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Read More, Click Less

by Tor Valenza

Radiologists must squeeze in more exams in a single day, and today's PACS are helping with more ways to reduce mouse clicks—or eliminate them entirely.

When it comes to PACS, there can be too much of a good thing.

Along with all of that power come more buttons, more toolbars, more mouse clicks, and more ways to communicate, consult, and report. All those powerful features can be cumbersome to the end user, slowing down workflow in an environment where high patient volume is paramount.

Of course, PACS companies are not going to eliminate good features for the sake of simplicity, but they are creating more intuitive ways to utilize those features, so that radiologists can diagnose more and click less.

Saving Clicks

While PACS may have become super-sophisticated, it is not as if radiologists are harkening back to the old days of lost films and file rooms. PACS is as much a part of radiology today as light boxes and film used to be. But whereas light boxes and film were slow to become obsolete, the life cycle of a PACS can be as little as 3 or 4 years, thanks to faster computer chips and innovative software developers.

George Kovacs, director, product marketing at the Medical Imaging Group, McKesson, Alpharetta, Ga, recalled how PACS was supposed to be a simplifying tool.

"Computers were supposed to simplify the workload for the radiologist," he said, "but when film went away and as radiology moved further into a digital universe, the platform, capabilities, and user demands kept on growing. So, new features continue to be added to the products, not just related to reading medical images, but to the workflow."

PDAs, cell phones, e-mail, and text messaging are all part of the radiologist's method of communicating during reads as well as their personal lives. In addition, PACS programmers have developed and refined sophisticated tools to manipulate images and share them across the globe using a host of new communication devices and platforms.

Yet all that power has created a clutter of programs and tool bars for radiologists, who appreciate that power, but do not want to go through a maze of clicks to start their diagnosis.

Peter Szabla, implementation and training manager for RamSoft, Toronto, said, "If you're doing a lot of simple cases where you're reading a lot of x-ray fractures, if you have to add 10 seconds per case for just digging through and finding the right tool, then after six cases, you've now added a minute. So, if you read 60 or 120 cases a day that use that toolbar, that's an extra hour spent."

Ed Heere, president and CEO of CoActiv Medical, Ridgefield, Conn, said that saving the radiologist and other end users time is more important than ever because of DRA and other health care reimbursement pressures.

"The radiologist now has to read more cases in a given period of time in order to earn the same amount of money. In order to do that, he wants things to run as quickly as possible for his own health purposes, with as few arm movements, hand movements, and clicking to reduce carpal tunnel [syndrome], as well as save time. So he wants a PACS interface to be intuitive to the way he thinks—and they all don't think alike."

Intelligent Worklists

To clear the PACS workstation screen clutter, vendors are designing their interfaces with as few buttons as possible and with limited, customizable tool bars and more automatic features.

Perhaps the best example of how vendors are streamlining mouse clicks and adapting to the needs of each end user is modern worklists. Typing in a patient name or scanning in a bar code to find a patient is being replaced by automatic filtering.

In previous PACS generations, programmers could sort worklists to some degree, but now filtering is to a level where any DICOM parameter can be set as a filtering agent. Those filters then can be customized to each radiologist and follow that radiologist to whatever workstation they log into.

For example, a radiologist can log in at home or at the office and receive only exams that are related to their subspecialty, such as unread mammograms or unread CT chest exams, etc. Filters also can sort by modality, gender, origination site, or reading status.

Filters can even select exams ordered by a picky referring physician who wants their patients read only by a favorite radiologist in the group.

Vendors are also giving worklists instant additional information through visual cues.

"You want to make the basic window that the radiologist is working with as meaningful as possible," Heere said.

One of the ways that CoActiv is providing more meaning is by color-coding the worklist's exam status.

For example, exams that are stat are not only positioned at the top of the list, but also colored red. Exams that were finished within the last 3 hours could be colored green; those that are 3 to 6 hours old are colored orange, etc. Exams that are currently open at another workstation could be blue. This feature can also be configured to grey scales.

Features like these help the reader focus immediately on exams that are relevant to their specialty, priority, and referrer's preference, thereby improving workflow.

"You want as much information on the workstation as possible without cluttering it," Heere said.

Beyond Hanging Protocols

Hanging protocols are nothing new in PACS, but vendors continue to further develop ways to speed up how exams are viewed and manipulated—with the least amount of clicks.

"Hanging protocols should not only encompass the layout of the image and the order of the sequences that you see them in, but you need to account for a lot of little things, such as turning on scout lines or automatically applying window presets," Szabla said. "So, if I open up a CT case for example, I can see maybe my chest slices in a lung window and a bone window, so that I can look at different types of tissues right away."

Of course, every physician has a different preference for the way they view studies, and features must be flexible. A feature that is helpful to one physician may slow down another. For example, vendors are making it easier to link images, but that does not mean every physician wants to view them that way.

McKesson's Horizon Rad Station, for example, has a staged hanging protocol feature that organizes the series of images and historical studies based only on that user's typical pattern of viewing and subsequent sequence of actions.

Connie Crumbley, a public relations specialist at McKesson, said: "Usually a radiologist has a preferred sequence of seeing things—ie, for a head, Dr Smith likes to first view the side, then the top, then straight-on, then zoom, etc. The system knows that Dr Smith likes to see his head CTs in this way, so when he logs on to view a study, the system puts them in that order on screen. If he'd like a different set of images, he just clicks for another 'page,' and the screen reflects another organization of the images for him."

RamSoft also customizes linking image sets to the individual's habits. Szabla explained, "Let's say I'm looking at a series of images that have got the same anatomy, but I'm viewing them in two different window presets, so that I can look at two different tissues. I don't want to have to scroll through each one of those individually. When I roll that mouse once, I want those images to jump to the next spot so I can quickly keep going. That's one radiologist's preference, but another radiologist might want to look at them individually."

Consequently, the latest in hanging protocols must allow physicians to tailor more than just the layout, but also the behavior of the mouse and other buttons.

Time-saving Communications

Whether sitting at a workstation, at home, or on the go with a laptop, radiologists are constantly being consulted about their diagnosis or about some viewing aspect of the exam. However, the more the radiologist is on the phone with a technician or the emergency department, the fewer exams get read.

Modern PACS systems are offering streamlined ways to communicate with various points of care.

Tyler Harris, RT, director of implementation at NovaRad, American Fork, Utah, said that the company is addressing this need with several new features. One new feature is a virtual post-it note system that helps the radiologist and emergency department communicate more efficiently.

"Whoever reads the examination first basically types in the note, and when the other user gets the exam, the note automatically pops up when the exam is opened," Harris said. "So, that eliminates the need for those phone calls back and forth or the faxing of preliminary reports or whatever information they use to get information back and forth between the two departments."

Text notes can be sufficient, but sometimes it is necessary to show —as well as tell—so NovaRad has a feature that can record and play the radiologist's voice while manipulating the mouse over an area of concern. When the emergency department receives the exam, the ED physician will actually be able to hear the radiologist's voice, see the synchronized recorded mouse movement, as well as read any typed annotation.

McKesson has a similar real-time communication option that allows the radiologist and specialist to communicate and consult while viewing an exam on separate workstations, simultaneously viewing, manipulating, and discussing the images. Later, with one final click, the referring physician is notified by an automated phone call, text, or e-mail that the final report is ready.

Going Clickless

From automatic normal templates to finalizing the exam and alerting the referring physician, PACS designers are intent on automating steps.

While this trend will ultimately save time, sometimes automation can bring you one step forward and two steps back, if a radiologist is too quick with a click.

"We have one button that will mark the exam read, finalize the dictation, close the viewing screen, and load the next exam on your worklist, all with one button," He ere said. "So now, you have one button that does four things. The disadvantage to that is if you click that button at the wrong time, then you have to go back and undo a lot of stuff. So you have to be careful, and you have to make it customizable so that the practitioners who want that capability and work that way have it, and those who are worried about clicking the wrong button can disable some or all of that mouse functionality."

User interfaces are also making the mouse obsolete with some users. Many PACS systems allow the use of video game joysticks or even using voice commands to move through studies, pan, zoom, close the exam, and more.

Perhaps the ultimate in the "un-click" is on the horizon with a future product that McKesson is demonstrating at trade shows.

The device is a multitouch data display screen that is similar to the iPhone user interfaces or the Nintendo Wii. Hand gestures replace mouse clicks, so that zooming, panning, opening cases, closing cases, and other functions may all be replaced by a flick of the finger. For now, however, the mouse and keyboard remain.

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