

Artificial Intelligence Based Industrial Product Maintenance Using IoT

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Abstract- Computer-aided engineering has been applied to high-current electrical engineering, mainly in the areas of power systems and motors and drives, to demonstrate the potential of applying artificial intelligence in these areas. Since artificial intelligence technology is permanent and consistent, and has the ability to be easily recorded and reproduced, this feature can develop new technologies in high voltage power supplies and other electrical engineering fields. The Internet of Things (IOT) in the manufacturing industry gathers information through various sensors and analyzes it to obtain information to become more productive. Information gathered by the machine often proves to be critical for predictive modeling.

Indexed Terms- Electrical Engineering, IoT, motors.

I. INTRODUCTION

Industry 4.0 is the fourth revolution that has occurred in the manufacturing process using digitization. From the first industrial revolution used having the mechanization through water and steam, to the mass production and assembly lines using electricity in the second. The “fourth industrial revolution” or called “Industry 4.0” will overcome all the flaws of the third industrial revolution by adoption of computers and automation and enhance it with smart and autonomous system fuelled by data and machine learning.

A new technology was added during the third industrial evolution in manufacturing process which had an extreme impact in the developing world. Computers have not only featured in the field of processing and performing difficult operations but also given an advancement to the world wherein communication is made possible without the involvement of human interaction. This advancement has led to easier and faster processing and communication in our day to day life.

There is an interconnection between the parts of these machine where they create and share results so as to analyze the amount of parameters working appropriately and efficiently. This machine, which can also be termed as smart machine, spectate each and every component in the machine and accordingly try to minimize the amount of defective parts. This machine learning model will help to decrease the error, minimize wastage and maximize the overall efficiency of a product.



II. LITERATURE SURVEY

Literature survey is done on INDUSTRIAL PRODUCT MAINTENANCE.

Karolis Liulys “Machine Learning Application in Predictive Maintenance” in this machine learning can be us for pattern understanding purposes and it will also help to understand the productive way to solve the problem and which me leads to good and acceptable output it uses trained input set for accurate output and provide more reliable output for any condition may requires to achieve.

TrungKien Nguyen, Illia Azarkh, Benjamin Nicolle

“Applying NIALM Technology to Predictive Maintenance for Industrial Machines” this method is more powerful and have good maintenance algorithm which save time and provide good results in product maintenance.it can also use in residential and industrial areas. with more data sets the output ratio increases and the accuracy also increase.

Ameeth Kanawaday , Aditya Sane “Machine Learning for Predictive Maintenance of Industrial Machines using IoT Sensor Data” IoT based machine learning helps to overcome many limitations in the product as compared to earlier production process. The supervised models helps to analyze the parameters individually and accordingly fix the component in order to minimize its error and cost. It also helps to reduce product quality degradation.

TeodoraSandra Buda, Haytham Assem, Lei Xu “ADE: An Ensemble Approach for Early Anomaly Detection”ADE will combine results from the techniques employed in order to detect an anomaly based on prior learning. Seven different window generation strategies have beenexplored to maximize the results of different evaluation metrics such as early detection or precision, recall. In order to minimize the number of false positives strategies that revolve around the ground truth label show better results in precision.

ZheYang , PieroBaraldi , Enrico Zio[5]“A Comparison Between Extreme Learning Machine and Artificial Neural Network for Remaining Useful Life Prediction “in this paper which helps us to increase accuracy , stability, training and execution times . this algorithm provide more oriented output data sets compared to previous model and the data representation also increase by every input data for better output which me needed at that time for industrial product. This method will save time and it is much suitable for the product maintenance outcome.

III. PROPOSED SYSTEM

Lot of time is wasted in so many procedures, where Artificial Intelligence comes in place and speeds up the work. Artificial Intelligence predicts more accurately and helps to correct the statistics as it acts as a human brain It is less time consuming but produces heavy data set and there isn't any auto correction.

IV. METHODOLOGY

4.1 Arduino Uno

Arduino Uno is a hardware component which is based on the ATmega328P. It is use for communication and sending data to different employee and store the data.

4.2 IR Modulex2

This is the sensor module which will detect whether the motor is present or not this will help to check the counting module of the function that we are applying in this research for the further use of it and it will proceed accordingly in production purpose for the industry.

4.3 Switch

Push Button Switch is a simple button that's widely used to control the circuit in the electronics projects. It's a small sealed mechanism that completes a circuit by pushing the button. A metal spring inside when connected with other wires allows the electricity to flow which means the switch is on.

4.4 DC Motor 12RPM

IR Module will check RPM of DC Motor. If the motor is rotating at specified RPM it will be considered as working.

4.5 Python3.6.5

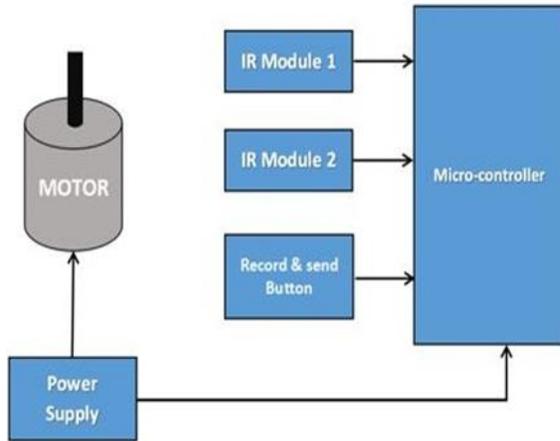
All these data will be stored to an Excel File using a Python Script. These Excel File will be sent to the user through E-mail. A switch is used to save all the data and send it through mail when it is pressed.

4.6 ArduinoIDE

This software is use coding in arduino by using C# language. This IDE is very basic way to communicate with system and tell it to how we can command it to solve basic issue that we faced in controlling the system. We can implement new idea in arduino via this IDE.

V. ARCHITECTURE MODEL

5.1 Block Diagram



5.2 Working

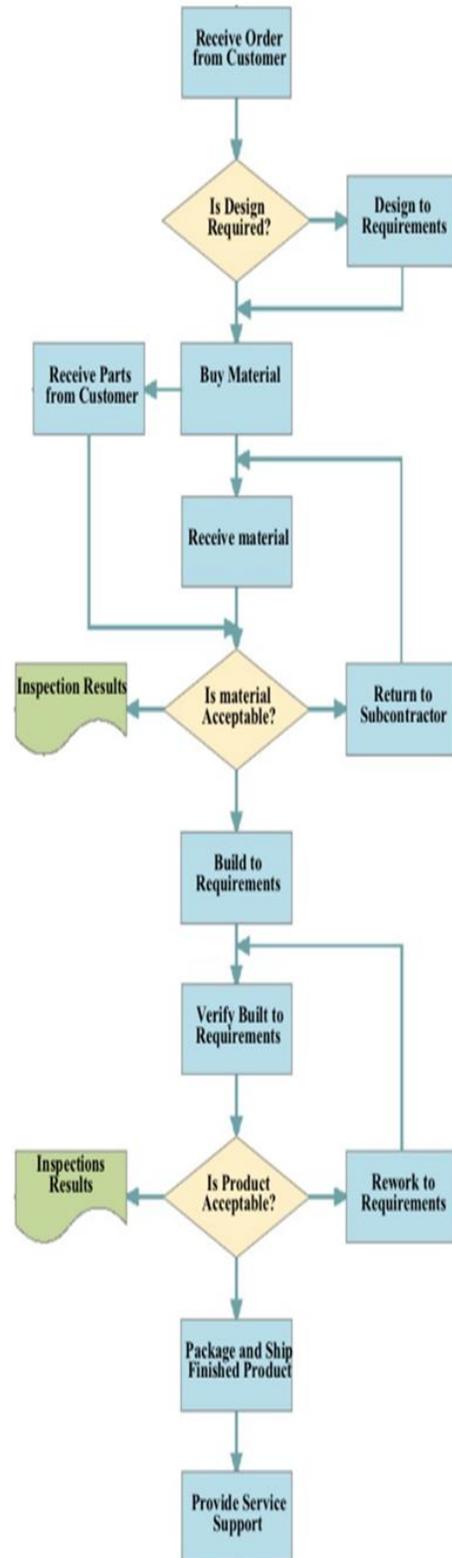
IR Module will check RPM of DC Motor. If the motor is rotating at specified RPM it will be considered as working otherwise it is not working. IR

Module no 2 will count the number of DC Motors the system is checking. All these data will be stored to an Excel File using a Python Script. These Excel File will be sent to the user through E-mail. A switch is used to save all the data and send it through mail when it is pressed.

VI. RESULT

In this project we have successfully calculated the motor count of our product for manufacture process which will save the time of all the worker and manager in the company.

Example of a Manufacturing Process Flow



CONCLUSION

In this research we have understand the basic Industry production and we have implemented Our way to contribute to society for growth in industry production at small scale by using IOT. This will help to save time and money in future.

FUTURE SCOPE

We can train the system to predict the problem which will come in further production try to solve it own its own and it will connect everyone in revolution of industry.

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