CONTROLLING ENVIRONMENTAL PARAMETERS WITH GUI BASED VIRTUAL INSTRUMENTATION SYSTEM

Kavita Katole[1], Swati Balwir[2], Nilesh Panchbudhe[3] and Nirja Dharmale[4]
[1,2,3]Department of Electronics Engineering,
Dr. Babasaheb Ambedkar College of Engineering & Research, Nagpur, India
[4]Rungta College of Engineering, Madhya Pradesh, India

ABSTRACT
This paper presents a system using multitasking process for controlling environmental parameters like temperature, humidity, pressure etc in vehicles. Here Virtual Instrumentation software LABVIEW is used for designing a Graphical User System to set or reset different environmental parameters in vehicles. It is the Multitasking system which will distribute the workload in a different core. The design consists of concurrent system with comparators for various controller used in vehicular system. The proposed system is a concurrent one having indicators like LED's or sound alarms to show upper or lower limit is crossed.

KEYWORDS: *Environmental parameters, virtual instrumentation, LabVIEW*

I. INTRODUCTION

Today, across the globe, electric vehicles have a major impact on the way we work, live and travel. For many years they have provided effective transport solutions for a wide range of applications from forklifts, access platforms, golf carts, to utility vehicles, and now interest is spreading.
Here, we have proposed a multitasking concurrent system for vehicular parameter controller with multiple parameters in LabVIEW
In computing, multitasking is a method by which multiple tasks, also known as processes, share common processing resources such as a CPU. With a multitasking OS, such as Windows XP, you can simultaneously run multiple applications. Multitasking refers to the ability of the OS to quickly switch between each computing task to give the impression the different applications are executing multiple actions simultaneously [3].
In this paper we propose an Environmental Parameter Controlling System for vehicles using LabVIEW. The implementation involves use of 3 cores each of which controls 2 parameters. Thus the system controls 6 different vehicle parameters i.e., speed, temperature, engine oil level, petrol level, pressure and humidity

II. ABOUT LABVIEW

LabVIEW is a graphical programming language that uses icons instead of lines of text to create applications. In contrast to text-based programming languages, where instructions determine program execution, LabVIEW uses dataflow programming, where the flow of data determines execution.
In LabVIEW, you build a user interface with a set of tools and objects. The user interface is known as the front panel. You then add code using graphical representations of functions to control the front panel objects. The block diagram contains this code. In some ways, the block diagram resembles a flowchart. One can purchase several add-on software toolsets for developing specialized applications. All the toolsets integrate seamlessly in LabVIEW. [4]

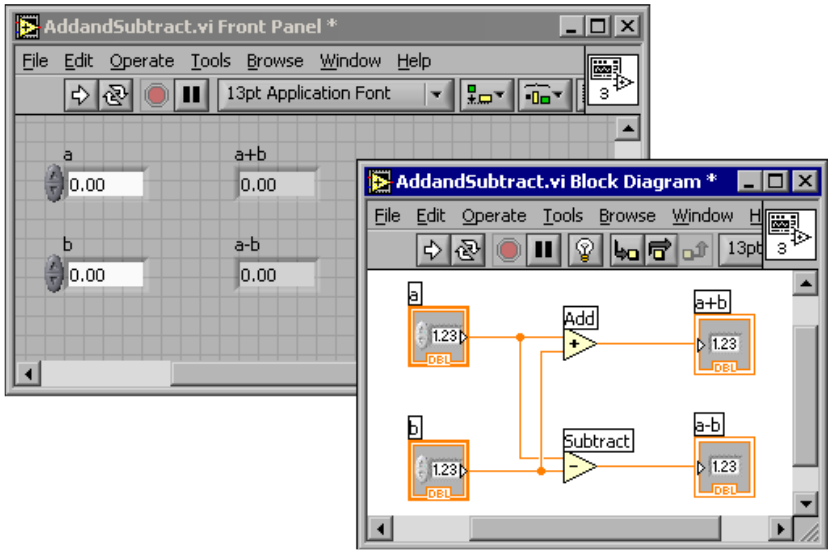

Figure 1 Example of a block diagram and corresponding Front Panel in LabVIEW

A novel concept of multitasking using LabVIEW software is proposed for vehicular system. Analysing several solutions it seems that the LABVIEW is the best candidate to support real-time control experiments.

The idea of open hardware and software solutions for LabVIEW offers an unlimited number of applications in the field of automotive system. The system design of control parameters is rugged, deterministic, reliable, modular, flexible, easily expandable and user friendly.

Most functionality in modern vehicles, such as cars, is in one way or another controlled by computers. The implementation involves use of 3 cores each of which controls 2 parameters. Thus the system controls 6 different vehicle parameters i.e., speed, temperature, engine oil level, petrol level, pressure and humidity. The results show that the proposed system works efficiently and optimizes vehicle's performance

III. METHODOLOGY

In this paper we propose a system which can control different environmental parameter in vehicle using LabVIEW. The implementation involves use of 3 cores each of which controls 2 parameters. Thus the system controls 6 different vehicle parameters i.e., speed, temperature, engine oil level, petrol level, pressure and humidity. The proposed system is a concurrent one having indicators like LED's or sound alarms to show upper or lower limit is crossed. Basic components that are used in the implementation of the proposed vehicle parameter controller is less than and greater than comparators, which compare the current value of each of the parameters to the set min and max values and provide appropriate alarm/notification.

Figure 2 gives the LabVIEW implementation of the proposed multi-core processor based Vehicle Parameter Controlling System. The system uses various blocks as discussed in chapter which interconnected using wires. The system uses VI's and SubVI's..

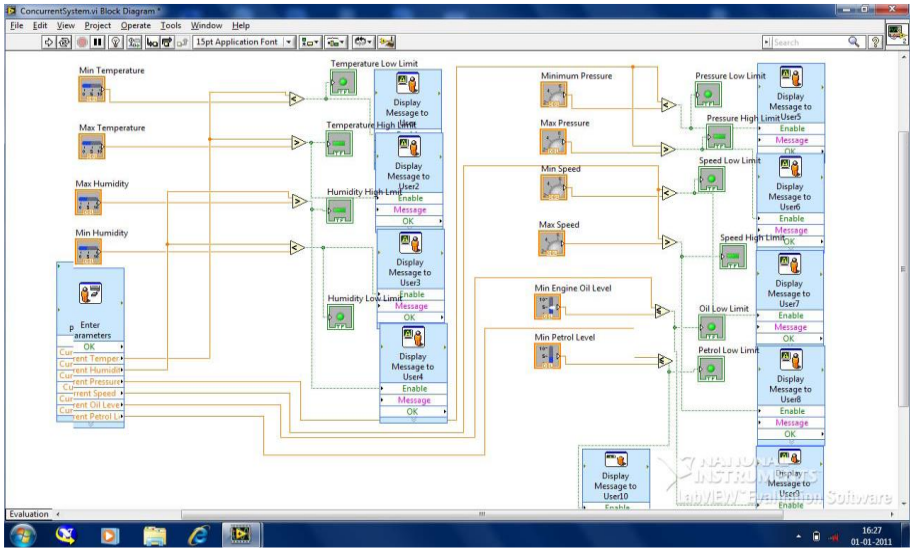

Figure 2 Concurrent system block diagram

IV. RESULTS

The results of the LabVIEW implementation of the proposed environmental parameter controller for vehicles will be tested using front panel. The figure 4 below shows the virtual front panel view of the controller showing all the controls to set the min and max levels for each of the parameters.

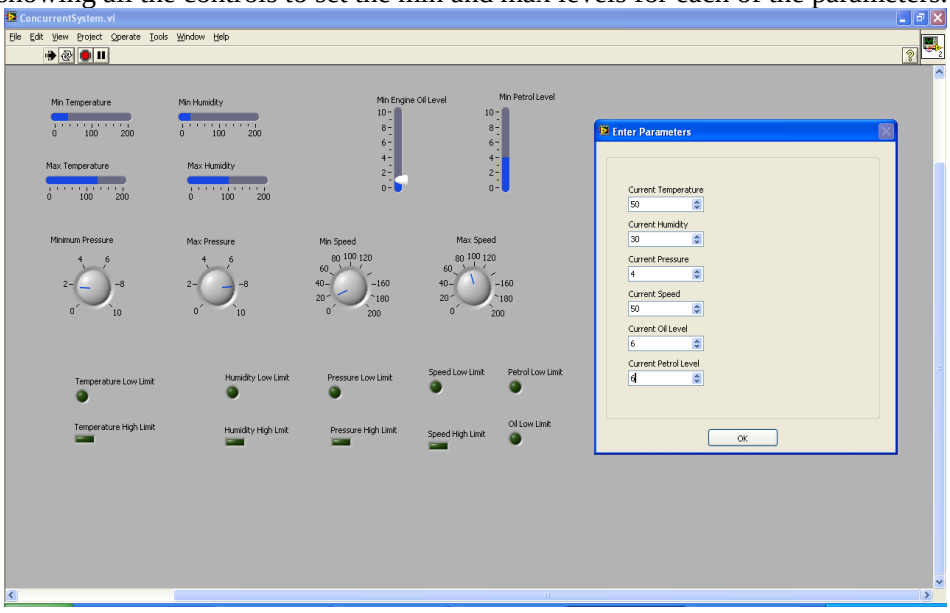

Figure3. All Parameters set to initial values

The Min Temperature and Max Temperature blocks are used to set the minimum and maximum values of temperature. Similarly Min Humidity and Max Humidity blocks are used to set the minimum and maximum values of humidity, and so on for the other parameters shown in figure 3. The Enter Parameters block takes the current value for each of the parameters.

The comparator compares the current input value for each parameter with its min and max set values in case of speed, temperature, pressure and humidity and to its min set value in case of engine oil level and petrol level. The Display Message to User block displays the output of the comparator to the user.

Figure 4: Temperature low limit

With respect to parameters set to values in figure 3, when the current values on the front panel are set as in figure 3, we get what is called normal output where are all the current values for each parameter is in the range and hence there is no indication or alarm. However figures 4 and 5 below show the abnormal outputs as one or the other parameter has current value outside the specified range or has exceed the limit; thus indicating the red alert for the abnormal current value for the respective parameter.

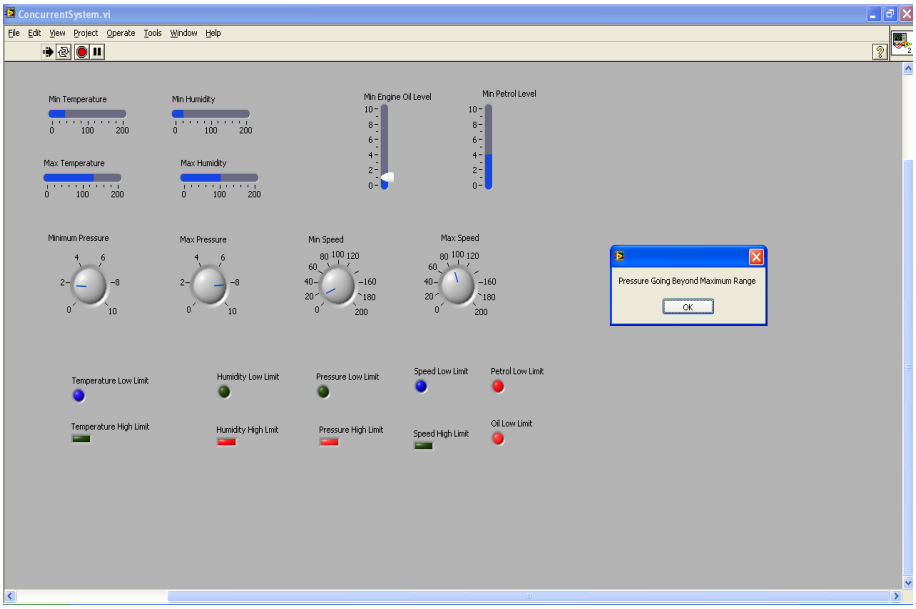

Figure 5. Abnormal Output: Pressure going above maximum

V. CONCLUSIONS

Thus an efficient system to monitor environmental as well as vehicular parameters to enhance safety of the vehicle is implemented. The system controls 6 different vehicle parameters i.e., speed, temperature, engine oil level, petrol level, pressure and humidity. The results show that the proposed system will works efficiently and optimizes vehicle's performance. The proposed controlling system can be implemented in hardware and live test the same on a vehicle.

VI. FUTURE SCOPE

The proposed controlling system can implemented in hardware on a vehicle using Data acquisition system.
The same system can also be implemented in Research labs to control various parmeters.

REFERENCES

[1] Wieslaw Winiecki , Piotr Bilski , 'Warsaw University of Technology, Institute of Radioelectronics, ul. Nowowiejska 15/19, 00-665 Warsaw, 'Multi-Core Programming Approach in the Real-Time Virtual Instrumentation' I2MTC 2008 - IEEE International Instrumentation and Measurement Technology Conference
[2] Edwin K. Rézaei, and Sri R. Kolla 'Internet-Based ON/OFF Controller Using LabVIEW' Electronics and Computer Technology Program, Department of Technology Systems, Bowling Green State University Bowling Green, Ohio 43404.
[3] B Al-Naami, J Chebil, B Trabsheh, H Mgdob, "Developing Custom Signal Processing Algorithm with LabView FPGA and Compact RIO to Detect the Aortic Stenosis Disease", ISSN 0276−6547, 2006
[4] Multicore Programming with LabVIEW Technical Resource Guide, www. ni.com/multicore.
[5] www. ni. com/ user manual

AUTHORS

Kavita Katole is presently working as Assistant Professor in Electronics Engineering Department of Dr. Babasaheb Ambedkar College of Engineering, Nagpur. She has done her M.Tech. (Electronics) in 2011 from G.H.Raisoni College of Engineering Nagpur. Her special field of interest includes Embedded System and signal processing.

Swati Balwir is presently working as Assistant Professor in Electronics Engineering Department of Dr. Babasaheb Ambedkar College of Engineering, Nagpur. She has done her M.Tech. (Electronics) in 2009 from G.H.Raisoni College of Engineering Nagpur. Her special field of interest includes Signal processing and Image processing.

Nilesh Panchbudhe is presently working as Assistant Professor in Electronics Engineering Department of Dr. Babasaheb Ambedkar College of Engineering, Nagpur. He has done his M.Tech. (Electronics) in 2011 from Priydarshani College of Engineering Nagpur. His special field of interest includes Embedded.

Nirja Dharmale is presently working as Assistant Professor in Electronics & Telecommunication Engineering Department of Rungata College of Engineering, Bhilai. She has done her M.Tech. in 2011 from Priydarshani College of Engineering Nagpur. Her special field of interest includes VLSI and signal processing.