algorithms, a strategic Fortune 500 life sciences customer avoids downtime.Formally known as Jones Lang LaSalle, JLL is a professional services firm that provides commercial real estate services and integrated facility management solutions to global clients. With origins dating back to 1783, the company employs more than 78,000 employees and has 300 corporate offices in more than 80 countries

**11.BIBILOGRAPHY**

***APPENDIX***

*A.****SOURCE CODE***

**Code for creating an HTML file:**

import sys

import ibmiotf.application

import ibmiotf.device

import random

#Provide your IBM Watson Device Credentials

organization = "eet2jj"

deviceType = "raspberrypi"

deviceId = "654321"

authMethod = "token"

authToken = "17481a04m7"

def myCommandCallback(cmd):

print("Command received: %s" % cmd.data)#Commands

try:

deviceOptions = {"org": organization, "type": deviceType, "id": deviceId, "auth-method": authMethod, "auth-token": authToken}

deviceCli = ibmiotf.device.Client(deviceOptions)

#..............................................

except Exception as e:

print("Caught exception connecting device: %s" % str(e))

sys.exit()

# Connect and send a datapoint "hello" with value "world" into the cloud as an event of type "greeting" 10 times

deviceCli.connect()

while True:

temp=random.randint(20, 90)

#print(temp)

hum =random.randint(30, 85)

#print(hum)

vib =random.randint (20, 50)

#Send Temperature, Humidity, &Vibration to IBM Watson

data = { 'Temprature' : temp, 'Humidity' : hum, 'Vibration': vib }

#print (data)

def myOnPublishCallback():

print ("Published Temperature = %s C" % temp, "Humidity = %s %%" % hum, "Vibration = %s m/s2" % vib, "to IBM Watson")

success = deviceCli.publishEvent("Wheater", "json", data, qos=0, on\_publish=myOnPublishCallback)

if not success:

print("Not connected to IoTF")

time.sleep(2)

deviceCli.commandCallback = myCommandCallback

# Disconnect the device and application from the cloud

deviceCli.disconnect()