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Data Monitoring and Controlling Over Cloud Computing Through VNC Viewer

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ABSTRACT: Majority of an automation industrial works are based on PLCs and HMIs. Here, the new theory of automation is developed to control and monitor using PLCs and HMIs over cloud computing. The HMIs is designed with different features to come preloaded with IOT (Internet of Things) enterprise technology. The Wi-Fi router is associated with HMIs. In HMIs, Graphical User Interface(GUI) that allows the human and sliding table saw to interact with each other. In this system the above operation can be done using android VNC viewer which serves a large display to make the human and sliding table to communicate with each other at one's convenience in any place then the parameters of the sliding table can be monitored and controlled via android VNC viewer and the data is accumulated.

KEYWORDS: PLC, HMI, Sliding Table, Wi-Fi router

I. INTRODUCTION

The Sliding table saw printing machine is mostly used in a book printing industry, newspaper printing industry and so on. However still, now this process is done by the presence of a human being who will be operating this sliding table saw printing machine. In this project, by introducing the technology in the above procedure they can be performed with minimum human assistance and also always the human need not to be available to assist the machine. To make this work simpler this system is introduced. Using HMI user easily divide the sliding table control and remote access between two distinctly separate networks. The HMI is a gateway into PLC and sliding table machine and the control network that is used to access remotely. The HMI modal is connected to a Wi-Fi router via Ethernet port that allows user to connect to a local wireless access point. Here an intranet is established which can be only accessed by an authorized user and it provides the internal communication within the industry using cloud computing, the user can able to transfer, monitor and control data of the sliding table over the network without requiring human interaction. The IOT evolved from machine to android device communication that refers to connecting the sliding table to the cloud, managing with and collecting data. The user can interact with the whole system from anywhere through VNC Viewer. The VNC viewer will help to control and operate the sliding table by interacting HMI over a cloud.

II. FLOW CHART

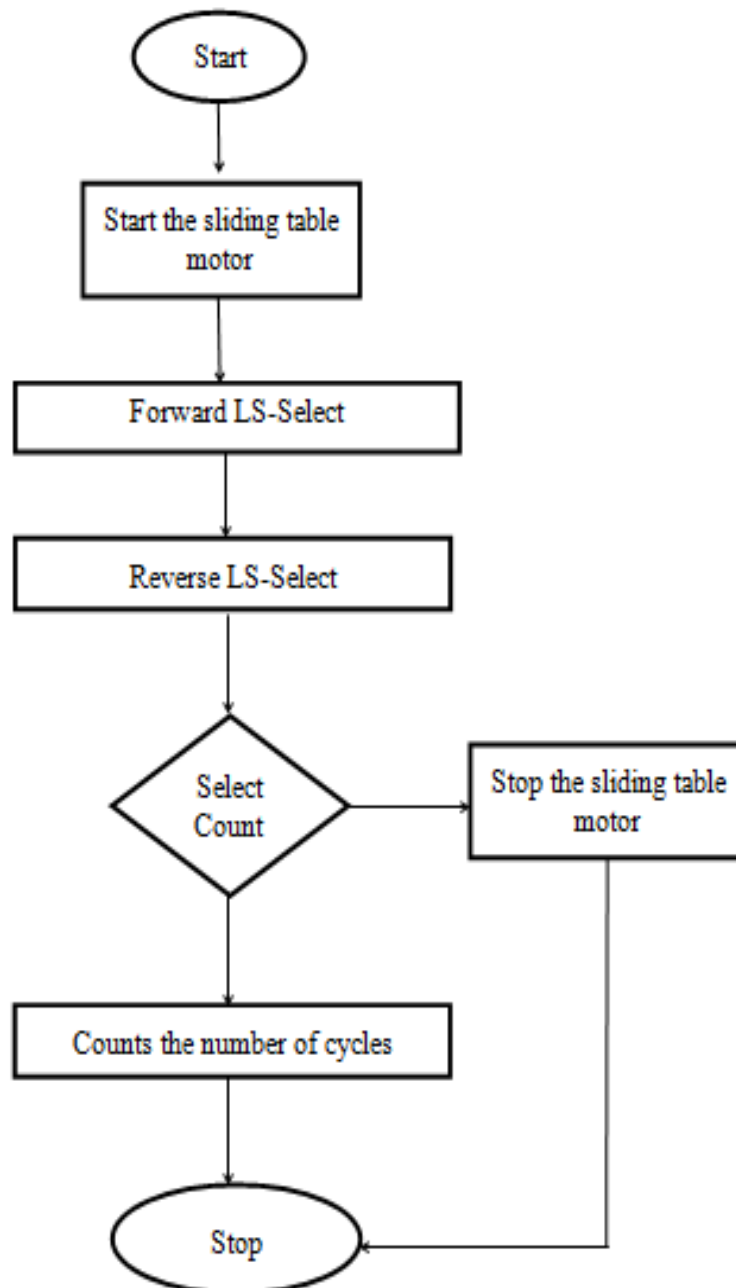


Fig.2.1 Flow Chart

III. PROPOSED METHOD

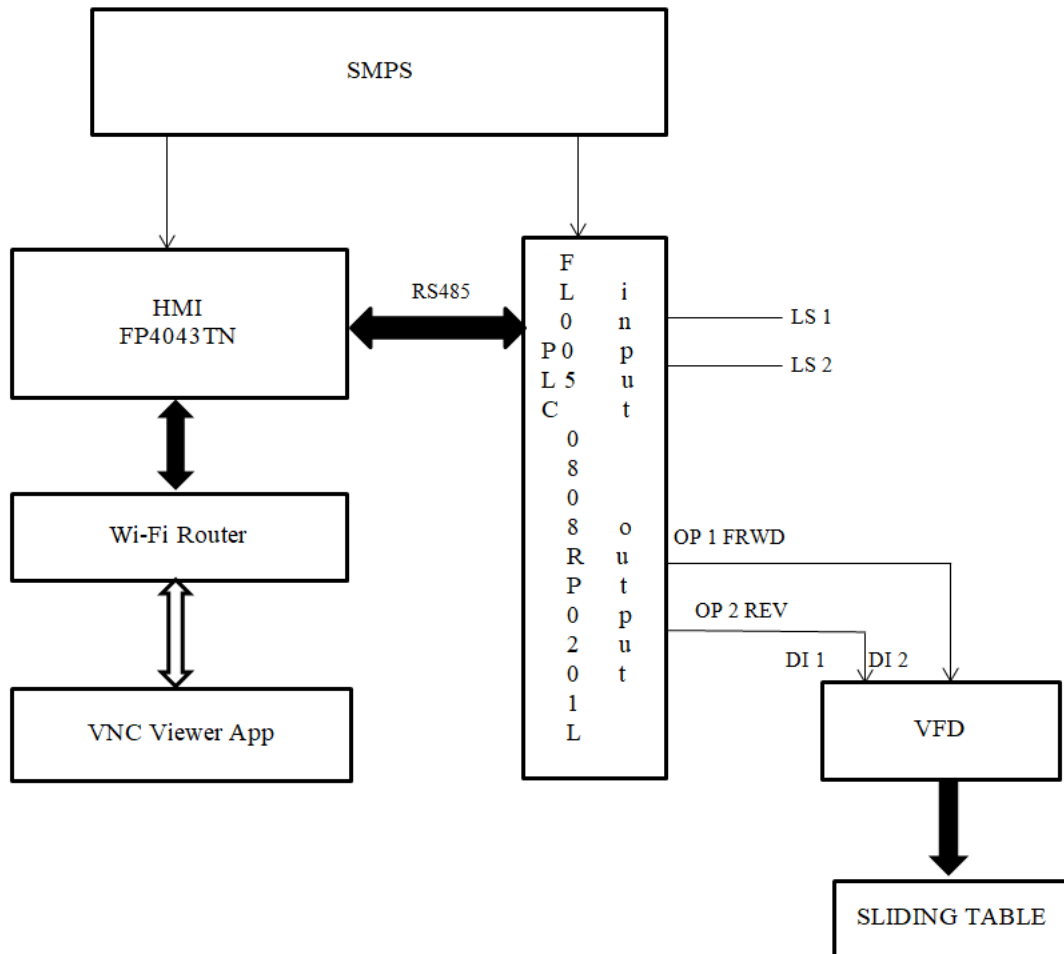


Fig. 3. 1 Block Diagram

IV. HARDWARE DESCRIPTION

A. PLC

The input and output modules are connected physically to the PLC. Here, the PLC acts as transducer where the input modules convert the electrical signals that come as an input to the signal that PLC can understand and output modules take the information from the PLC and convert to an electric signal that an output field device can understand like a sliding table (Special Purpose Machine). The communication between the PLC and HMI can be done through an RS485 communication port as it is used for long distance or multi-drop networks.

The Central Processing Unit in the PLC stores the control program and data in the memory. In PLC, new programs can be written even if an old program exists. This is a beneficial feature when compared to other microcontrollers.

The advantage of using PLC in the production line is the modification in the programming can be done easily through the computer software without modification in the wiring. When compared to another conventional system, PLC is also known as self-diagnostic function that makes troubleshooting easier in the system.



Fig. 4.1 PLC

In the above figure the FL005 0808RP0201L, the rated power supply is 24 volt and has isolation of 1kV power supply. The input signal is the digital signal in which 24 volt DC inputs that include 4 high speed and 2 quadrature inputs which supports 200 kHz frequency and the digital output that include relay and PNP transistorized pulse output of 200 kHz frequency.

B. HMI

A Human –Machine interface is a screen that provides information to an operator about the status of the sliding table. It is a process where the human and the machine interact with each other. HMI consists of GUI which is used to display in graphical format.

HMI provides a visual representation of the functions of the sliding table on its LCD screen while performing the function. HMI screens are used for functions like monitoring, tracking, changing the parameters. The faults that occur in a system can be rectified easily through touch panels.

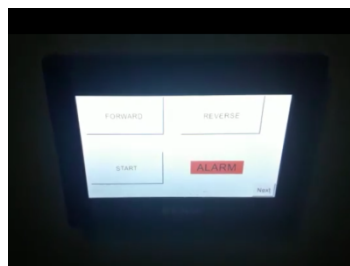


Fig. 4.2 HMI

In this FP4 advance, series offers a powerful, feature-rich and versatile range which provides the perfect solution for complex applications. Flexi soft runtime gives a perfect balance of configuration and efficient performance. It supports Ethernet options.

Both HMI and PLC provides a lean automation solution. Lean automation is a powerful method to boost efficiency in the production process.

C. SMPS

The switched mode power supply is an electronic power supply that converts AC power supply to the DC power supply and it regulates the incoming power or voltage. Initially, the input is given by SMPS. It is used to reduce the incoming 230V AC supply to 24V DC supply. It also acts as a filter to reduce the unwanted noise, the output from the SMPS is given as the input to the PLCs.

D. Wi-Fi Router

A wireless router performs the functions of a router and wireless access point. The DIR-600M wireless N 150 router is used in the system for high-performance that makes easy to share the broadband internet connection with the Android mobile. It creates a high-speed network with wireless speed up to 150 Mbps. This router has a repeater mode, which allows extending the range.

E. VFD

A variable frequency drive is a motor controller that drives a sliding table by varying the frequency and voltage of its power supply and it also controls the speed of the sliding table. The VFD also has the capacity to control ramp-up and ramp-down of the motor during start or stop respectively. Adjusting the sliding table speed can be used to save energy and improve system efficiency and converts the power in hybridization applications. It also reduces the mechanical stress on machines to extend their lifetime. In this system, the single phase VFD is used.

V. SOFTWARE DETAILS

A. FLEXISOFT SOFTWARE

This software is used to create an application using Ladder Logic programming language. Multiple logic blocks can be created to make program readability and maintenance easier. A Flexisoft software comprises of nodes, tags, screens, various drawing objects, tasks to be executed for the projects and screens. User-defined function blocks (UDFBs) allows creating own functions that can be used in any programs.

B. Ladder logic programming

The PLC program can be done using ladder logic programming where sequential control of a process or manufacturing operation is required. It is used in the very complex automation system. The Ladder Logic is used in conjunction with the HMI program operating the sliding table. It is a rule-based language. When implemented in PLC the rules are executed sequentially by using software and the output is acquired.

C. VNC Viewer

The android VNC viewer is a graphical screen that uses the remote frame buffer protocol to remotely control the sliding table. This android VNC viewer is simply known as the excellent remote control application. Here, this application makes the user access the system from anywhere at any time and ensure that both the system and devices are connected to the internet.

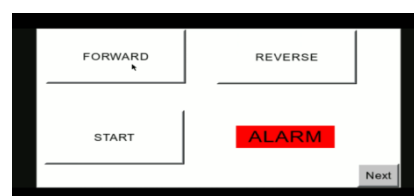


Fig. 5.1 VNC viewer

VI. RESULTS ANALYSIS

The objective of the project is to develop and implement automated data monitoring and controlling sliding table parameters using VNC viewer application and PLC. VNC viewer is used for remote accessing of the parameters. The system is compact and provides accuracy.

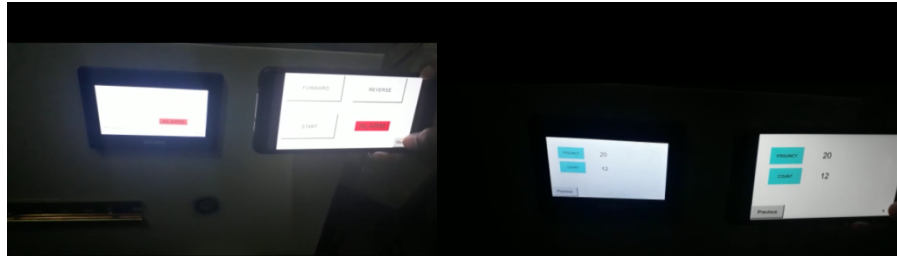


Fig. 6.1 VNC and HMI

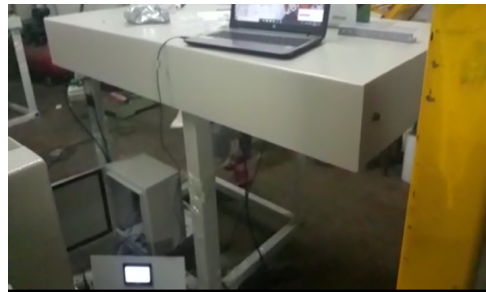


Fig. 6.2 Sliding table

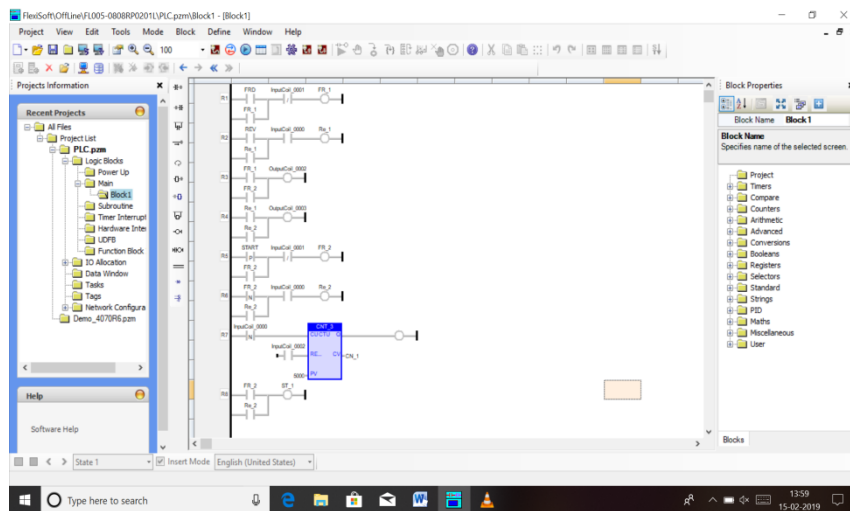


Fig. 6.3 Ladder logic programming

VII. CONCLUSION

The purpose of the project provides operator mobility and monitors the system around the world. These days, automation has become the necessity of every human being as well as industry. This system enables the automation of a sliding table. The PLC and HMI are connected using RS485 cable. The ladder logic program for the sliding table is programmed in the PLC using FLEXISOFT software. The Wi-Fi router is used to connect

HMI and Android VNC Viewer. The Wi-Fi is very useful in industrial automation like Sliding table to control remotely.

In this project, android VNC viewer application is used to monitor and control the sliding table saw machine from anywhere at any time. This project is automatic, so it reduces a lot of manpower and time. The working individual can control the machine even in their absence in the industry. This system makes the work simple and easy.

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