



# **Industrial Process Management and Automation System By LabVIEW**

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**ABSTRACT:** This paper proposes the control of Industrial process like control of motor and other applications using LABVIEW. In today's world the industrial applications can be done by using remote control. Lab view is one of the useful software which is used for monitoring and controlling the systems in industries. The system fed with having different types of controllers, can be used to perform different actions like speed control, and sensors to monitoring temperature, current, voltage etc. These things can be done by using the LABVIEW programming. It is a human machine interface (HMI) design software which is user friendly and we can easily interface hardware. The acronym for Lab VIEW is Laboratory Virtual Instrumentation Engineering Workbench. And it issued in the form of graphical representation for producing flexible and measurable designs, controlling and testing applications with less amount of cost. By using Lab VIEW one can interact with the signals of the real world in order to analyse the data for more information which is meaningful, and the result or output can be seen by using web, report and display. Irrespective of experience in programming the user can work easily and fast with lab view. In Lab VIEW we use G programming

**KEYWORDS:** LABVIEW, Induction motor, HMI, Graphical programming.

## **I.INTRODUCTION**

Now-a-days, Automation is one of the important and useful in many industrial applications. The main problem occurs during the designation of an engineering system .It needs more Hardware Circuits. Then we have to go for more wiring connections. At that case it is impossible to design the distance control of the system, why because if more hardware's is there then more wiring is needed. And also the design needs modification and improvement along with time, then that hardware has to be replaced which is not sustainable. As the technology is improving day by day, the LABVIEW software made the engineering design easy and the hardware material required is decreased why because in this case the total design is implemented in software. LABVIEW can be generally used in the industries for controlling induction motor inverter fed variable drive system. Now the distance control is possible, we can also use different communication devices such Ethernet control in between the computer and the Induction motor. The Lab VIEW can be used for several applications in industries which are virtual instrument instead of using heavy and real instrument in order to control the induction motor.

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The DAQ card used here is Arduino Uno Here the motor information will be given to the LABVIEW through the DAQ. From there the information will be sent to the LABVIEW. From there the information will be given to the inverter and the inverter is connected to the motor Here we need to control the three phase squirrel induction motor. Controlling means forward and reverse directions of the motor and also to stop the motor. For that we need to interface or we need to create communication between the Arduino and LABVIEW why because here we are using LABVIEW as the external third party software means here the implementation of software will be done. For that reason only we are performing start and stop operations of the motor in any direction i.e forward or reverse direction in LABVIEW and also monitoring the temperature, speed, voltage, current etc

## II. LITERATURE SURVEY

Researches had been carried out to replace the large control panels using different microcontrollers. The project is implemented using Arduino platform which is highly efficient. In the present days interfacing with the LabVIEW and monitoring the process is not available. In the proposed project the same is implemented using LabVIEW. Various authors have discussed about the sensors and the Arduino platform. [1] Thomas E. Murphy, "Introduction to the Arduino Microcontroller, " Hands-on Research in Complex Systems, June 17 –29, 2012. [2] Sabedin A. Meha, Besnik Haziri, Loreta N. Gashi, "Controlling DC motor speed using PWM from C# Windows application", 15th International Research and Expert Conference, "Trends in the Development of Machinery and Associated Technology" TMT 2011, Prague, Czech Republic, September 2011.

## III. MEASUREMENT OF PROCESS VARIABLES

The process variables [3] such as Speed, Temperature, Current, Voltage are monitored using corresponding sensors and the corresponding values are controlled from LabVIEW. The various processes variables are discussed below.

**SPEED:** The contact with the rotating shaft is avoided with an optical sensing mechanism that uses an infrared (IR) light emitting diode and a photo detecting diode. The IR LED transmits an infrared light towards the rotating disc and the photo detecting diode receives the reflected light beam. This special arrangement of sensors is placed at about an inch away and facing towards the rotating disc. If the surface of the disc is rough and dark, the reflected IR light will be negligible. A tiny piece of white paper glued to the rotating disc is just enough to reflect the incident IR light when it passes in front of the sensor. The output from the IR Tx is directly connected to the arduino analogue input pin.

In order to control the speed of the motor we can use the frequency control method. Here the frequency can be changed by using the variable frequency drive called as Inverter. And also the inverter here can be used to convert single phase to three phase.

**TEMPERATURE:** The most commonly used type of all the sensors are those which detect Temperature or heat. These types of temperature sensor vary from simple ON/OFF thermostatic devices which control a domestic hot water heating system to highly sensitive semiconductor types that can control complex process control furnace plants. Temperature Sensors measure the amount of heat energy or even coldness that is generated by an object or system, allowing us to "sense" or detect any physical change to that temperature producing either an analogue or digital output. There are many different types of Temperature Sensor available and all have different characteristics depending upon their actual application. In this project, temperature sensor circuit using a LM35 sensor.

**CURRENT SENSOR:** Measuring a voltage in any system is a "passive" activity as it can be done easily at any point in the system without affecting the system performance. However, current measurement is "intrusive" as it demands insertion of some type of sensor which introduces a risk of affecting system performance. Current measurement is of vital importance in many power and instrumentation systems. Traditionally, current sensing was primarily for circuit protection and control. However, with the advancement in technology, current sensing has emerged as method to monitor and enhance performance.

**PRESSURE:** A pressure sensor measures pressure typically of gases or liquids. Pressure is an expression of the force required to stop a fluid from expanding, and is usually stated in terms of force per unit area. A pressure sensor usually

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acts as a transducer; it generates a signal as a function of the pressure imposed. For the purposes of this article, such a signal is electrical.

## IV. MONITORING PROCESS VARIABLES IN LABVIEW

The various process variables discussed above are monitored from the plant and given as the input parameters to the LabVIEW VI through Data Acquisition System. The block diagram shown in Fig.1.gives the details of monitoring and controlling of various process station using LabVIEW.

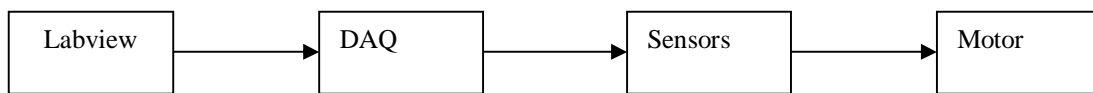


Fig1: Monitoring and Controlling of various Process.

Here the DAQ will collect the all analogue data from all sensors and convert into digital form and provide a data path to real world and Labview. Again the controlling signal coming from the labview is provide to the real world, in here it will provide to control the speed of induction motor.

## V. IMPLEMENTATION IN LABVIEW

The process first needs to a third party software we used Labview, it have two windows one is front panel and another one is programming window. In front panel window consider that all type controlling elements like dials, switches ,knobs etc and monitoring elements like gauges, scales, meters are used in front panel fig 2 shows the our proposed system front panel control.

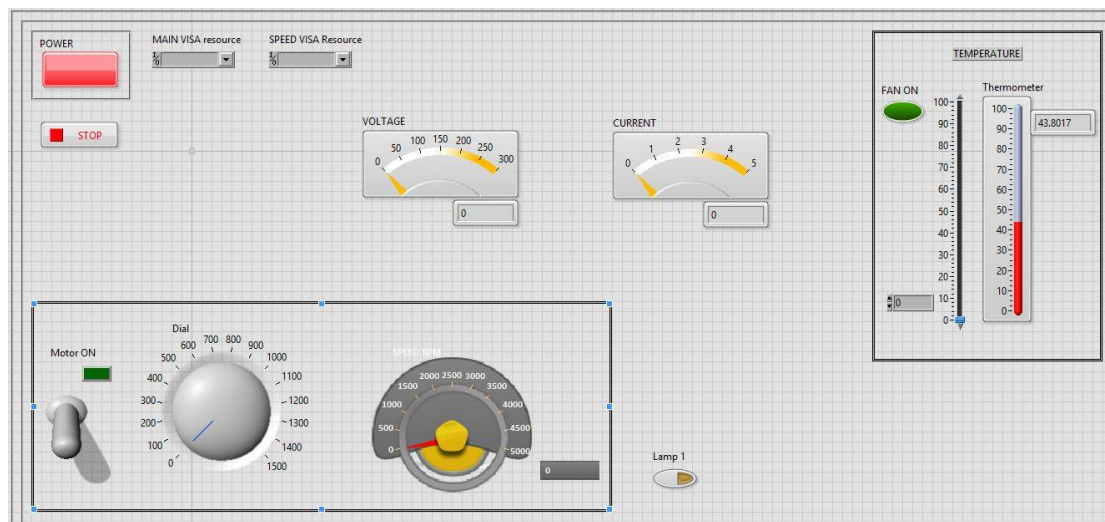


Fig:2 Front panel

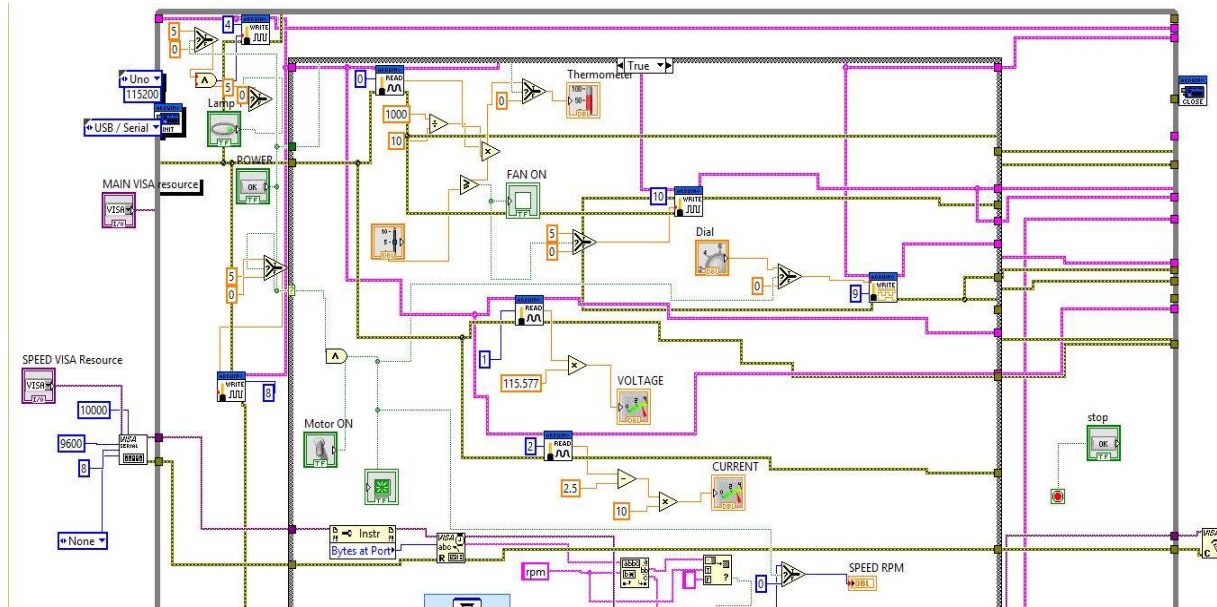


Fig 3:Block diagram

Another window is block diagram window, In Lab VIEW we use G programming where G indicates graphical. And it can also be called as dataflow programming because in order to execute the designed program it will depend on the block diagram structure. If we compare LABVIEW and text programming, LABVIEW is more flexible and user friendly why because here we can develop the program and can be connected with relevant blocks through wiring .The programs in LABVIEW are named as virtual instruments, or VI, due to their appearance and mode of operation of the instruments like oscilloscope and multi- meters. In LABVIEW we are having loops like for, while loops and case structure, sub blocks i.e sub VI etc.fig 3 shows the block diagram of these system.

### VI. CONCLUSION

Here we are using LAB VIEW for implementing the program which is a human machine interface and it is used for taking appropriate decisions, and it has various applications. Moreover it can be easily understandable and economical. The objective of our paper is controlling and industrial monitoring can be done by using LabView.

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