Interaction Restraint: Enforcing Adaptive Cognitive Tasks to Restrain Problematic User Interaction

Joonyoung Park / Jin Yong Sim / Jaejeung Kim / Mun Yong Yi / Uichin Lee
Graduate School of Knowledge Service Engineering, KAIST

Background

- Smartphone usage provides instant gratifications to users.
- Such gratifications are known to reinforce frequent checking behaviors
- However, these behaviors cause user to get distracted from ongoing tasks and result in making a negative impact on his or her cognitive performance.
- Therefore, we suggest a novel intervention mechanism called '*Interaction Restraint*' to degrade the interactivity of a smartphone.

Research Objectives

Interaction restraint aims to

- Place some cognitive burden on user interaction as a nudging mechanism to encourage self-reflect and regulation.
- Change '*automatic interaction*' to be '*conscious interaction*'
  - By enforcing users to perform a light cognitive task at that moment of user interaction.
  - By intentionally slowing down user interaction and thereby suppressing user craving.

Preliminary Study

- We interviewed 13 participants to investigate how people considered our intervention method.

1) Intervention Target

- To determine the coverage of intervention
- *"I usually do Facebook a lot, and would like to get some intervention on apps that I lose track of time and immerse myself in."*

2) Workload Assessment

- How users thought about the intervention method of the number inputting task
- *"It is just like typing in a password for unlocking a smartphone, so it is pretty familiar."*

3) Workload Variation

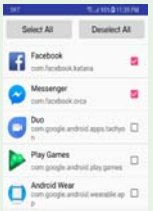
- To understand users' preferences on varying task workload based on the seriousness of problematic usage
- *"Intensity has to be maximized when the usage interval is below a certain limit."*

System Design

Configuration

Setting:

- Configuration of installed apps where users are allowed to select any apps to be intervened (including select and deselect all button)



Restraint Tasks

Examples:

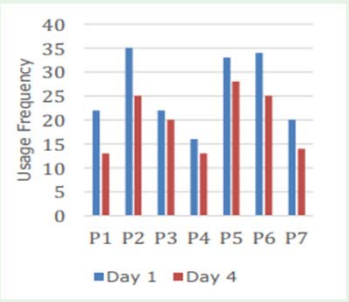
- Two restraint tasks that require the minimum (a) and the maximum (b) numbers to type in respectively depending on the app usage interval

(a) (b)

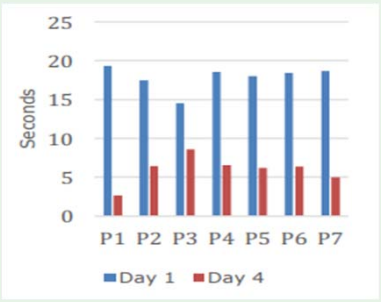
- Restraint task is a simple digit input work.
- Task workload is set based on the time interval between the last and the current time.
- Set Min/Max intensity threshold of the restraint task.

Field Trial

Results



Total Usage Frequency



Average Time Staying on Restraint Tasks

- As a result, participants commented that the interaction restraint effectively increased users' awareness of smartphone usage by making user interaction cognitively conscious.
- We also found that our interaction restraint helped our participants self-reflect on their daily usage behaviors.

Future Work

- Design a controlled experiment to validate the benefits of the interaction restraint mechanism
- Perform longitudinal field study to see whether such restraints effectively change their actual behaviors

KAIST