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

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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 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 nudge 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)

Restrain 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
  - Restraine 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

- 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 restriants effectively change their actual behaviors