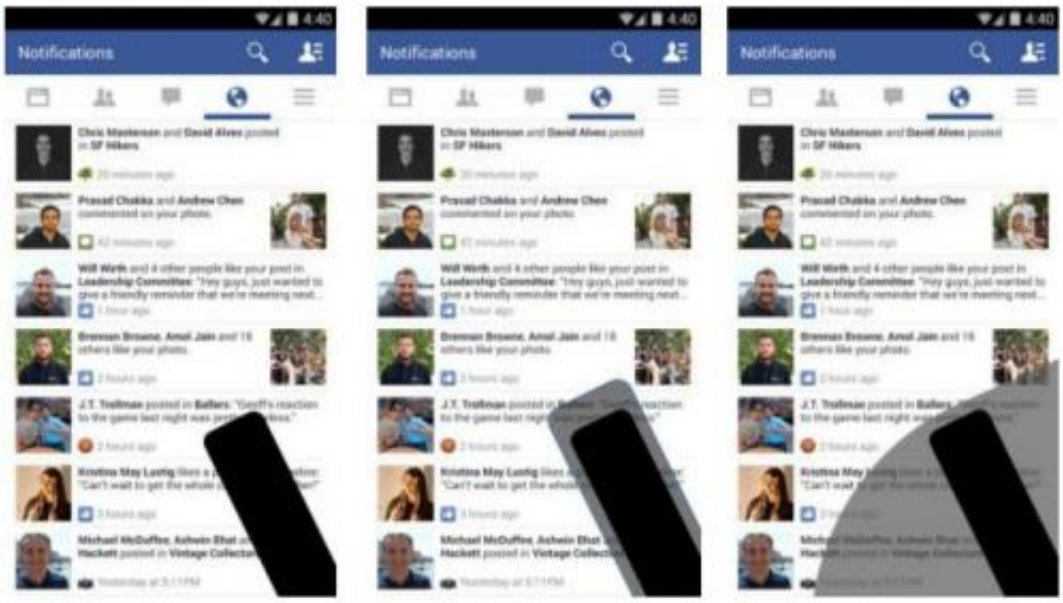
FingerShadow is proposed as screen power-saving technique

October 3 2014, by Nancy Owano



Different local dimming policy examples. Credit: Microsoft Research

With all the new-version features and form-factor advances in smartphones, a common problem still remains, and that is power. Displays place a strain on battery life. Advances in the Organic Light Emitting Diode (OLED) screen are in place but researchers say the screen remains a power-hungry module. Xiang Chen, Kent W. Nixon, Hucheng Zhou, Yunxin Liu, and Yiran Chen, a team of five representing Microsoft Research in Beijing and the University of Pittsburgh, are calling attention to a solution in their paper, "FingerShadow: An OLED

Power Optimization based on Smartphone Touch Interactions."

As the screen is one of the energy-consuming modules in smartphones, technologists have turned to the OLED screen but lower power consumption is not the only reason for their attention to OLED, as the screens offer better display quality, and the feasibility of manufacturing flexible and transparent screens. As for power solutions for OLED, technologists have proposed techniques such as local dimming and color remapping to cut OLED screens' power consumption.

The authors noted that OLED's power consumption is color dependent. Taking advantage of this color-dependent nature, said the team, techniques such as local dimming and color remapping have been proposed to further reduce the power consumption of OLED screens. "Local dimming proportionally lowers the RGB values, while color remapping changes power hungry colors to power friendly ones." The authors, meanwhile, set about thinking about finger actions for saving power. They observed how users interact with their phones via the touchscreen, in using Twitter, Facebook, and other interactive apps, for example, where the screen was partially covered by the user's fingers. The authors also said that "Besides finger actions such as tap, swipe and scroll, users may also constantly hover their fingers over the screen for a long time, for example, in scrolling a list of tweets."

In their paper, they proposed the screen-power saving technique based on user touch interactions, FingerShadow. This technique applies local dimming to the screen areas covered by user fingers. As the user cannot see the screen areas covered by fingers, FingerShadow is able to save power without compromising the user visual experience, they said. The authors reported the technique showed potential with about 12.96% in average of screen power saving, with 22.32% at most.

"We have studied 10 users' touch interaction behaviors and found that on

average 11.14% of the screen were covered by fingers. For these 10 users, we estimate that FingerShadow can achieve 5.07%~22.32% power saving, averaging 12.96%, with negligible overhead."

The paper discussed the advantages of their proposed technique. "FingerShadow has several advantages. First, the dimming area is located by the finger touch/hover operation, and the sensor call back process's calculation load is ignorable. Second, the pixel rending process doesn't require intensive computation load, the target area could be directly turned down or dimmed to the predefined level. Third, the dimming layer introduced by FingerShadow is handled by dedicated display controller rather than GPU," they wrote.

More information: FingerShadow: An OLED Power Optimization based on Smartphone Touch Interactions - research.microsoft.com/apps/pu … fault.aspx?id=230303