International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395 -0056
Volume: 03 Issue: 06 | June-2016 www.irjet.net p-ISSN: 2395-0072

Web Enabled Remote Machine Monitoring and Troubleshooting System

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Abstract - *This paper introduce a system for troubleshooting machine from remote location by using internet. Basic idea is to provide machine monitoring and control through WEB, so that even though service engineer is not present with machine but he/she can be virtually in touch with machine from remote location anywhere anytime. System consist of three layers, mainly as, browser, server, machine (i.e. circuit). BROWSER:-This is basically used at remote which will download ASP page from the server which consists of a form that shows the devices the administrator wants to control. SERVER:-Server is used to maintain ASP page and a database for the administrator to check its username and password. It also provides the registration form for new user. MACHINE: - In our machine prototype, we are putting four tentative Electronic tap points; A person sitting anywhere can have access and monitor the same schematic of circuit on the machine. This can also be useful to detect the exact location of the fault in the machines control panel.*

***Key Words*: Internet monitoring, server database, web designing arduino kit, .NET Framework...**

1.INTRODUCTION

As Machines are very sophisticated ,they include electronic, electrical, hydraulics, enabled gadgets , which need regularly watching and maintening, in case if there is any fault occur, it causes a high end damage, leading to economic as well as product defects, finally hampering the outcome of industries, so as we recognize electronics as core eternal heart of industries, due to automation in machines lots and lot of electronics is used in machine and the electronics are mostly embedded with control panels in the form of special cards, like power supply, amplifier, driver, clipper cards etc, So there is need to develop an automated system which will allow us to monitor as well as trouble shoot the machine electronic parameters.

This paper is mainly concerned with to monitor machines using internet. User can use any type of machine for this system. As the name suggests, the maintenance of machinery is done remotely by using web. Our target is to monitor and troubleshoot the machine by using web for that purpose we need to design website which include parameter and database of particular machine.

The paper is made up of following sections, Second section is represent the overview of system in which the proposed system architecture is given and next section represent the implementation of system with input database which is followed by next section which contain the result screens.

2. RELATED WORK

Recent survey of remote monitoring and controlling on the base of internet has number of references worldwide. In this section we briefly review the most relevant literature of web enabled remote machine monitoring and troubleshooting system. There was the most of monitoring systems based on internet which given below.

One web based monitoring system available which use in medical field is "Mobile and Web Based Monitoring of Patient's Physiological Parameters using LabVIEW", by Nishigandha D. Agham ,Vijaya R. Thool, Ravindra C. Thool in this excellent provision to admit in hospital for patients and mainly for doctors who are able to examine their patients at the appropriate time in the hospital . The advantage of these efforts is presented and they follow the successful study in occupying many signals like temperature and ECG from healthy persons by the use of BIO-PAC system which is for signal acquisition and processing. The perticular sensors and the MIT-BIH database of many arrhythmia is used for PCG signal. It is guess that new trend of mobile technologies trigger more development in applications based on LabVIEW causes subscription in the health maintenance.[1]

There is another one remote monitoring system is "The Design of the Integrated Remote Monitoring System based on Internet/GPRS", which proposed by Xin-rong Li, Yu-bao Cui

and Yong-xue Li explain the issue of the present monitoring system by analyzing the design solutions of the internet based integrated remote monitoring system / GPRS is proposed. The system is integrated multiple monitoring ways and it can monitor multiple locations simultaneously. Users can view video, temperature and humidity, smoke, infrared intrusion and other information of monitoring spots, and also can remote control through these three ways by using phone software, short message and Web browser.[2]

3. OVERVIEW OF SYSTEM

3.1 Proposed System

In this system we are going to develop a dedicated website for the machine under observation. The website is a electro dynamic website portal, includes the database and the current values of parameters. We are also providing tap points for each fault prone area so by just pressing the buttons one can view the actual voltages dynamically available at physically on machines control panel instantaneously. We are also providing a database of the parameters which can be accessed through net and monitor accordingly.

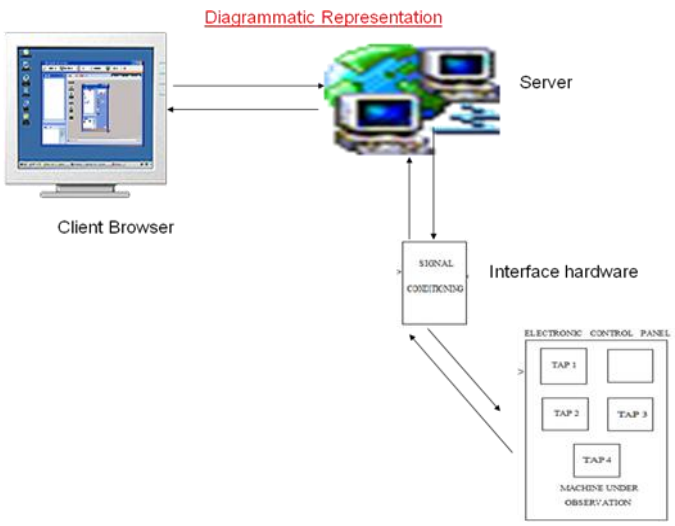

Fig -1: Proposed System

In machine prototype, there are putting four tentative Electronic tap points; A person sitting anywhere can have access and monitor the same schematic of circuit on the machine. This can also be useful to detect the exact location of the fault in the machines control panel, even scada like data logging can provide high end histogram for any parameter analysis with respect to time, enabling us to feedback the system or improvements in machine workings and strengthening the machines working ability.

3.2 General Specification Of System

- A circuit which is use to troubleshoot, having different tap points for troubleshooting that circuit area.
- A hardware to collect the data from various tap points and interface it with server.
- Data is then stored at one place (server).
- Data then can be retrieve and used by accessing the web application from any remote login.
- Also it will help to monitor machine status from remote login.

4. DATABASE CREATION AND WEB DESIGNING

4.1 Measurement of voltage using Arduino kit

Normally fault in the machine or circuit is indicate by change in voltage at certain points of circuit. The voltage is measure at different tap point is in analog values. But to provide this data that is voltage at different tap point we required signal conditioning which is interface between machine and server to provide data to server. For that purpose Arduino kit is used. Which play role as interface card between machine and sever and provide different voltages at different tap points to the circuit.

Table -1: Analog Voltage Values

Tap	Voltages (V)	
	Without fault	With fault
1	3.8	00
2	0.50	00
3	5.07	00
4	0.01	00

4.2 Database at Server

A web server is a software tool which manages (hosts) web pages and makes them available to browsers, either through a local network or through the Internet.

Physically web servers and the client machines can be on same machine or separated miles apart. However this does not make any difference in terms of access. There are many web servers available in the market today. Apache, IIS (Internet Information Services), Enterprise Server by IPlanet are a few. ASP. NET runs on IIS. network.

Arduino kit provide data to system which is use as server. The real time data that is voltages at different tap points are continuously provide to the server by using arduino kit. The database is created at server as shown below in table. The table contain the values of voltages at different tap point which provided by arduino.

Table -2: Database at Server

	Different tap points			
	Tap1	Tap2	Tap3	Tap4
1	770	114	1014	0
2	770	114	1014	0
3	770	114	1014	0
4	770	114	1014	0
5	771	113	1014	0
6	771	114	1014	0
7	773	113	1014	0
8	773	113	1014	0
9	774	114	1014	0

4.3 Web Design

In order to access the internet remotely with a secure connection that is platform- and device-independent, the .NET framework provides an effective and ideal solution by using the concept of web services. The applications of web services provide a safe and secure connection at one end and the process or operation at the other end of the connection. The framework also does not confine itself to computers and makes the whole operation inter compatible across devices. Thus, using the .NET framework in ASP.NET, the code for operation programmed on a different server, which can be accessed using the web services protocols using a web interface to remotely access it.

4.4 Provision for Security

The website designing performed using web services in the .NET framework. The pages were designed using ASP. NET with SQL server as the back end. Web services were then consumed from a different server into this server. The pages were integrated together and were hosted on the web.

For the purpose of security we provide unique user id and password at the remote location. So whenever we want to troubleshoot or monitor a system we have to log in by using given user id and password.fig.2 and fig.3 shows the provision of user id and password in given system at windows application.

Windows application is use to provide realtime data that is voltage values at different tap points to the website which we design for monitor circuit or machine from remote location.

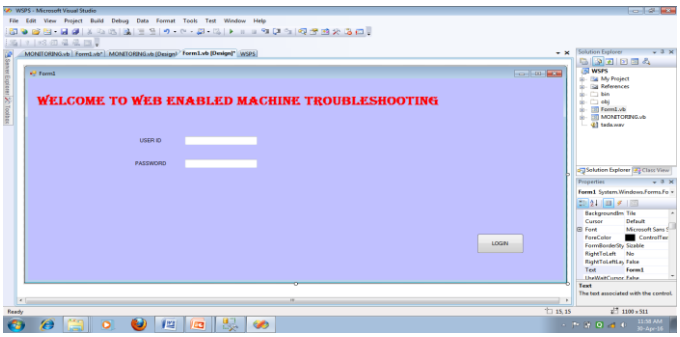

Fig -2: Provision of user id and password for windows application(1)

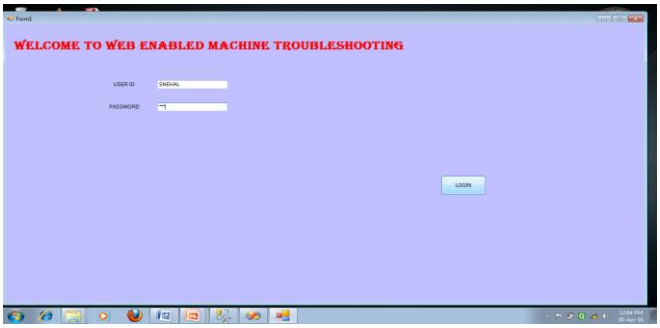

Fig -3: Provision of user id and password for windows application(2)

At webbrowser that means when designing the website for system that also user id and password protected. The unique user id and password is provided for website which is operated from remote location.

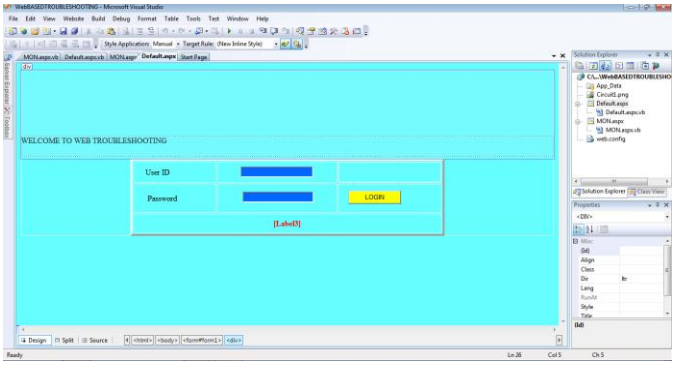

Fig -4: user id and password protection in website designing

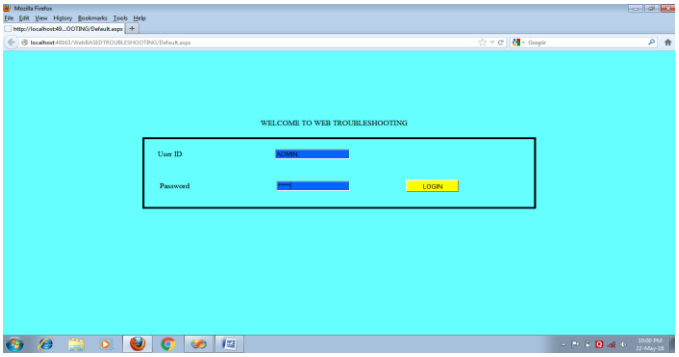

Fig -5: user id and password protection at remote location

So for monitoring and troubleshooting machine have to log in first then there is real time updation of values of different tap points.when there is fault at any point then indication is displayed on that. When designing website to update the values of tap points the real values are provided website from windows application as shown above.

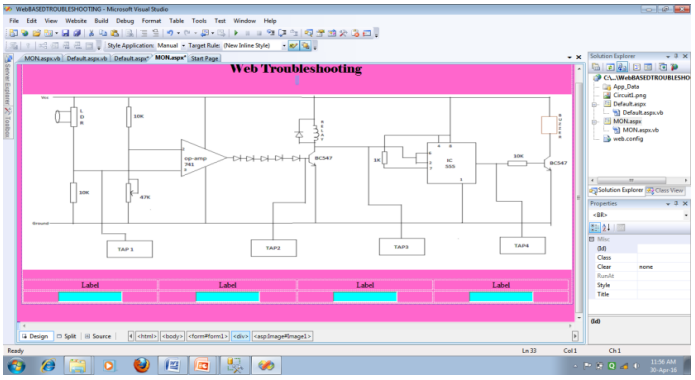

Fig -6: Designing website with provision of values at tap points.

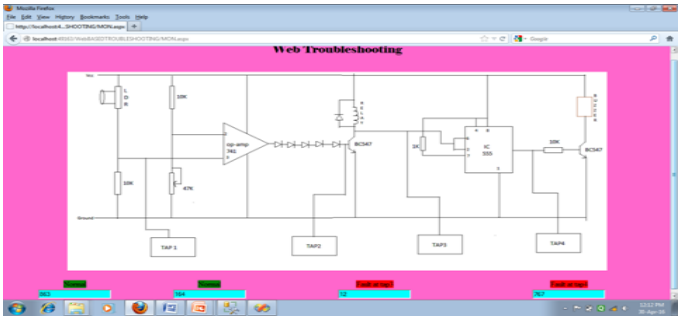

Fig -7: Logged in website at remote location which shows status of machine that is fault and normal condition of tap points.

5. CONCLUSIONS

In this paper monitoring and detection of fault of any machine or circuit from remote location through internet is implemented. The parameters of given circuit or machine that is voltage is use for checking fault is occur or not. Arduino board which read analog value of voltage and convert them into digital value. Output of arduino is given to system which is use as server. Server read data from arduino output and create database. Server provide database to remote location from where fault in machine detected. The voltage at tap points are continuously compare with ideal value of voltages if value does not match then fault at that particular tap point is shown. Hence any fault occurred in machine can be detected from remote location by using internet.

ACKNOWLEDGEMENT

I wish to express my sincere thanks and the deep sense of gratitude to respected guide Prof. D. D. Ahire in Department of Electronics and Telecommunication Engineering of Matoshri College of Engineering and Research Centre, Nashik for the technical advice, encouragement and constructive criticism which motivated to strive harder for excellence. I also wish acknowledgment to the people who gives support direct or indirectly to my project.

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