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Project Research Article

Speed Read: An Android Application

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Abstract

Rapid Serial Visual Presentation is an experimental model frequently used to examine the temporal characteristics of attention. The RSVP paradigm entails participants to look at a continuous presentation of visual items. They are all shown in the same place. The targets are implanted inside this stream of continuous items. They are separate from the rest of the items and can be called distracters. The distracters can either be a color change or it can be letters that are among the numbers. An adoption of RSVP is used in a android application that is used to read text files.

Keywords: *Rapid Serial Visual Presentation, Android application, Key-hole mode.*

1. Introduction

Reading makes an integral part of our everyday lives. Whether it's with respect to education or just casual reading, reading is the first step towards understanding written information. With increase in technology, we moved from physical books, to reading from computer screens. Today, computers have been replaced by hand-held devices like mobile phones and tablets. Thus, it is only natural to make reading on these portable devices more enriching and interactive.

Speed Reading is an Android application that lets users read documents saved on their mobile devices at varying speeds as selected by the user. Users can create files or use the default books available in the application's repository which will be retrieved from the SD card.

The application is mainly aimed at any user who would wish to improve his comprehension skills. Being able to read fast and understand all the same is of utmost essence for students appearing for competitive examinations like GRE, and TOEFL etc. Candidates appearing for competitive exams would benefit greatly from the application. Also, it can be noted that more and more users are moving to reading books, articles on their portable devices. The application can be used by voracious readers who prefer e-book readers over physical bound books. This helps them to refrain from carrying large bulky books and magazines and be able to read at their convenience. This application also focuses on users with reading disabilities and focusing problems.

This document on Speed Reading will highlight the purpose and scope of developing this application. We shall predict how the system will be used in order to gain a better understanding of the project, outline concepts that may be developed later, and document ideas that are being considered, but may be discarded as the product develops. This document provides a detailed overview of our application, its parameters and goals. It also describes the project's target audience and its user interface, hardware and software requirements.

2. Concept Review

There are a few different ways to present text on small screens. They can be divided into traditional and dynamic text presentation formats. The major difference between the formats is that traditional text presentation requires physical interaction when reading whereas the text proceeds automatically when dynamic text presentation is used. The text presentation formats presented here are however not applicable to small screens alone. Sometimes there is a need for squeezing a lot of information into a small area on large screens as well.

A. Traditional Text Presentation

The text on a screen is traditionally presented with a spatial layout in the same manner as on page. However, since a full page cannot be displayed on a small screen it is divided into smaller parts. The text can then either be presented as smaller pages that fits the screen or as a long page, i.e. a scroll, continuing outside the screen. In the page format turn-page keys are used to move between the pages and in the scroll format a scroll-bar is used to move in the text. Continuous scrolling has been found to be preferred compared step-by-step

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scrolling but the page format is still more popular to use. Both formats require the reader to interact physically in order to move forward in the text but the increase in interaction may be acceptable considered that these formats are more familiar to the readers.

B. Dynamic Text Presentation

Leading and RSVP are the two most common forms of dynamic text presentation. Both formats requires very little interaction from the reader since the text proceeds automatically, the obvious advantage of these techniques with respect to limited screen displays is however their ability to display text in one single line, leaving the rest of the space for other pieces of information. In Leading, or horizontal scrolling(also known as the Times Square Format), the text moves from right to left. Chen and Chan(1990) evaluated leading with self-paced versus experimenter-controlled presentation speed. The results showed that the self-paced subjects read faster whereas the experimenter-controlled subjects remembered more. From these results they deduced that self-paced reading can be counter-productive and that experience is important when reading moving text. RSVP originated as a tool for studying reading behavior but has lately received more attention as a presentation technique with a promise of optimizing reading efficiency.

C. Rapid Serial Visual Presentation

The term RSVP was first introduced by Forster as a name for a technique used for studying text processing and comprehension. Later RSVP was introduced as a presentation technique for computer screens with the assumption that the reduced need for eye movements would reduce cognitive load and optimize reading. However, the term RSVP has come to label a wide variety of approaches for text presentation where the only common denomination has been that chunks of text have been successively displayed.

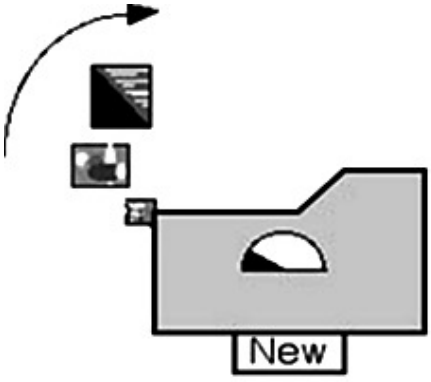

Fig. 1 RSVP has started

Riffling in electronic information space: An early embodiment of the RSVP technique1, in the context of electronic information spaces was the 'carousel-mode' RSVP. A mouse-click on a folder icon initiates a flow of images which emerge from one side of the folder shown in Fig. 1, follow a roughly circular trajectory around it shown in Fig. 2 and eventually disappear back into the opposite side of the folder shown in Fig. 3. Each image might be visible for a total of around 200 to 400 ms, so that as many as 50 images might be viewed in as little as 3 or 4ms.

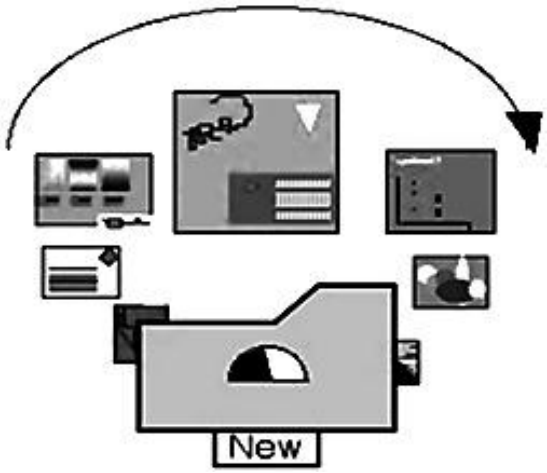

Fig. 2 General Appearance

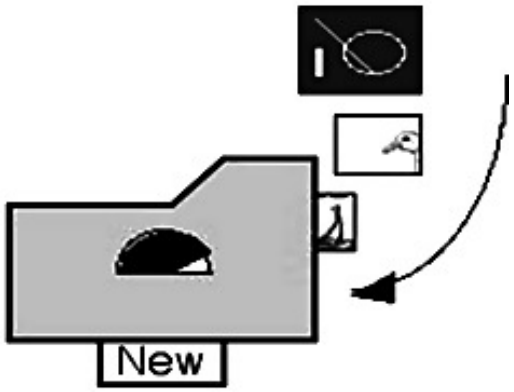

Fig. 3 RSVP has almost finished

Some of the many trajectories that can be associated with RSVP.

i. Collage-mode RSVP

Imagine that a travel agent is showing you some photographs of available holiday destinations. To give you some overall feeling for possibilities the agent drops the photographs, one by one but quite rapidly, on to the table between you, spacing them out so that as many as possible can been seen simultaneously before some are inevitably masked by later arrivals. Fig. 4 shows an implementation of Collage RSVP in the context of an online bookstore. Controls are provided to enable the user to adjust the speed of presentation, to reverse it and, most importantly, to stop it.

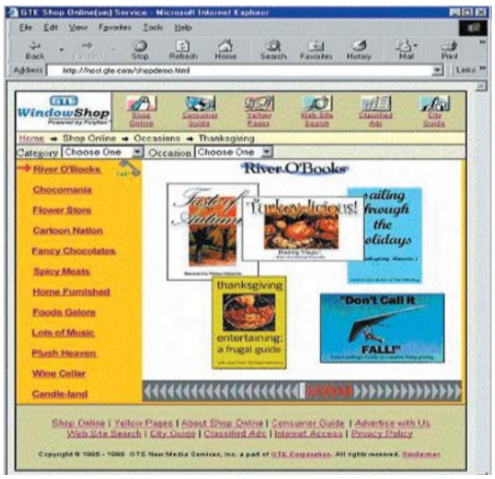

Fig. 4 Collage-mode RSVP

ii. Shelf-mode RSVP

Inspired by an e-commerce application in which bottles of wine move along a shelf to allow inspection, the RSVP mode illustrated in Fig. 5 was proposed. Here, the initial presentation of an image is 'full size' and located at the lower right-hand corner of the display. It remains there for about 500 milliseconds before moving at constant speed, along a linear trajectory, towards the upper left-hand corner of the display, decreasing in size all the time.

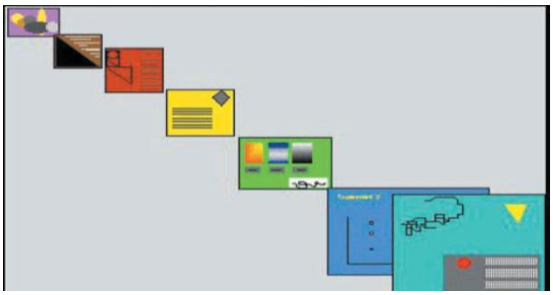

Fig. 5 Shelf-mode RSVP

An adaptive RSVP format had to be developed, it already existed as an idea but it had to be put into practice. After that adaptation had to be integrated into an application for RSVP on a handheld device. Finally, the prototype had to be benchmarked against other presentation formats in a usability evaluation.

iii. Keyhole-mode RSVP

Keyhole-mode RSVP, a space-time trade-off is a form of RSVP to be considered alongside the generic modes. Such a trade-off is especially valuable in situations where space is severely limited, as with mobile telephone displays and PDAs.

Exploitation of the space-time trade-off

A specific example will illustrate the power of the space-time trade-off. Effective navigation of the World Wide Web and many other information spaces requires the ability to view not only a current page (Fig. 6) but, in addition, two other sources of information. One source is the collection of visible representations of out links, a source that enables an informed decision to be made about the next destination. Second, in view of the frequent need to backtrack, a visible – and selectable – representation of 'footprints' (those pages previously visited) can also ease navigation. A potential benefit of selective retreat is a consequent enhancement of the user's mental model of the information space.

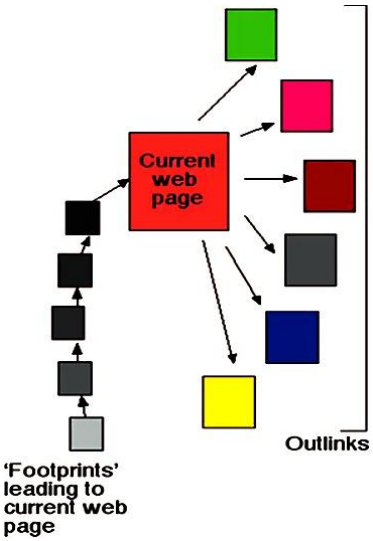

Fig. 6 Navigation in information space

All these requirements can be satisfied by keyhole-mode RSVP in a manner illustrated in Fig. 7.

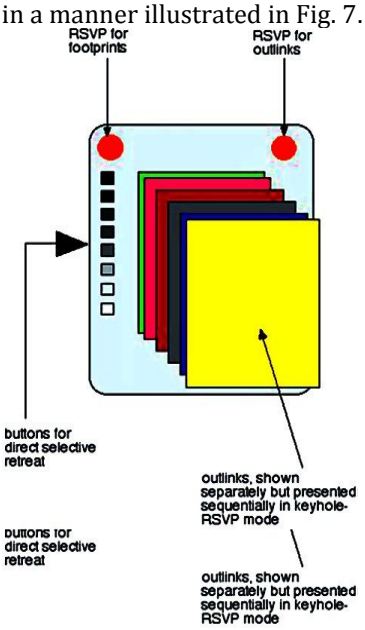

Fig. 7 Scheme to allow navigation of information space from a display of limited size

One control generates, in keyhole mode, the display of appropriately designed images of outlinks, and in such a way that the presentation can be halted and outlinks

selected. Another control similarly handles the footprints. To some extent, the space-time trade-off has been exploited by Wittenberg with their collage display, in the context of which they remark that their technique combines temporal and spatial resources. Tse also pointed out the space advantage of keyhole-mode RSVP.

Human performance with keyhole-mode RSVP

Quite independently of any space-saving advantages, experiments carried out by deBruijn and Spence yielded interesting comparisons between carousel- and keyhole-mode RSVP. Subjects were able to look at a target image for as long as they wished. They were then asked to say if that target was in a seven-image carousel display of a set of 20 images. The exercise was then repeated, with a different time period assigned to the location of an image in each of the seven locations. With the keyhole mode, the presence or absence of the target image was reported accurately even when each image was visible for only 40 ms; with one subject the exposure time was as low as 20 ms. Thus, performance in image recognition required only about 40 ms exposure in keyhole mode compared with about 700 ms in carousel mode.

With keyhole RSVP, the user's eye-gaze can only usefully be fixated in one location. As suspected, the nature of the image influenced subject performance. The experiment was conducted with three different types of image, the extremes of which were subjectively categorized by the experimenters as 'most distinctive' and 'least distinctive'. Generally, longer visibility times were required as the nature of the images varied from 'most distinctive' to 'least distinctive'.

4. Overall Description

A. Product Description

Speed Reading is an Android application that lets users read documents saved on their mobile devices at varying speeds as selected by the user. Users can create files or use the default books available in the application's repository which will be retrieved from the SD card. Using the concept of Adoptive Rapid Serial Visual Presentation (RSVP), when the user changes the orientation to Landscape view, each word will be displayed on the screen, at the rate of X words/min, such that it seems like a stream of words. Thus providing advantages over Meta-guiding and traditional reading techniques. In this application the file containing text is streamed in a horizontal fashion. It allows users to set a standard speed whilst reading their documents. Thus users do not need to move their eyes from left to right and can instead focus on one particular point while the words stream from right to left. Users can gradually increase their reading speed once they get accustomed to the current speed.

B. System Functionalities

- Landscape View
  RSVP concept coupled with stream mode with Play/Pause features.
- Vertical View
  Generic page format concept. The text that user has completed reading in landscape view will be displayed in a different font color.
- Speed of Stream
  User can select from a number of pre-defined speeds at which he requires his text file to be read.

C. Operating Environment

- Hardware Requirements
  An android device with minimum of 512 Megabytes of RAM and a 1 GHZ processor.
- Software Requirements
  Minimum required Operating System – Android Gingerbread 2.3.2

D. Algorithm

Display stream of words in Landscape View
Step 1: Retrieve file from the SD card
Step 1.1: Open connection and access the file from the directory
Step 1.2:
If(inputstream !=null)
Save string from the file
Step 1.3:
By using a while loop
Append text to string builder
Convert to string s
Step 2: While(s!=null)
Step 2.1:
Split the sentence into words
Step 2.2: Position word to the center of the screen
Step 2.3:
Display the word
Step 3: Finish

4. Conclusion

Users have switched to hand-held devices for most reading purposes.

RSVP supersedes traditional and meta-guiding techniques of presentation, but it is not the best form of presentation.

Thus, an adoptive type of RSVP is used to eliminate the drawbacks of generic RSVP for text presentation.

5. Future Scope

Once implementation of the proposed model is complete, Speed Reading can be further improved by adding the following functionalities:

A. Day and Night mode

Day mode offers ideal conditions and screen settings for reading during the day. Likewise, night mode caters to reading in the dark.

B. Font Size

Users can choose font sizes from the options available according to their preferences.

C. Bookmark

Users can Bookmark the line they were on, so they can go right back to where they left off from.

D. Previous/Nex

Users can jump through the stream and view the previous or next word.

E. Help Bar

The Help Bar can be used to find meanings to difficult or unknown words that appear in the stream along with correct usage and examples.

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