

HP develops new technology to save battery life on mobile devices

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"Right now... you can dim the entire screen or have a smaller display. We thought there should be something better," says Partha Ranganathan, a researcher at HP Labs.

You're on a long-distance flight with a two-hour DVD to watch but only 90 minutes of battery power left on your laptop. You're unexpectedly detained out of town without the charger for your mobile phone. Your MP3 player runs out of steam just when you locate that rare song to download.

We're more reliant than ever on our mobile devices, but battery life remains a problem. Improvements in battery capacity simply haven't kept pace with ever-more-powerful processors.

HP Researchers have come up with an answer for mobile devices that not only reduces power usage but enhances usability as well. Targeting one of the main culprits of battery consumption — the display — they've developed an energy-aware solution that dims parts of the screen that aren't in use.

Beam of light

"Right now, there are only two things you can do to reduce the amount of power used by the display — you can dim the entire screen or have a smaller display. We thought there should be something better," says Partha Ranganathan, a researcher at HP Labs.

Ranganathan and his colleagues devised a method of lighting up only the portion of the screen that's being used — only the lines of text you're reading, for example. The display changes as the user scrolls up or down the page.

"It's like a beam of light moving up and down," says Ranganathan.

The researchers devised their solution by first studying a group of volunteers to track how people use their machines and displays. Much to their surprise, they found that people weren't using all of the properties of the display. It wasn't just that they didn't use the whole screen; the volunteers didn't use the full color spectrum or the full screen resolution, either.

Users preferred energy-saving display

HP design, usability and display experts — iPAQ system architect Ken Nicholas, HP Labs researcher Erik Geelhoed and Meera Manahan, manager of customer-centered design services — worked with Ranganathan to develop software that monitors a PDA's screen when it is in use and automatically dims the unimportant pixels. The team then tested the solution on a group of volunteers.

The result: Display battery life lasted from two to 11 times longer, depending on what the user was doing.

What's more, 95 percent of users said they preferred the new interface, even without the energy-saving advantages.

"People said they liked the light shining the way it did because it emphasized the content they cared about," says Ranganathan. Users have the option of turning off the energy-saving function, shrinking or enlarging the size of the lighted area and changing the brightness of the

display.

Energy-saving displays, and more

The team also explored changing the default appearance of the screen. The default display for an MP3 player has two hours of battery life. But one altered to highlight only the most frequently used features — the "Play" button, the names of the tracks and the equalizer — was able to last three times longer. An alternate MP3 design targeted at those use the display infrequently (because they're listening to music, for example) provided a twenty-fold improvement in battery life.

"The need for this is great, and there's a big opportunity going forward," says Nicholas, the iPAQ system architect who collaborated on the energy-saving technology, which could potentially be used for the iPAQ and other devices.

Researchers are now investigating adding dynamic energy-saving components that are sensitive to time as well as context. For example, the whole screen could dim when not in use. Or, rather than relying on the display, an LED light could blink to communicate the arrival of an email. It may even be possible for MP3 players to save energy by playing tunes at a slightly lower fidelity without a noticeable change in audio quality.

"When we started this work, people told us, 'You can't innovate in the commodity space,' Ranganathan. "We showed that you can."

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