

LabVIEW based real time data monitoring and control system

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Abstract— Simple and low cost data analysis and control is a real need of automation industry. This project deals with the developing a real time virtual platform for controlling the machines. Health monitoring of machines is very important factor to improve efficiency and quality of product with flexibility and rugged reliability. In this paper overall review and proposed work is explained. This is possible with use of advances in software and electronic technologies. Many conditioning and monitoring systems have been developed. We are developing microcontroller based monitoring and control system using flexible and powerful graphical programming language tools of LabVIEW with hardware interface. LabVIEW gives extensive acquisition, presentation, presentation, control and many more capabilities in single environment. This project deals with master slave configuration of machines using MODBUS. This is similar to SCADA system which widely used in automation industry. It consist of different phases of hardware integration and software development in which hardware consist of sensor arrays, analog and digital input signals to be monitored and various outputs.

Index Terms— *LabVIEW, MODBUS RTU, microcontroller, monitoring and control, web publishing.*

I. INTRODUCTION

The conventional methods for plant monitoring may be uneconomical due to high cost, so integrated automation and control has become the solution for making it efficient and cost effective. Normally, an automated system improves the system efficiency, plant monitoring, productivity and the operation management of the plant. The main objective of system is to give the means to the human operator to control and to command a highly automated process. We have described some ideas, reviews and proposed work in this paper. LabVIEW is used as Data Acquisition, monitoring and control software. It is a graphical representation and programming platform which helps to design and test the system[9]. It provides easy way to implement the small to large scale systems using complex in built data algorithms.

II. METHODOLOGY

In this project physiological parameters are obtained processed and display on graphical user interface. Microcontroller based different nodes of machine condition parameters like sensors, analog and digital inputs-outputs and pc are communicated using MODBUS in RTU mode. By using a simple Internet connection complete system can be controlled in both local and remote modes[1]. Real-time results can publish on web page using to be viewed and controlled The proposed software has been designed under a LabVIEW environment which gives the possibility to remotely control setups by using an Internet access[8]. System can easily log data to the built-in networked historical database and if anyone of vital parameter go out of normal range then alarm gets generated by the system. System also provides SMS and E-mail notification to authorized person. This project deals with the development of a virtual platform for real-time application dedicated to signal conditioning monitoring and control of machines.

The platform is basically on several tools which are developed by using the LabVIEW software. Various techniques of diagnosis and condition monitoring have been integrated. One can develop a complete solution on the platform of your choice. The real time monitoring of physical parameters can be acquired and saved into database. Database can be of Microsoft office format like MS Excel or other format and can be communicated with other PC. In this project database get saved into MS access format with the help of udl file. The SCADA project consists of a hardware setup phase and a software development phase. The hardware setup phase consists of dedicated Sensors, analog and digital input/outputs, Microcontroller board and Local PC. The monitoring analog input signals and a local PC are allowed the user to monitor and control system parameters by LabVIEW.

III. PROPOSED WORK

Now-a-days managing the process is tedious job in all over industries. So that we plan to propose intelligent multi tasking monitoring and control system which can control various global parameters using simple low cost PIC microcontroller.

This controller is ideal for large low power (nanoWatt) and instrumentation panels as well as metering and industrial control and monitoring applications.

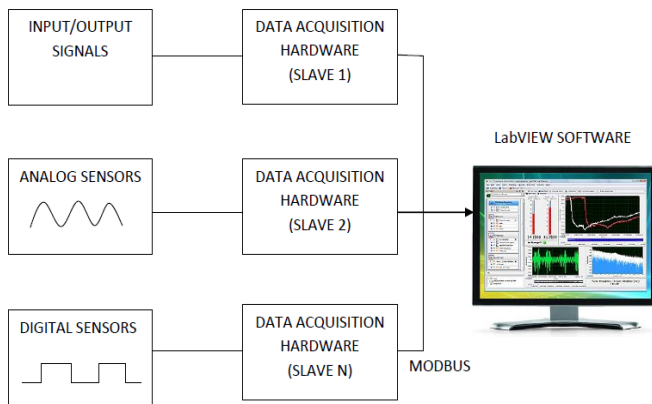


Fig 1: Laser doppler flowmetry technique

This system can monitor ‘n’ numbers of machines at a time with the help of MODBUS by connecting slaves to the single master as shown in figure 1. Each slave consist of data acquisition hardware which includes transducers, signal conditioning, analog and digital sensor array to monitor pressure, temperature, humidity, vibrations, voltage, current, energy parameters etc with protection circuitry. Hardware acts as a interface between outside world and software. Data acquired from each slave is gathered, processed and send to the mater. Here PC plays role of the master. Master which is configured with LabVIEW platform compiles data received from all enable slaves[5]. It shows real time changes in parameters where we can view and track online changes encountered in all parameters on the front panel. One can connect HMI for monitoring large scale systems. HMIs are available in small to large size. This Project can be implemented in any of the process industries where there is a The Internet plays a significant role in real time industrial manufacturing, scheduling, monitoring and management.

IV. COMPONENTS OF THE SYSTEM

The system is consist of processing devices, elements and various signals from outside environment to be processed. This system is made up to give security and ease for monitoring resultantly which reduces human efforts.

A. Input / output

Data acquisition and processing usually consist of input or output responses, which include analog to digital converters, various sensor inputs, digital outputs, relays, control signals etc. It includes input sensors for monitoring

and measuring, output indicators to know status of the system.

B. Sensors

Sensors are the very important part of this system as it all depends on these transducer inputs to follow processing[7]. In this project we have interface both analog and digital sensor which will help to monitor entire machine plant. Two temperature sensors are used which indicates air temperature and panel temperature respectively. Monitoring of plant including sensors for oil level detection, humidity, motion detection, machine vibration, gas leakage detection, human presence detection, light presence indication etc. For security purpose of plant fire alarm also integrated in this system.

C. Data acquisition hardware

PIC microcontrollers leads to low voltage, cheap, accurate and simple hardware solution. Monitoring and control of entire plant is made possible of using MODBUS. As shown in figure 1, LabVIEW front panel is act as a master and acquisition hardware are the slaves. Slaves are communicate with master via modbus in rtu mode[2] so that all machines in entire plant get monitor and control on single screen. Hardware gets measurements from sensors and gives output indications accordingly on HMI.

D. Software

Software part is divided into two sections; front panel monitor development in graphical representation using LabVIEW and microcontroller firmware where system is programmed using embedded c with PCW compiler which is authorized compiler for PIC microcontrollers.

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