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MONITORING AND CONTROL OF PLC BASED AUTOMATION SYSTEM PARAMETERS USING IoT

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Abstract - *Industrial process machines mainly work on PLC and SCADA based system. PLC are equipped with many sensor, electronic safety guard, connectors. PLC is an industrial digital computer adapted for the control of manufacturing process such as assembly lines, or robotic devices. All the information gathered from sensors is accepted as digital signals to PLCs. This information is made available on Supervisory control and data acquisition (SCADA) through RS485 protocol. Internet of Things (IoT) is rapidly increasing technology. IoT is the network of physical objects or things embedded with electronics, software, sensors, and network connectivity, which enables these objects to collect and exchange data. In this project, we are developing a system which will automatically monitor the industrial applications and generate Alerts/Alarms or take intelligent decisions using concept of IoT. IoT has given us a promising way to build powerful industrial systems and applications by using wireless devices and sensors. It designs and implements a web based real time programmable logic controllers (PLC) data monitoring system. A main contribution of this project is that it summarizes uses of IoT in industries with Artificial Intelligence to monitor and control the Industry.*

Key Words: **PLC, IoT, Sensors, RS485, Energy meter, CCW software, Modbus communication.**

1. INTRODUCTION

In existing systems there is no ways to detect un-even condition in industry. Manual intervention required for monitoring. Where need to use CCTV which only monitor but no Alert generation. Alert and their appropriate actions not present. The process of monitoring and control is time consuming to detect and generate Alert Manually. Industry alert are based on manual intervention. Notification for any circumstances in Industry not provided. The Internet of Things (IoT) is a term, referring to the trend of enabling connectivity for all devices, to allow more information provided for optimization of device operation, whereas Industry 4.0 specifically applies the IoT trend to industrial scenarios and use cases.

Industry 4.0 vision that outlines the next generation Smart Connected Factory. The second is Internet of Things (IoT) which is a big shift towards smart, connected 'things'. Everyday objects are getting connected and exchanging information with each other and with users. Manufacturing is a mature industry with machines and assembly lines that run with a high degree of automation. Supervisory Control & Data Acquisition Systems (SCADA) and Distributed Control Systems (DCS) are prevalent industry standards.

IoT is complementary to SCADA and DCS. Information generated from SCADA systems acts as one of the data sources for IoT. SCADA's focus is on monitoring and control. IoT's focus is firmly on analyzing machine data to improve your productivity and impact your top line. Internet and wireless technologies, as well as increase in computational and storage capability of computers.

1.1 Objective

- To take the input parametric value.
- To monitor the parameter value.
- To implement IoT gateway.
- To generate report and alerts.
- To take remote monitoring and controlling actions.

1.2 Problem Statement

To build the system which can monitor the sensor data and upload it over internet and also provides facility to take controlling action from remote location using IoT.

2. LITERATURE SURVEY

Ashwini Deshpande, Prajakta Pitale and Sangita Sanap[1]

Introduces Internet of Things (IoT) is rapidly increasing technology. IoT is the network of physical objects or things embedded with electronics, software, sensors, and network connectivity, which enables these objects to collect and exchange data. 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. IoT has given us a promising way to build powerful industrial systems and applications by using

wireless devices, Android, and sensors. A main contribution of this review paper is that it summarizes uses of IoT in industries with Artificial Intelligence to monitor and control the industry

Putta Sindhuja and M. S. Balamurugan[2] introduced machine to machine interaction. This work has been designed to implement smart power monitoring and control system through IoT using cloud data storage. Findings: Power consumed by various appliances is monitored through an ARM based controller interfaced to Hall Effect current sensors and stored in a cloud data base known as Xively. Power control of home appliances is achieved through actuators such as relays which can be controlled by client with the help of a web server. The web server is designed using Hyper Text Transfer Protocol for communication between client and server by establishing Remote Procedure Calls between client and server. Conclusion/Improvements: The designed system enables client to monitor and control the appliances at home from anywhere availing the IoT features

3. PROPOSED METHOD

3.1 Block diagram

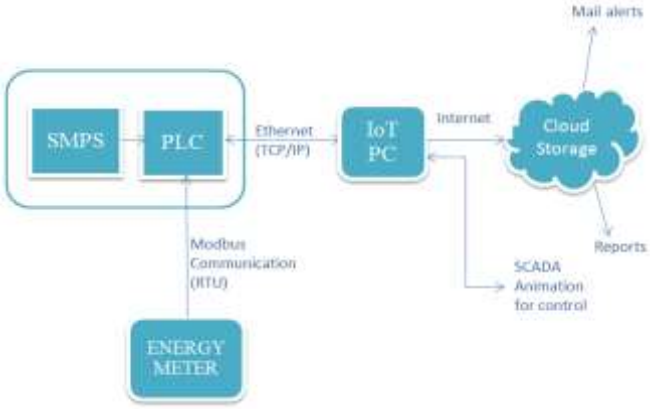

Fig -1: Block Diagram

3.2 Working

In this IoT based PLC automation initially controlling and data acquisition takes place through a PLC for various parameters like flow, pressures, phase voltage via their appropriate sensors. An instantaneous real time data display takes place on energy meter and it has eight segment LED display and contains three rows of alphanumeric displays, according to that one can adjust parameters through potentiometer knob. This energy meter having feature to convert to Kilo, Mega, Giga values by indicators.

Appropriate power supply is given by SMPS to PLC. Input given to SMPS is ranging from 100-240v and current approximately ranging from 1.5A. The output voltage of the power supply that we used typically is 24V and current approximately at 2.5A.

According to controlling parameters, instructions are written in rungs, Blocks as well as in statement format. In this control programming input/output switch symbols, timers, & counter blocks are used.

In this blocks we can set an appropriate parametric values according to requirements. It is necessary to configure Ethernet IP driver for communication. To configure PLC module to CCW Ethernet address MAC ID should be set through BOOTP DHCP Ethernet/IP commissioning Tool. The loading of these code takes place through Ethernet cable. Now, data received on PLC is transmitted to distant location to observe machine performance and for predictive maintenance through Ethernet TCP/IP protocol.

It is possible to see graphical representation of control system on SCADA platform and also able to perform controlling action from distant location in industrial plant.

IoT gateway is established through internet based Ethernet protocol for data and command transmission and reception.

Program can be created on web server which allow for a web based SCADA system by using .NET languages like C#, VB.net, C++.

There are many features can be implement through IoT platform such as mail alerts, daily reports formation for analysis of machine health. Data also get stored locally as well as on cloud.

4. CONCLUSION

In industries to reduce manual overhead we planned to implement Internet of Things (IoT) in Industry to monitor as well as to inform the responsible person to take appropriate measures, but this will partially fulfill our requirement. As sometimes it will be late in this process So, We are developing an industrial application using internet of things technology. We aim to provide an application for monitoring industrial appliance. We aim to serve as an efficient backbone for achieving a network of sensors and actuators which can help for improving the performances of the day to day gadgets/activities for industry use.

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REFERENCES

1. Ashwini Deshpande, Prajakta Pitale and Sangita Sanap, "Industrial Automation using Internet of Things (IOT)" International Journal of Advanced Research in Computer Engineering & Technology (IJARCET) Volume 5 Issue 2, February 2016.

2. Putta Sindhuja and M. S. Balamurugan, "Smart Power Monitoring and Control System through Internet of things using Cloud Data Storage" Indian Journal of Science and Technology, Vol 8(19), DOI:10.17485/ijst/2015/v8i19/76698, August 2015.

3. Prof. Niranjan M, Madhukar N, Ashwini A, Muddsar J, Saish M, "IOT Based Industrial Automation" IOSR Journal of Computer Engineering (IOSR-JCE) e-ISSN: 2278-0661,p-ISSN: 2278-8727 PP 36-40

4. Esha Gandotra, Suvidha Kohli, Shavaya Gupta, Rohan Slathia, "IoT based Industry Automation using Arm7" International Journal of Advanced Research in Computer and Communication Engineering ISO 3297:2007 Certified Vol. 6, Issue 5, May 2017

5. Dr. V. Ramya & G. Thirumalai Rajan, "Raspberry Pi Based Energy Efficient Industrial Automation System" International Journal of Innovative Research in Computer Science and Engineering (IJIRCSE) www.ioirp.com ISSN: 2394-6364, Volume – 2, Issue – 1. January 2016

6. Instron Technologies LLP, www.instrontechnologies.com