

Mitigating Smartphone Interruptions During Social Interactions

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A push notification on smartphones is sometimes seen as an interruption rather than a useful piece of information[1, 3]. In particular, interactions in a social gathering are often disturbed by a smartphone use. A Pew Research survey[4] shows that 88% and 62% of American smartphone users think it is generally not acceptable to use a smartphone at a family dinner and a restaurant, respectively. Another work[1] shows that many users experienced getting disturbed by smartphones use by others and think people should control their smartphone use in a social gathering. From our observation, while many people try not to use their smartphone in a business or professional setting, people tend to freely use smartphones around friends and families, being potentially inconsiderate to people who are more personally meaningful to them.

We propose Social Context-Aware Smartphone Notification Management System (SCAN) to intelligently push notifications on smartphones so that people can better focus on real life social interactions. The system consists of two parts: i) social context detection, and ii) notification management. SCAN, installed on a smartphone as an app, detects a situation in which the user interacts with others in a social gathering. Push notifications are then delivered in a batch at a breakpoint, which we define as a time when the user is not engaged in a conversation. For example, a silence within a conversation or a user temporarily leaving the table are breakpoints for receiving push notifications. Deferring push notifications until a breakpoint reduces interruptions, helping the user to stay focused on the conversation.

The followings are key considerations for designing SCAN:

- *Context detection*: Smartphones are equipped with various sensors. Yet, it is still challenging to accurately detect social contexts of a user[2, 5]. A novel system design is needed to assure the accuracy of detecting the current activity and identify the involved people.
- *Energy efficiency*: Sensors in a smartphone could consume high power. Running on power-constrained smartphone, SCAN should use sensors in an energy efficient manner.
- *Breakpoint detection*: The timing of delivering push notifications during an ongoing interaction should be carefully selected. Inappropriate breakpoint detection might cause adverse effects on the interaction.
- *Notification priority*: Different notifications have different priorities to a user. While some notifications do not require immediate attention, an urgent notification should be informed promptly.



Figure 1: State transition diagram of smartphone usage in a gathering of two friends

To identify our target social context and breakpoints, we informally observed on people’s smartphone usages in cafes and restaurants. From our observation, we generalize smartphone usage patterns as shown in Figure 1. Once a person at a table starts to use a smartphone, the other person pauses and begins to use her smartphone. When one of them stops using a smartphone, the person eventually uses it again as there is no one to interact with. We find that a person who is with friends tends to use a smartphone more freely than one with coworkers. There are occasional pauses and silent moments during a conversation. Receiving notifications at those points does not interrupt, if so minimally, the conversation, which we consider as possible breakpoints.

Although the findings from our initial observations suggest target social contexts and breakpoint candidates, we are currently conducting a user survey to further verify them. In our user survey, we aim to explore how people’s smartphone usages vary on whom they are with and their perception towards others’ smartphone uses. We are designing the user survey to identify key factors for social context detection (e.g. smartphone placement, usage patterns per social group) and the types of notifications that interrupt the social interaction the most. Based on the survey result, we will develop SCAN that detects different social contexts and identifies a breakpoint within a conversation using the right set of sensors on a smartphone. Furthermore, we plan to evaluate the effectiveness of SCAN through controlled and in-the-wild user experiments.

1. REFERENCES

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