Zaturi: Blending Hours Spent at Work and Hours Devoted to Children

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Abstract

Zaturi is a mobile system that enables parents to create an audio book for their children by utilizing their micro spare time. We define micro spare time as tiny fragments of time with low cognitive loads that frequently occur in daily lives, such as waiting for an elevator. Zaturi notifies the parent user of her micro spare time at work in real time and helps her seamlessly record the book piece by piece, so that the child can enjoy the book recorded in the parent's own voice. We develop and demonstrate the working prototype of the Zaturi system. It helps parent users develop her own feelings of parental achievement by putting her micro spare time together. More important, the use of Zaturi at work does not compromise the quality and quantity of parent users' working hours.

Author Keywords

Micro spare time; parenting; reading books to babies

ACM Classification Keywords

H.5.3 [Group and Organization Interfaces]: Asynchronous interaction

Introduction

The responsibilities of parenthood require parents to spend a significant amount of time and efforts on childcare. However, it is not easy for working parents to secure sufficient

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time for parenting because they need to devote much time to their work as well. Many parents feel they spend too little time with their children [4]. Such difficulties come from a common belief that hours spent at work and hours devoted to children are mutually exclusive.

We uncovered an opportunity to blend these two buckets of time. More specifically, we ask: *can we design a new way to devote time to children at the workplace, without compromising the quality and quantity of working hours?*

We propose the notion of *micro spare time*, which we define as tiny fragments of time with low cognitive loads that frequently occur in daily lives. A few examples include the moments waiting for an elevator, walking to a different building, waiting for public transportation, and so on. In this demonstration, we present Zaturi [2], a childcare application leveraging micro spare time of parents at work. Zaturi is a mobile system that enables a parent user to create an audio book for her child in the parent's own voice. Zaturi continuously senses the user's activity and detects micro spare time at work in real time. Upon every moment of micro spare time detected, Zaturi fetches a new unit of a sentence-level recording task that would fit in a single session of micro spare time, thereby helping the parent user continue the voice recording instantly and seamlessly. Zaturi provides a situation-friendly interface to mitigate the social awkwardness of theatrical reading in a public space. Zaturi is a Korean word with a meaning close to "remnants," but which also carries an implication of being "useless on its own."

Zaturi is unique in the following aspects. First, it allows a parent user to create a gift for his/her child even while being at work *without* compromising existing working hours. It discovers and carefully arranges spare time that otherwise would be left unaware and likely wasted. Second, Zaturi

does not make use of the parent's micro spare time in a piecewise manner [1] only, but also pursues incremental creation of a tangible outcome that the child can enjoy as a whole. Last, Zaturi proposes a widely applicable service to the general population including working parents who commute daily over a long distance [5] or across different time zones [3]. We developed the initial notion of micro spare time at work and implemented a working prototype of the Zaturi system.

Zaturi design

We designed the Zaturi system that enables working parents to create an audio book for their children during micro spare time at work. Zaturi mainly consists of a smartphone for a parent user's recording, a tablet device for a child's reading, and a server for the data management. More specifically, with the mobile-side Zaturi, a working parent records a part of their child's favorite book during each available unit of micro spare time, eventually creating a whole book narrated in their own voices. The child reads and listens to the audio books with his/her parent's voice using the tablet-side Zaturi. The server synchronizes the audio data recorded on a smartphone and the interaction events generated on a tablet device.

We developed the Zaturi system with the following design goals.

• Design of a recording task to be done during a single session of micro spare time: A recording task given to a parent user should be small enough to be completed in a single session of micro spare time. At the same time, the task should be large enough to make all combined recordings natural and fluid.



Figure 1: The overall architecture of the Zaturi system.

- Maximization of opportunities: To maximize opportunities in utilizing micro spare time, Zaturi continuously monitors parent user's status and proactively notifies them when it is appropriate for recording.
- Situation-friendly recording: Micro spare time at work usually occurs in a public space where other people are likely to be around, e.g., co-workers in the lounge. It implies that theatrically recording a book nearby other people could make a parent user feel embarrassed. Zaturi aims to provide situation-friendly recording to alleviate the awkwardness of theatrical recording in a public space.

The accurate detection of all types of micro spare time only with sensors in a smarptphone is very challenging and beyond the scope of this paper. We carefully selected four types of micro spare time at work: 1) long use of smartphone for leisure, 2) right after phone calls, 3) walking alone, and 4) daily micro spare time at a specific time.

System Implementation and Operation

Figure 1 shows the overall architecture of the Zaturi system. On the mobile-side Zaturi, we devised *micro spare time detector* that detects the aforementioned four types of micro spare time events in real time with a low overhead. Upon detecting a parent user's micro spare time, the mobile-side Zaturi allows the parent to record a part of the book during micro spare time. The recorded parts are aggregated on the server-side Zaturi and played on the tablet-side Zaturi by their child.

The mobile-side Zaturi is provided to a parent user for micro spare time notifications and book-recording. Upon detection, Zaturi notifies the parent user of the event via a notification bar with vibration. To help users select a book to record, Zaturi displays a list of preregistered picture books with the title, the cover thumbnail, and the recording progress (See Figure 2). If the user completes recording all pages of a book, Zaturi marks its state as completed.

For convenience and efficiency, Zaturi provides the user interface for book recording as shown in Figure 3. Its key feature is to display one page on the screen and provide



Figure 2: Book list UI



Figure 3: Book recording UI

one sentence as a unit of a recording task. One sentence is a suitable length to record in a single session of micro spare time because the sentences in picture books are often short and it takes about several seconds to read aloud. For pages that have multiple sentences, Zaturi highlights the sentence to record by underlining it.

Zaturi provides *listen-record* interface, which is for situationfriendly recording. It is automatically activated when a user brings the smartphone close to her ear and deactivated when she takes the phone away. Zaturi detects such events with the proximity sensor, which is usually placed next to the upper speaker of smartphones. When the user holds up the phone, it plays a sentence to read with a computergenerated voice through the earpiece, which is generated by the Android text-to-speech APIs.

On a tablet device at home, Zaturi allows a child (or a caregiver) to play the audio book. The user interfaces of the tablet-side Zaturi are almost identical to those of the smartphoneside Zaturi, except that it does not display the recording button. The tablet-side Zaturi also monitors a child's interaction with the book, e.g., how many times the child reads the page and how many books the child completes reading.

Description of the Demonstration

We will demonstrate a full operation of the Zaturi system: 1) The Zaturi system detects four types of micro spare time and notifies a participant immediately, 2) the participant can record an audio book with both the listen-record and normal recording interfaces, 3) the participant can listen to the audio book recorded his/her own voice, which also will be provided with a web link.

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