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Industrial Data Acquisition

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ABSTRACT -The use of technology and control systems to run and manage industrial machines and processes in a factory or other industrial setting is known as industrial automation. This technology is used to increase productivity, improve efficiency, and reduce the need for human intervention in these processes. The hierarchical structure of industrial automation systems is typically organized according to the information accepted by each level and the information passed to the next level. At the highest level, a supervisory controller is responsible for monitoring and controlling the operation of multiple automatically controlled loops. This controller receives information from sensors and other sources and uses this information to make decisions about how to control the machinery.

I. INTRODUCTION

As global markets demand higher quality products and lower costs, the industrial automation industry is moving from individual machines with simple hardware-based controls to advanced linked control and data systems. This evolution has resulted in the creation of integrated manufacturing enterprises, where different machines and processes are connected and controlled through a centralized system.

For many organizations, the transition to industrial automation has been gradual, starting with the introduction of machine and process controllers and personal computers. However, in some countries, the adoption of automation technology has been rapid and is accelerating. This is driven by the need for companies to remain competitive and meet the demands of global markets.

The use of advanced control and data systems allows companies to improve the efficiency, productivity, and accuracy of their operations. By automating processes and tasks, companies can reduce the need for human labour and minimize the risk of human error. This can lead to cost savings and improved product quality.

In addition, the use of linked control and data systems allows for the real-time monitoring and control of industrial processes. This enables companies to quickly respond to changes in the market or production environment, and to make data-driven decisions that can improve performance and efficiency.

The development of integrated manufacturing enterprises has also led to the creation of new technologies and processes. For example, advances in robotics and artificial intelligence have enabled the development of advanced manufacturing systems that can handle complex tasks and adapt to changing

Automation is a step beyond mechanization, which uses machinery aided by human operators to perform a task. Mechanization is the manual use of powered machinery for a task that relies on human judgement. Contrarily, automation uses logical programming commands, robust machinery, and replaces human interaction.

Industrial automation is the term used to describe the use of machinery and technology to monitor and control industrial activities and processes without the direct involvement of humans. This technology is used in various industries such as manufacturing, transportation, and energy production to improve efficiency, productivity, and accuracy.

II. LITERATURE SURVEY

They suggest an effective approach for automating the industrial sector that would enable online user control of industrial devices and appliances. It is a task to fill. Performed by a machine that packages liquid goods like water or iced drinks [1]

The author compares open source and proprietary software-based web application development methodologies. Three important web development technologies are compared: PHP Hypertext Pre-processor, Active Server Pages (ASP.NET), and Java Server Pages (JSP) (PHP) [2].

The experiment's verification and analysis show that Modbus-S can completely make up for Modbus TCP's design flaws. This solution can significantly enhance the Modbus TCP protocol's communication security and is more secure than currently used techniques. [3].

This article provides a USB to RS485 interface converter module based on the FTDI2232 from the FTDI Company for industrial control features and requirements. [4].

Most energy metres and multi-function metres used in homes and other commercial buildings to measure energy consumption (Energy, Power, and Power factor) connect with centralised SCADA systems utilising the serial RS-485 protocol. [5].

They have suggested leveraging cloud computing and Internet of Things applications based on sensing for industrial automation. In that research, sensing technology is used to monitor a variety of behaviours, including fire, humidity, and ambient temperature. [6]

The three types of electronic controllers—traditional relay controllers, PLC controllers, and microcomputer controllers—are described by Author. Because classic relay controllers have complex hardware, poor precision, and are challenging to maintain, they are used less frequently today. [7]

The benefits and drawbacks of automation as a manufacturing tool are the main topics of this essay. The influence of automation on jobs, the environment, and the demand for sustainable automated components, along with the anticipated results from its integration with AI, and its positive consequences on the growth and development of society. [8]

III. METHODOLOGY

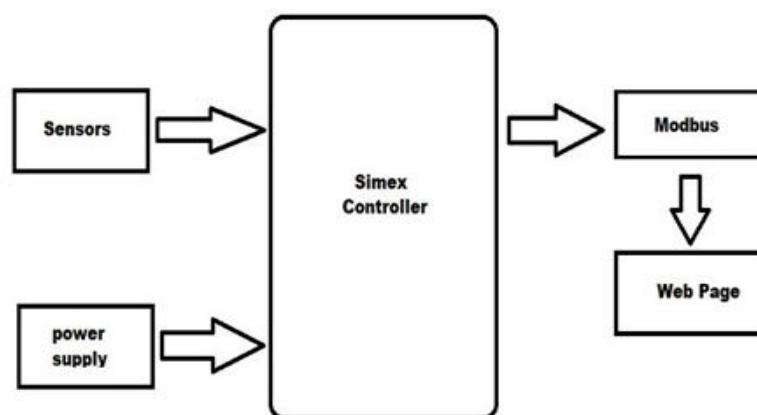


Figure 1 Block Diagram for Industrial Application

Temperature sensors sense the temperature and send the analog value to the Simex controller. Simex controller converts the analog data into rs485 and sends it to Tm-7561. Tm-7561 converts the RS485 to USB and then sends it to the PC.

We use Modbus communication Protocol for communicating hardware with web page. In a request-response protocol like Modbus, A Modbus device receives a request from the client. The Modbus device replies with a message.

The Modbus Protocol uses these data types:

1. Coil - Single bit outputs.
2. Discrete Input - Single bit inputs
3. Input Register - 16-bit input registers.
4. Holding Register - 16-bit output registers.

IV. HARDWARE REQUIREMENT

Simex Controller: The SLI-8 multi counter module enables independent counting of pulses delivered to 8 discrete binary inputs. Every counter is 24 bits long and is always accessible to the user for reading and clearing. When a particular input switches to the HIGH state, the green LEDs labelled IN1 through IN8 blink. After a given input's lowering edge, the counter is implicated (input state changes from HIGH to LOW).

TM-7561: A reasonably priced USB to RS-485 converter is the tM-7561. One RS-485 connection is available when the tM-7561 is connected to a PC, allowing you to access RS-485 devices via the USB interface. The "Self-Tuner" chip in the tM-7561, automatically adapts the baud rate and data format to the RS-485 network. The USB port provides the tM-7561 module with electricity; an extra power adapter is not required.

SMPS: Switch mode power supply is referred to as SMPS. It is an electronic power source that transforms electrical energy from one form to another using a switching regulator. SMPS are used in a variety of applications including computers, consumer electronics and industrial equipment. They are often used in place of traditional linear power supplies because of their high efficiency, small size and lightweight.

Modbus: Modbus is a communication protocol used for industrial automation and control applications. Developed in 1979 by Modicon (now Schneider Electric) to establish communication between devices in control systems.

Modbus uses a master/slave architecture where a master device initiates communication with his one or more slave devices. Master devices can read and write data from slave devices, and slave devices can respond with data or status information.

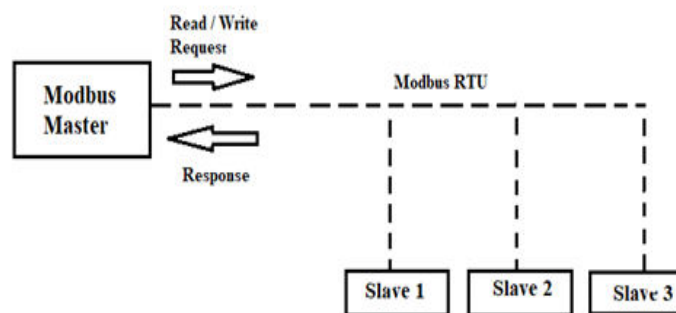


Figure 2 Modbus Architecture

V. RESULT ANALYSIS

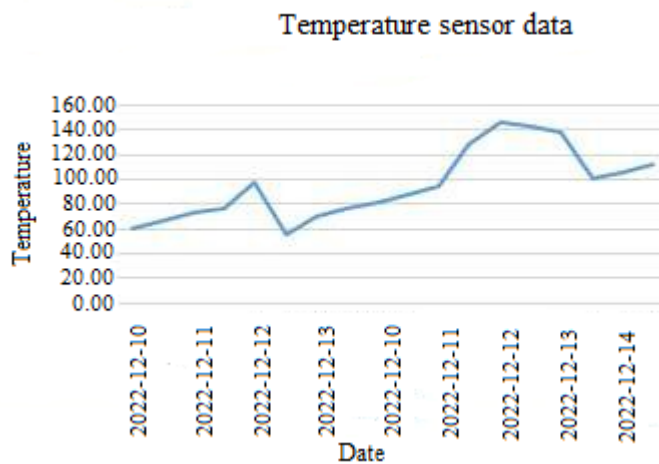
The main goal of industrial automation is to increase efficiency, productivity, and accuracy in a variety of industrial processes. This can help to reduce costs, improve safety, and increase overall competitiveness for businesses that use these systems. Some common applications for industrial automation include manufacturing, material handling, assembly, and packaging. For example, a manufacturing company might use industrial automation to automate the production of a particular product, which can help to improve the speed and accuracy of the process, while also reducing the need for manual labour.



Table (Sample Sensor Value Data):-

Date	Time	Sensor_id	Temperature
2022-12-24	15:56:25	843575+00	6.866889
2022-12-24	15:56:40	244287+00	26.589260
2022-12-24	15:56:45	653115+00	79.992517
2022-12-24	15:56:53	560205+00	24.320102

Graph:-



VI. CONCLUSION

This can result in higher levels of output, lower costs, and improved quality. Industrial automation can also be used in other industries, such as transportation, energy production, and healthcare, to improve efficiency and productivity in a variety of ways.

REFERENCES

- [1] Apurva S Zope, Mayuri S Jambhale, Nimisha M Korde and Nimisha M Korde (2017): "IOT Based Industrial Automation", Electronics and Telecommunication Atharva College of Engineering Mumbai, India.
- [2] David A. Botwe and Joseph G. Davis, "A Comparative Study of Web Development Technologies Using Open Source and Proprietary Software", Vol.4 Issue.2, February- 2015.
- [3] Luo Xuan, Li Yongzhong June 2019: "Research and Implementation of Modbus TCP Security Enhancement Protocol", Journal of Physics Conference Series 1213(5):052058.
- [4] Sandhya CSR*, Sri Vaishnavi Tirunagari Shubhasmita Sahoo, and Pradeep Kumar Yemula: "Extraction of Data from an RS-485 enabled Multi-Function Meter for Building Monitoring Systems".



- [5] Mrs. Shweta Suryawanshi and Miss. Pradnya Ghadage: "IOT gateway design and implementation for MODBUS protocol". International Journal of Engineering Applied Sciences and Technology, 2019 Vol. 4, Issue 6, ISSN No. 2455-2143, Pages 104-107 Published Online October 2019 in IJEAST.
- [6] Shital P. Yende, Rahul D. Dekate, and Ashish R. Polke: "Industrial Automation Using Various Applications for the Internet of Things". IJARIE-ISSN (O)-2395-4396 Vol-8 Issue-3 2022
- [7] Udit Mamodiya, Priyanka Sharma: "Review in Industrial Automation" IOSR Journal of Electrical and Electronics Engineering (IOSR-JEEE) e-ISSN: 2278-1676, p-ISSN: 2320-3331, Volume 9, Issue 3 Ver. IV (May – Jun. 2014), PP 33-38
- [8] Amol Verma and Gagan Saluja: "merits and demerits of automation in manufacturing" International Journal of Mechanical Engineering and Technology (IJMET) Volume 9, Issue 10, October 2018, pp. 464–469, Article ID: IJMET_09_10_049 Available online at <http://iaeme.com/Home/issue/IJMET?Volume=9&Issue=10>



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