Mitigating Distractions from Smartphones

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1. INTRODUCTION

A smartphone, with its versatile connectivity and incredible computational capability, can easily become an indispensable part of a user's day. But that same user can quickly become addicted to his/her device, constantly checking Facebook notifications, playing games, etc. This constant distraction can adversely affect a user's productivity and even his/her happiness. With the advent of always-on mobile devices, the torrent of incoming data follows users everywhere. As our appetite for information has grown, many have tried to warn of the dangers of a world that is constantly distracted [1]. In fact, employee distraction has been shown to decrease productivity [2]. Software like *MacFreedom* and *Unplug & Reconnect* try to alleviate this problem by disabling network connectivity [3, 4]. A smartphone, utilizing its sensors and access to user data, could filter distractions rather than simply silencing the phone.

A smartphone is well positioned to understand its user's behavior, learn the current context, and make suitable recommendations. In addition, because of cloud storage, smartphones now have access to the same user data that a desktop computer would. We propose *YogiPhone*, a system that uses these insights into a user's behavior and activity and intelligently makes decisions to aid users in mitigating digital distractions.

2. IDENTIFYING DISTRACTIONS

Context-aware sensing has finally come to the mainstream in the form of *Google Now*. By using the user's location, web searches, preferences, *etc*, *Google Now* automatically fetches pertinent information, like the weather at the user's location, without the user actively searching for it. *YogiPhone* proposes to use this knowledge of user data, including calendar events, emails, location, *etc*, to identify times when distractions should be eliminated. However, we must be exceptionally careful about how we utilize this data. User privacy is very important and while we believe users are willing to let a system access their information, we must ensure that privacy and security are taken into account.

YogiPhone classifies distractions by separating them into two distinct groups: *internal* and *external user distractions*. *Internal user distractions* are distractions that are generated due to the user's immediate actions (*e.g.* a user launching an entertainment application like *Angry Birds*). *External user distractions* are simply the opposite (*e.g.* an incoming email or *Facebook* notification). As shown in Figure 1, we deal with each type of distraction separately.

Although the system's intention is to nudge the user towards a better lifestyle, there will be times when a user would like to override the system's recommendations. When the user overrides *YogiPhone*, the system will gradually learn about the user's preferences and continue to refine its recommendations. This way, a user is not encumbered by the system and the two adapt to each other.

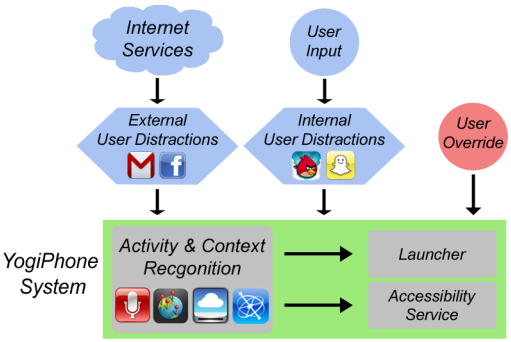

Figure 1: The *YogiPhone* Architecture

3. ONGOING WORK

We are working on a prototype using a Google Nexus S, on Android OS 4.1.2. Using knowledge about the user, along with sensor data, we can determine the user's activities and current context and then infer whether or not we should activate the system. For instance, we could use short audio samples to determine if a user is in a noisy area where distractions don't need to be eliminated, or vice versa. In the case of user addiction, we can also use the amount of time an app has been in use to make our recommendations. By using a custom *Launcher*, we can selectively disable applications that are deemed distracting to the user. Through an *AccessibilityService*, we intercept incoming notifications, calls, *etc*, and only let through important notifications (*e.g.* calls from family members, emergency texts, severe weather, *etc*). We plan to evaluate *YogiPhone* using a user study, comparing a control's number of distractions to the number of distractions a user running the proposed system encounters.

4. REFERENCES

[1] Matt Richtel, "Silicon Valley Says Step Away From the Device," *New York Times*, July. 2012.
[2] Michael S. Victoroff, "Putting Employees Online Risks Distractions," *Managed Care*, pp. 62–63, 2001.
[3] Eighty Percent Solutions Corporation, "MacFreedom," *http://macfreedom.com*.
[4] Sound Strategies, "Unplug and Reconnect," *http://unplugreconnect.com*.