Multi-touch improves data analysis

Multi-touch technologies have rapidly moved from the commercial to the industrial sector where they are being used to enhance data analysis.

Steve Byrom
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Multi-touch technology is rapidly migrating from smartphones and tablet computers to industrial automation. One of the main reasons for this trend is that recent studies suggest that an operator accustomed to the technique can manipulate information on a screen much faster than when using a conventional keyboard and mouse combination.

In addition, multi-touch technology has almost universal familiarity due to the proliferation and widespread use of smartphones, tablet computers, and other handheld electronic devices (Figure 1). Therefore, little or no training is required to introduce multi-touch to industrial plants and processes, resulting in quick adoption and immediate gains in productivity and effectiveness.

One of the main responsibilities of plant operators and other personnel is data analysis, and this discussion will show how multi-touch technologies can be used to improve the performance of this and related tasks.

Single-touch technologies can't keep pace

Industrial manufacturing and test facilities often find themselves drowning in data, and struggling to use this data in meaningful ways to improve operations. One of the main ways that this information is viewed and analyzed is through data acquisition and control systems. These systems use color graphical displays to allow operators and other plant personnel to view

process data, and to control equipment or processes. More advanced systems can securely save data for viewing on demand, particularly useful for review of historical data with comparisons to present conditions.

Modern data acquisition and control systems replace old recording technologies such as pen and ink chart recorders, or supplement the functions of plant-wide automation systems. The latest products benefit from secure high-capacity data storage, able to save months or even years of historical data within the device. Operators can view and study this data without having to use a separate PC and special software.

Although data measurement and recording techniques have improved dramatically over the years, producing greater amounts of useful data, analysis techniques and operator interface technologies haven't fully kept pace.

Traditional screen navigation techniques such as a mouse and keyboard have proven to be an inefficient way to view and analyze large amounts of data. Touchscreens have been used for many years now and are an improvement, but most employ single-point technologies that only allow an operator to touch and manipulate a single screen object. In many cases, a single touch will then activate a function or select a menu to move to a more detailed screen, with multiple touches often required for even relatively simple tasks.

Although a well-designed touchscreen interface allows for faster direct-selection of menu icons and other items than is possible with a mouse and keyboard, systems that produce a large amount of historical data still require the operator to constantly tap or touch a screen control to navigate to an area of interest. But a better method is at hand, and is now available in leading data acquisition systems and other related products.

Multi-touch takes charge

Some studies have characterized multi-touch screen manipulation as three times faster than with a keyboard and pointing device. This allows operators and other plant personnel to find, view, and analyze the data of interest much more quickly. These and other benefits of multi-touch for data analysis are listed in Table 1 and described in detail below.

Table 1: Benefits of multi-touch for data analysis

1. Three times faster than with a keyboard and a pointing device
2. Panning quickly locates the area of interest on a graph or chart
3. Pinching allows quick zoom-in on data of interest
4. Pinching to zoom out gives quick perspective on a longer time horizon
5. Operators can handwrite notes on a trend display

A two-point touchscreen supports swipe and pinch operations. With a single finger, an operator can swipe a trend screen and traverse across the horizontal time scale until a particular area of interest is reached (Figure 2). He or she can then use two fingers to pinch the screen in or out to compress or expand the time scale (Figure 3). This allows trend data to be examined quickly in an overview fashion, and then investigated in detail.

An operator can also rapidly scroll through historical trend text-based data by swiping the screen, in the same manner that he or she would scroll rapidly through a contact list on a smartphone. In many cases, this is a much faster way of finding data than the traditional method of typing letters or numbers and performing a search function.

Another productivity enhancing feature is the ability to add short handwritten notes and symbols directly on a trend display or other screen with a stylus, or even with a finger. One simply presses a finger to the screen and writes a note or creates a symbol, similar to finger painting.

As a matter of fact, the entire user experience with a multi-touch product suddenly becomes very familiar since operators are already interfacing to their smartphones and tablet devices in much the same manner. This reduces the learning curve required to master the operation of a new data acquisition product, while at the same time encouraging the use of features tailored around optimal touchscreen navigation. Finally, multi-touch imparts a fun-factor to routine tasks and operations, increasing operator involvement and productivity.

But as with all new technologies, there are some caveats that must be examined prior to implementation.

Garbage in, garbage out

Any data being analyzed must be accurate, reliable, and trusted. Once trusted data is available, it must be delivered to the viewing device at intervals frequent enough for meaningful analysis. Large amounts of data also need to be stored and easily compared to current operations as this greatly improves analysis.

Poorly executed application software written to use multi-touch techniques will cause problems for users. Operators will approach an application with immediate expectations of how it is supposed to work. If it doesn't perform the way they expect, users will lose engagement quickly.

Although multi-touch improves the productivity of many operation interactions, single-touch on-screen keyboards and pointing devices still have their place. For example, scrolling through a list of up to hundreds of variables is generally faster with multi-touch, but searching a database with thousands of entries will usually be quicker with traditional type and search.

Best results in terms of high productivity and ease-of-use will continue to be found through a judicious combination of multi-touch and single-touch technologies, so both should be supported, as in the following application.

Source:

http://www.controleng.com/home/single-article/multi-touch-improves-data-analysis/44e9b753d73c653409cf5ad5f8c23f38.html