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Process Control and Maintenance using Industry Automation for Pharma Industry

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ABSTRACT: A SCADA system can be referred to as a special category of computer software application designed to perform a dedicated function and keep a close tab on controlling the industrial process. With the industrial transformation (Industry 4.0) coming in, many of the manufacturing industries urged to make Smart Manufacturing Processes which will help to make smooth, reliable, error less system as well as it will reduce wastage and increase the production rate with good quality and tracking of each process starts from design to dispatch. The concept of data analysis and cognitive computing gives a thrust to process control and maintenance process. With industry 4.0 coming in the basic requirement of the system integration along with cloud computing and big data will help the process industries achieve the additive product delivery

KEYWORDS: Industry 4.0, SCADA, Process Control, Cloud computing *Introduction* (Heading 1)

I. INTRODUCTION

A SCADA system can be referred to as a special category of computer software application designed to perform a dedicated function and keep a close tab on controlling the industrial process. The scope of the SCADA is a major part of the industries like automobiles, pharmaceuticals, food and beverage, energy, etc. The setup includes the production room where the actual production machine is available with the controlling computer having the SCADA software installed in it. Since the system is dedicated to specific tasks, design engineers can optimize it by reducing the size and cost of the product. It is allocation of human controlled functions to technical equipment for increasing the productivity, quality, and increasing the safety in working conditions thereby reducing the manpower and cost

The pharmaceutical industry discovers, develops, produces, and markets drugs or pharmaceutical drugs for use as medications to be administered to patients, with the aim to cure them, vaccinate them, or alleviate the symptoms. The pharmaceutical processing is the process of drug manufacturing and can be broken down into a range of unit operations, such as blending, granulation, milling, coating, tablet pressing, filling and others

The concept of data analysis and cognitive computing gives a thrust to process control and maintenance process. With industry 4.0 coming in the basic requirement of the system integration along with cloud computing and big data will help the process industries achieve the additive product delivery. Effective data management is one of the key aspects that will help the automation industry manage its repositories, also cloud data storage will help them minimise the space requirements

A. Key Features

This will help us to keep a monitor and control the process that will be essential for the Pharma sector.
Production Floor:- The system will collect all the information that will be fed by the sensor to the controller (PLC).
Production Machine:- This will keep information regarding the machine availabilities and the statistical data regarding the production

1. Use of Cloud: The data generated using the system will be sent to cloud. The cloud can be used as the storage means or you can also use the same for the generation of the statistical data analysis.

B. Proof of Concept

The concept behind the project is to design a system that will be capable of reducing the human efforts and increasing the efficiency and precision of the work getting done in the pharmaceutical industry. The prime objective is to monitor, control and achieve the maintenance remotely using IoT hub.

This project will need the Industry 4.0 and the automation process work hand in hand.

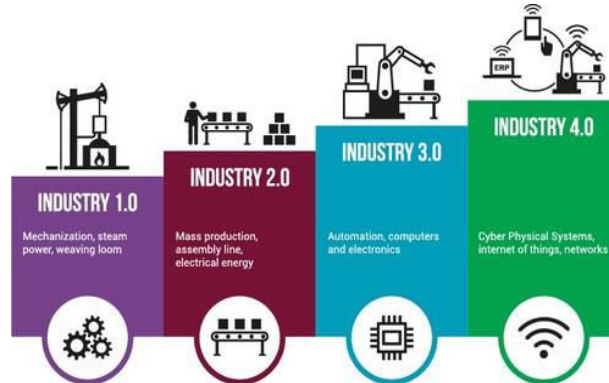


Fig: Industrial Transformation from version 1 to 4

The main characteristics of this system are categorized with regard to processes and formats

- i. Association: the power of machines, devices, sensors, and other people to attach and communicate with one another via the Internet of People
- ii. Technical Support: The technological facility of systems to help humans in decision-making and problem-solving, and therefore the ability to assist humans with difficult or unsafe tasks
- iii. Propagated Decision making: the potential of cyber security devices to require decisions on their own and to perform tasks autonomously.

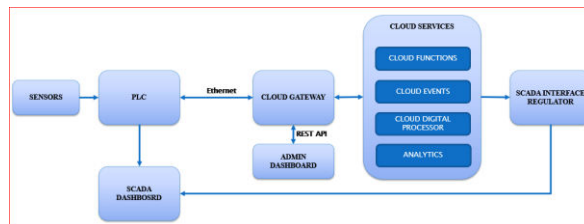


Fig: Architecture for Process Control and Maintenance

The architecture defines the exact working of the system. In the same the sensors are connected to any controller. These sensors are integrated with embedded devices which are may be edge devices to perform better and efficient work during several operations. Cloud gateway can communicate with several services through communication protocols which can interact with device and cloud services simultaneously.

The cloud services will analyse the data stored on the cloud. These analytics services are connected with administrator dashboard where the admin have the rights to innovate and transform the representation as well as data requirements. Once the data is analysed, based on the analysis the data will be shared to the SCADA dashboard where the user can check the analysis.



Fig. Required Hardware



II. OVERVIEW OF THE SYSTEM

Most of the SCADA systems take the perfect opportunity to log the data correctly, however, local storage creates issues while storing the data. Hence, in order to minimise the storage issues, we use cloud computing, service referring the industry 4.0 concept.

In order to understand the parts of cloud computing one must know the concept of industry 4.0. The concept of industry 4.0 is nothing but achieving the synchronisation between the hardware and the cyber(internet) in order to bring the revolution in the manufacturing process.

A. Technological requirements:

In order to achieve the physical-cyber relation, the below technological requirements are needed.

1. PLC: The PLC is nothing but any controller which will help us to achieve the communication between the field devices and the SCADA.



2. Field Devices(AKA Sensors): The field devices are the peripherals of the system responsible for the data acquisition.
3. SCADA: This will be key component of the project which will help us in bridging the gap between the user and the machine
4. Cloud Services: These will help us in analysing and summarising the data that will be logged in the system and will be generated in runtime
5. Industry 4.0 concept: In order to achieve cloud computing the industry 4.0 version will be used.



B. Advantages of using this system

1. This is highly reliable and cost-effective solution for controlling complex systems
2. It has ability to communicate to other computer system in the plant hence increasing the speed of operation and can be made compliant with any of regulatory standards
3. It is flexible in programming and re-programming hence making it easy for maintenance/ troubleshooting
4. It helps in reducing space requirements hence saving the required project time and Energy

III. CONCLUSION

This system is implemented keeping in mind the new revolution in industry. Where industry 4.0 will impact on current practices and trends in manufacturing system.

This system is based on computer vision algorithms which can do all manual tasks and can be accessed using any platform which could be useful in presentations and to reduce workspace equipped with features such as enlarging and shrinking models and can be accessed in any way and by all the authorized users only



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2. Modelling and Implementation of Supervisory Control Systems using State Machines with Outputs. This paper is published by Moacyr Carlos Possam Junior and Andre Bittencourt Leal, Santa Catarina State university, Brazil, works on the growth of the complexity of automated systems in industry that has extensively occurred in the recent years
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4. The manufacturer shall establish and implement an effective pharmaceutical quality assurance system, involving the active participation of the management and personnel of the different departments" [Article. 6 Directive 2003/94/EC and 91/412/EEC]
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 - b. Anish Pharma equip, Nashik
 - c. Ima-PG, Mumbai
 - d. Glenmark Pharmaceuticals, (Aurangabad, Indore, Goa and Baddi, Himachal Pradesh)
 - e. Emcure Pharma, Pune
 - f. Centaur Pharma, Pune
 - g. NK Pharma, Gujarath



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