

DEMO of Focus: A Usable & Effective Approach to OLED Display Power Management

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1. INTRODUCTION

We will demo *Focus*, a system for effectively and efficiently reducing the power consumption on mobile devices with OLED displays. *Focus* uses the notion of saliency to reduce display power by dimming the parts of an application or game that are of lower interest [2]. Our measurement results, performed using the Monsoon hardware power measurement tool, shows that *Focus* can save, on average, between 23 and 35% of the OLED display power when applications are used. In the demo, we will allow users to use *Focus* with 6 different applications running on a Galaxy SIII phone. During the demo, users will be able to configure *Focus* for any of the 6 applications and then see the effect on the usability and power consumption of the resulting system.

2. SYSTEM OVERVIEW

OLED displays use individual LEDs to light up the screen. Hence, saving power can primarily be done in one of two ways; a) change the colors displayed to use “cheaper” colors (solution used by prior work such as Chameleon [1]), or b) dim or turn off portions of the screen that don’t need to be displayed. *Focus* uses this second approach.

The fundamental premise of *Focus* is that large portions of the mobile display are, at any point in time, unimportant to the user and thus can be dimmed to save power. In particular, for many applications, the lower portion of the screen contains less important information and can thus be dimmed or even turned off. The flow of *Focus* is shown in Figure 1.

3. DEMONSTRATION DETAILS

Our demo will allow participants to manipulate the dimming profiles for six popular Android applications — WhatsApp Messenger, Facebook, BBC News, Gmail, Adobe Reader, and Firefox Browser. The participants will be able to change the dimming regions for each application using our interactive adjustment tool (the middle part of Figure 1). After they are satisfied with their choices, their profile will be loaded onto a phone and they will get the opportunity to test their dimming profile with the real application running on a real phone. They can then repeat this process as many times as they want for either the same or different applications.

For each profile setting chosen, we will also report how

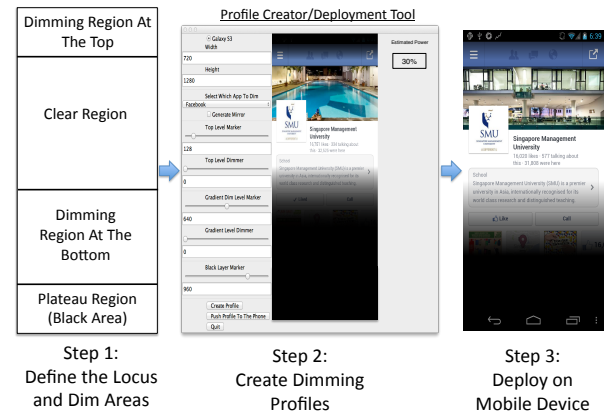


Figure 1: Steps Needed to Use Focus

much display power is being conserved — using values computed a-priori for each application using the Monsoon measurement device. Finally, we will also plan to anonymously record the preferences and usability ratings provided by the demo participants. This record will thus show, at the end of the demo session, the efficacy of this type of power-saving system (which trades off screen real estate for longevity).

Finally, we will also demo how *Focus* can be used with two different games — Quake 3 and Fruit Ninja. We use a different type of profile for these games and participants will be able to see how *Focus* can be applied to games.

3.1 Demo Setup & Requirements

The demo will use one laptop and three Galaxy S III phones. We will require Internet access and power points. We will also have a poster and would like to request for a poster stand, board, and mounting pins.

4. REFERENCES

- [1] Dong, M. and Zhong, L. Chameleon: A color-adaptive web browser for mobile OLED displays. *MobiSys*, Bethesda, Maryland, June 2011.
- [2] Tan, K. W. and Balan, R. K. Adaptive display power management for oled displays. *ACM Comput. Commun. Rev.*, 42(4):485–490, Sept. 2012.