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Design and Analysis of Quality Control in Process Industries Using Labview

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Abstract
In all process Industries, to get quality product as output, the ingredients have to be composed in correct composition. So, to control quality of output product, we have to control the quantity of ingredients to be composed. In this paper, we have designed virtual Instrument which controls the process assessing the percentages of ingredients of any product using Lab VIEW. It checks whether added sum of percentages is equal to 100% or else halts the process. There by, it prevents the unequal percentage composition of ingredients to be composed. In spite of having many more techniques to make quality analysis followed by quantity analysis, Lab VIEW is most preferred among them. This paper provides the facility to evaluate a chemical composition before it is to be composed.
Keywords: Composition, Ingredients, Lab View, Quality Analysis

I. INTRODUCTION

Virtual instruments replace part of signal acquisition, processing and display, in traditional instruments, by using personal computer. By graphical programming, the computer monitor can be turned into the front panel of the traditional instruments and, in fact, with enhanced features. Plug-in data acquisition boards transform personal computers into digital device capable to collect signals from sensors and to send commands to actuators.

In general, Virtual Instrument is defined as the combination of hardware and software with industry-standard computer technologies to create user-defined instrumentation solutions. In this type of test instrumentation that is basically software reliant and primarily dependent on a computer to control test hardware and equipment, analyze, and present test results. The power of VI application software, Lab VIEW lies in the fact that it empowers the user to include test equipments as objects in their programs. There are two basic types of virtual instruments. Simple virtual instruments are PC based instruments. These are basically cards or modules that can simply be plugged into a PC and the accompanying software allows the user to perform relevant measurement and data analysis. Alternatively, a variety of programmable test instruments, communication buses like GPIB (IEEE-488), VXI, serial and chemicals/ingredients affect the quality of the compound.

Application test software such as Lab VIEW, Agilent VEE are available which can be used together to configure a VI.

In this paper, we have reported the design and analysis of quantity control using Lab view.

II. CHEMICAL INGREDIENTS

Chemical compounds should be composed safe with active formulations to have better products. The most used chemical compositions which are to be quantitatively controlled are paracetamol, cement, cough syrups, etc.
In this paper,

III. QUANTITY CONTROL USING Lab VIEW

We all know that quantitative control of a composition plays a vital role in maintaining the quality of the product. The quantities of the chemicals/ingredients we compose decide the quality of the product so quantitative analysis and control is most important in any pharmaceutical and manufacturing companies. Even small changes in the quantitative volumes of A Typical example of compounds which are Composition of Portland cement is 50-70 % C3S, 15-30% C2S, 5-10% C3A, 5-15% C4AF and 3-8 % other additives or minerals. It is the hydration of the calcium silicate, aluminates and allumino ferrite minerals that causes the hardening, setting, of cement.

Here lab view software is used to realize and simulate the process. The main advantage of using Lab VIEW is the ability of re-programming and virtual programming. We can make the quantitative analysis before actually designing the plant.

Lab VIEW has ready-to-use libraries for integrating stand-alone instruments, data acquisition devices, motion control and vision products, GPIB/IEEE 488 and serial/RS-232 devices, and PLCs, among others, to build a complete measurement and automation solution. Lab VIEW also incorporates major instrumentation standards such as VISA, an

interoperable standard for GPIB, serial, and VXI instrumentation; PXI and software and hardware based on the PXI Systems Alliance Compact PCI standard; IVI interchangeable virtual instrument drivers; and VXI plug& play, a driver standard for VXI instruments.

IV. HOW QUANTITY DOES IS CONTROLLED?

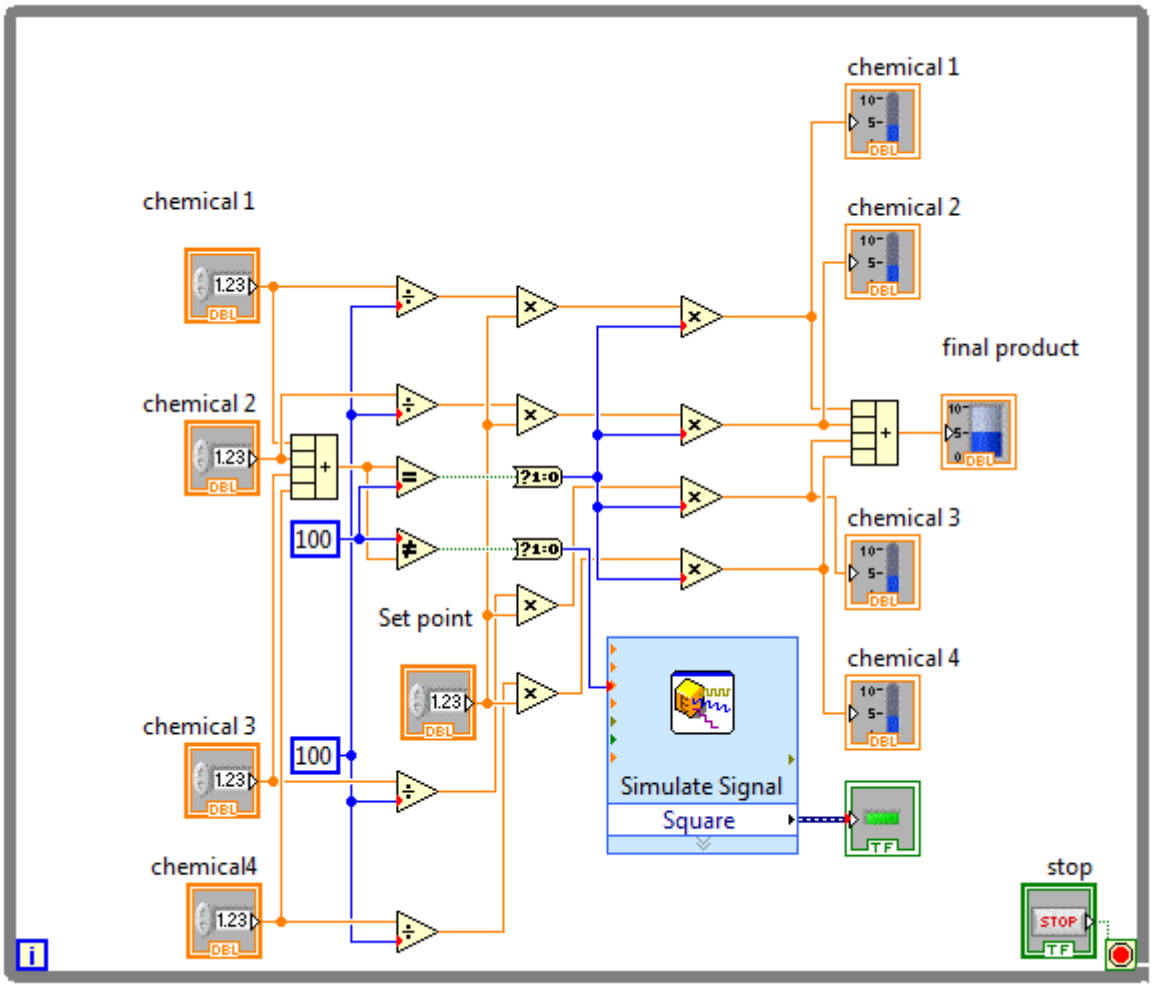
In this paper, let us consider that four inputs have to be given for a product of set point **500**. The input is given to the numerical control in the front panel. Now the percentage of chemicals are been taken from the input. The numeric add function adds the value of the given input and divides the percentage value and convert into the decimal and then the multiply function generates the total percentage value to the required percentage.

At such condition the value is verified, whether it is equal to 100 percentage or not. If it is true i.e. equal then the process is done and the chemical is analyzed as the given input. If it is false i.e. not equal then the process is stopped, it doesn't indicate any level of the chemical.

In true case the LED glows in white colour and in false case the LED blinks in red colour, in this case the signal simulation produces the square signal which enables the blinking red light.

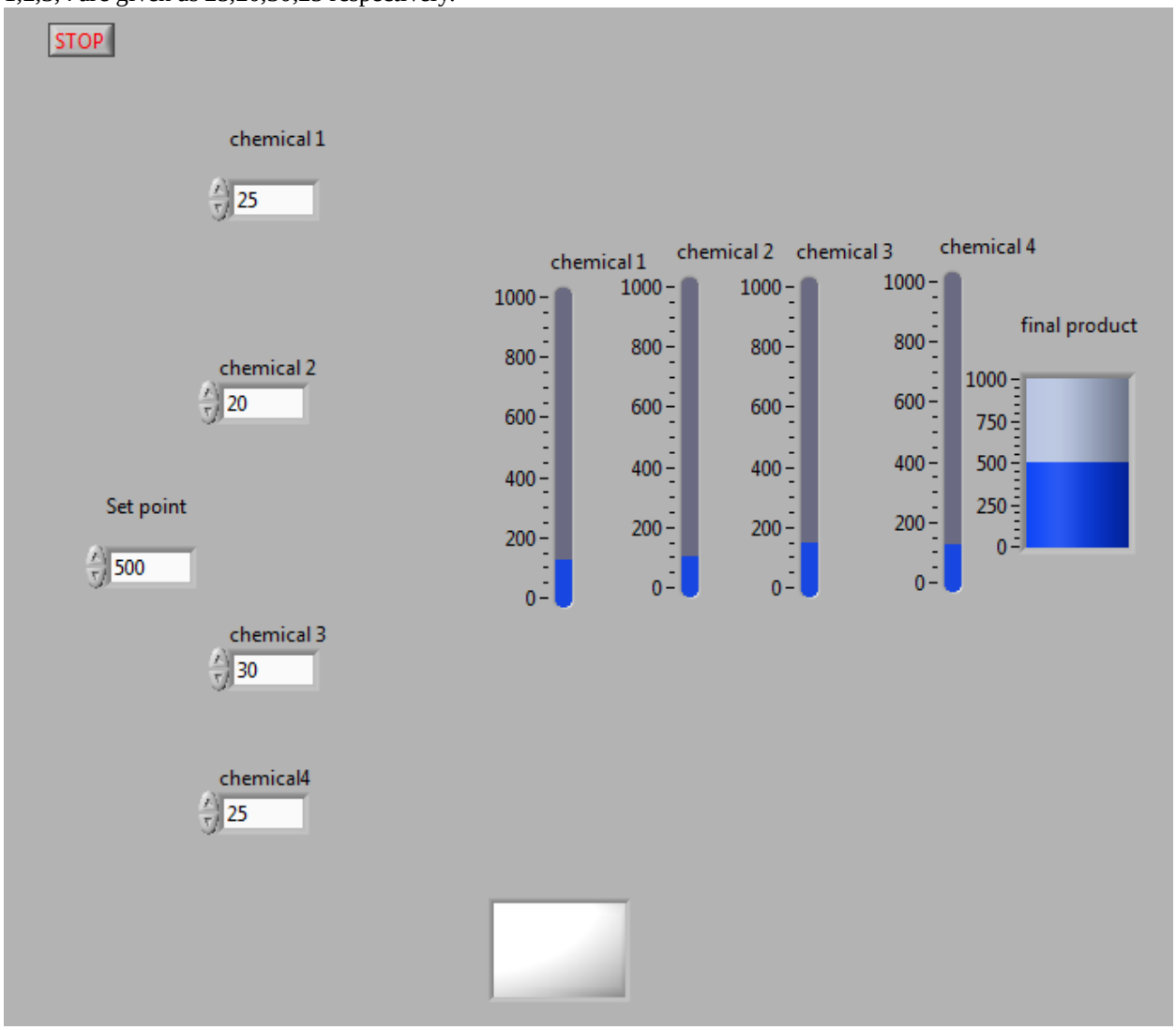
V. RESULTS AND DISCUSSIONS

The block diagram programmed as follows:



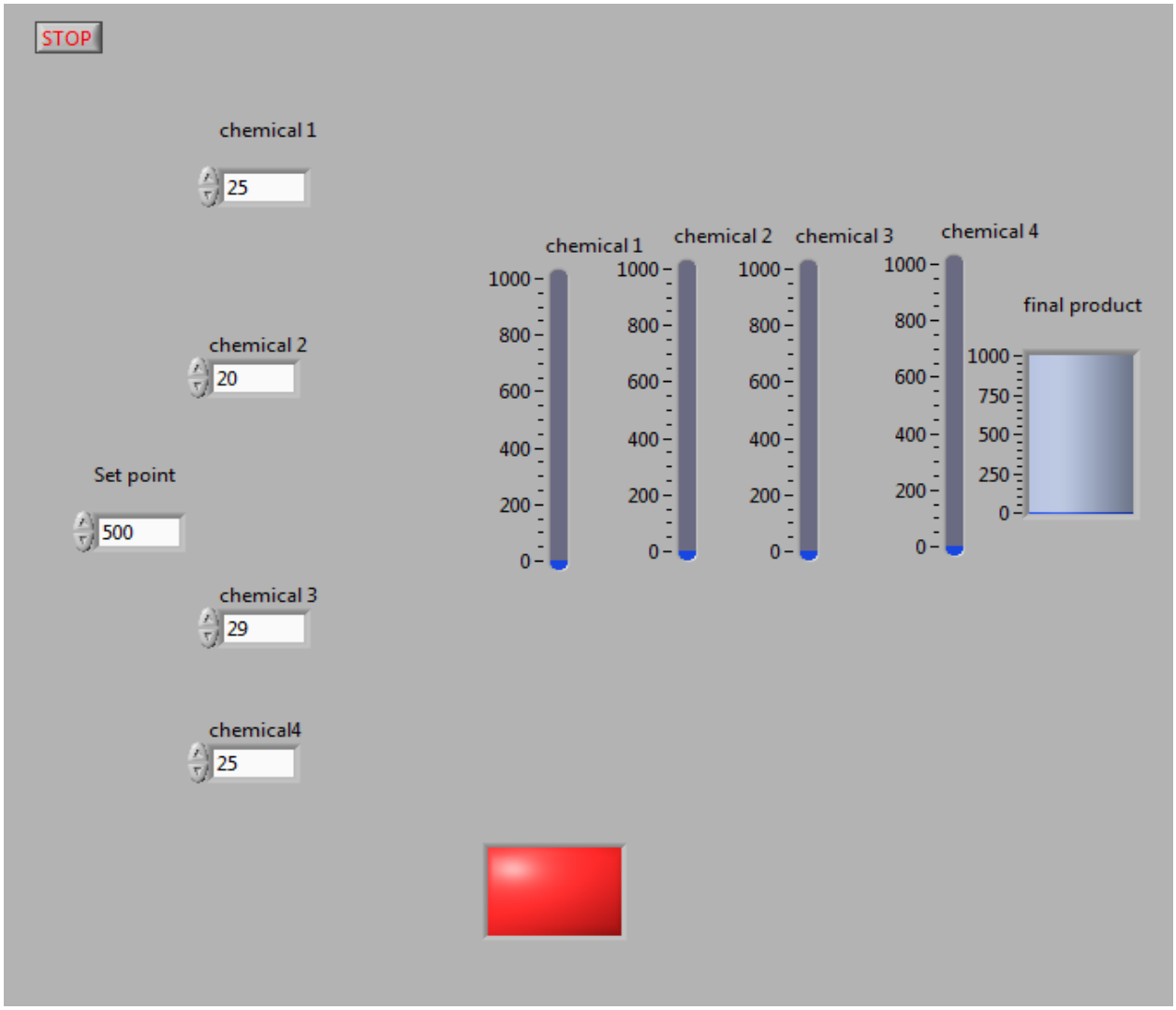
The front panel will be as follows:

Case 1: When the chemical percentage is given correctly, i.e. when the set point is given as 500 and chemicals 1,2,3,4 are given as 25,20,30,25 respectively.



Here, chemical composition is given correct and so, the process takes place and final product was indicated and also LED glows **WHITE.**

Case 2: When the chemical percentage is given incorrectly, i.e. when the set point is given as 500 and chemicals 1,2,3,4 are given randomly other than percentages given in first case. Here, chemical 3 is changed from **30 to 29**,



Here, chemical composition is given incorrect and so, process halts and indicating that composition was given wrong and LED glows **RED,** thus a small change also be checked here which is more advantageous.

VI. Conclusion

In this paper, we have designed Quantitative control using Lab VIEW. This is the most effective way to produce better products. It plays a vital role in designing the products affectively maintaining the quality. Though numerous techniques are available to perform quantitative analysis, Lab VIEW is preferable because of its advantages. This technique is not only used for quantitative analysis of chemical compounds but also rooted to other homogeneous mixtures. This could be new emerging tool for quantitative analysis in many manufacturing industries in future times.

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