Data Acquisition Using Microcontroller and Python for Induction Motor

Ashwin Digambar Labhane [1,] Kalyanee Mukesh Ambade[2],Rohit Ravindra Dange[3], Rutuja Rudesh Gedam[4], Sachin Pandurangrao Gadade [5],K.M. Dhenge [6]

Kdk college of engineering nagpur electrical engineering(india)


ABSTRACT- In the current era automation has become a basic would like for the industries. Induction Machines square measure the nerves of the many industries. This paper discusses the event of wireless structure management of Associate in Nursing induction motor scalar drives. By utilizing the devised system one will sit on a laptop and might use a specially created Graphical program (GUI) to manage a method and acquire information through sensors. The experiments show that the information assortment and watching system has some options of being low price, simple to use and a large vary of application, and includes a important application for assortment and watching information in industrial areas and laboratory.

Keywords-Data Acquisition; Arduino NANO,Singlephase Inductionmotor,&wireless communication.

I.   INTRODUCTION-

Using wireless technologies in industrial and plant automation is extremely engaging for several reasons. The wireless approach of communication makes plant setup and modification easier, cheaper, and additional versatile. observance of power consumption by a small controller or any appliance of Even plant are often monitored and hold on knowledge for the later analysis. The necessary parameters in power analysis area unit the voltage, Current, power issue, speed and winding temperature. With the advancement of computers, digital management, system and web of things additional and additional industries area unit focusing heavily upon the employment of computers for management tasks and knowledge acquisition. Through a mix of code and compatible hardware one person will monitor the whole method on his personal computer (PC) sitting in his

home. Moreover, the person will offer parameters for the management operations and at constant time check the system often for errors or irregular patterns. As shown in Figure one, the pc communicates with a microcontroller, programmable logic managementler (PLC) or different such compatible digital control systems via information cable (like USB, RS232 etc.), wireless networks (e.g. ZigBee) or the net (using web-based GUI). Moreover, the controller manipulates the operation of the mechanism to manage the method and therefore the info of the necessary parameters of the method area unit monitored through sensors. The sensor's information is employed as a feedback for the system moreover because it is provided to the pc for info for any check and balance.
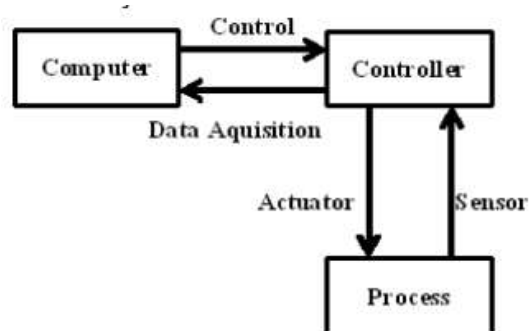
Figure 1. Schematic diagram of system model for automation and control of a process

Microcontroller and sensor's –
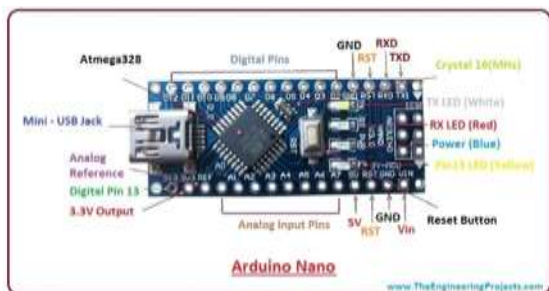
Arduino Nano could be a tiny, complete, versatile and breadboard-friendly Microcontroller board, supported ATmega328p, developed by Arduino.cc in Italia in 2008 and contains thirty male I/O headers, designed in a very DIP30 vogue. Arduino Nano Pinout contains fourteen digital pins, eight analog Pins, two Reset Pins & half dozen Power Pins. USB cable is employed to transfer the program from the pc to the board. This board has several functions ANd options like an Arduino Duemilanove board. However, this Nano board is totally different in packaging. It doesn't have any DC jack in order that the ability offer is given employing a tiny USB port otherwise straightly connected to the pins like VCC & GND. This board is provided with half dozen to 20volts employing a mini USB port on the board.

Current sensor-ACS712 may be a current device that may care for each AC and DC. This device operates at 5V Associate in Nursingd produces an analog voltage output proportional to the measured current. This tool consists of a series of preciseness Hall sensors with copper lines

Temperature sensor-DS18B20 is 1-Wire digital temperature detector from Maxim IC. Reports degrees in stargazer with nine to 12-bit preciseness, from -55 to one hundred twenty five (+/-0.5). every detector features a distinctive 64-Bit Serial range carven into it - permits for an enormous range of sensors to be used on one information bus.

And more sensor we are useing like transformer, voltage sensor,and IR sensor for speed measurement.

Literature review-
Our system is basically based on the idea of acquiring data of motor or any other device to remote places and reduce human efforts and dangers associated with it.In industries the motor parameters are checked by the in-charge person. By using our system all the motor parameters like Temperature, Voltage, Current and Speed can be analyzed in real time in the control room itself.In the Python software, real time graph will the plotted of the above parameters.Wireless data acquisition will be don using wireless modules like HC12/HC05. A Atmega based microcontroller board will be the heart of the system. Different parameters of single phase induction motor will be monitored by different sensors connected to Arduino. RPM will be sensed by IR sensor, Voltage will be sensed by voltage transformer 6Volt, Current will be sensed by using current sensor ACS712, and will be sensed using lm35 temperature sensor. All these parameters will be transmitted to Python using wireless sensors. On receiver side wireless receiver will receive data and serial to usb convertor will give data to Computer (python installed). python will read data from com port and accordingly plot the graph on different parameter's respective axes.

Working Principle-We have successfully interface all the sensors with Arduino controller. The sensor we are using are transformer, current sensor, voltage sensor, temperature sensor which is also known as one wire temperature sensor and IR sensor for speed measurement.We have connect the transformer with controller via bridge rectifier circuit and potential divider circuit which will calculate the voltage or act as an voltage

sensor.One wire sensor is used for temperature measurement and IR sensor is used to detect motor speed.LCD display is successfully interfaced with controller and we have shown the output on LCD display. We have send data wirelessly using Python successfully. The UI is shown in figure below.
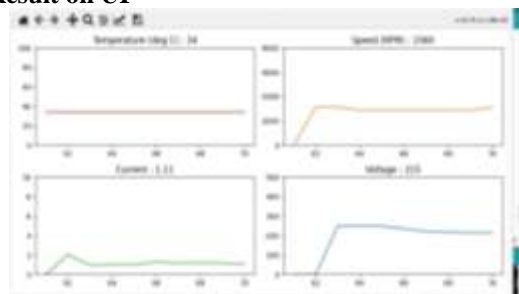
System diagram-
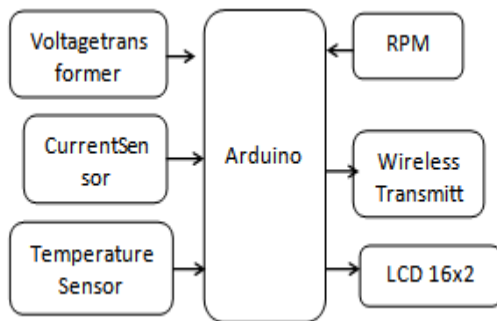
Complete system-

Result on LCD display-

Result on UI-

II.   CONCLUSION-

In this project we've used multiple sensors like temperature, voltage device, current device. As individual condition detected microcontroller takes action and shows result on show|LCD|digitaldisplay|alphanumeric

display} display. This whole system updates information on factor speak server victimisation web affiliation. we have a tendency to studied the assorted kinds of the networks so as to decide on the foremost adequate protocol for the appliance of a far off management of AN induction motor drives. we have a tendency to given the operative mode of network WiFi still because the technical resolution to hold out the wireless management of AN induction motor. This work developed a control and information acquisition   system   that monitors sensor's information values and might modify motor speed employing a laptop primarily based graphical computer program (GUI). Work has been done antecedently on such systems, they used completely different controllers, modes of communication and programming languages (for developing GUI) to watch completely different operating parameters of motor operation and management   motors   supported information noninheritable from   these   sensors. Wireless communication between controller and laptop   or   controller   and   device   is used. information is noninheritable and given from multiple device nodes still. The program is created transportable and Arduino primarily based backup or information may be developed.

Advantages-Low cost , simple to put in, Secure , Reliable and self healing, versatile and long , Low power consumption, simple and cheap to deploy, international usage with use of unlicenced radio bands, Integrated intelligence for network set-up and message routing.

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