

StoryTime: Eliciting Preferences from Children for Book Recommendations

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ABSTRACT

We present StoryTime, a book recommender for children. Our web-based recommender is co-designed with children and uses images to elicit their preferences. By building on existing solutions related to both visual interfaces and book recommendation strategies for children, StoryTime can generate suggestions without historical data or adult guidance. We discuss the benefits of StoryTime as a starting point for further research exploring the cold start problem, incorporating historical data, and needs related to children as a complex audience to enhance the recommendation process.

CCS CONCEPTS

• **Information systems** → **Recommender systems**; • **Social and professional topics** → **Children**; • **Human-centered computing** → **Human computer interaction (HCI)**.

KEYWORDS

Kids; cold start; recommendations; preference elicitation; interface

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1 INTRODUCTION

Reading is an important foundation for children to excel at learning. To help nurture reading skills it is vital that children find books that are not only within their reading level but also reflect their interest, as to keep them engaged [4]. Our recommender, StoryTime¹, aims to help children with book suggestions by eliciting children’s interests without relying on historical data or adult help, in a manner tailored for them. It used to be that to get a book recommendation you would need to go to a library. The draw being there is an expert, a librarian, who could offer suggestions. Children may not feel comfortable approaching a librarian. As many children regularly use the internet, a web-based recommender may be the answer. Book recommendation websites exist for adults in droves, but there are

¹StoryTime is available at <https://boi.st/StoryTime>.

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very few to specifically support children. This could be attributed to, in part, the practical and privacy issues in obtaining historical data related to children required by most recommendation techniques. Even among these known strategies the interface is designed for adults; Children have different interface needs and preferences, such as favoring visual rather than textual representations [1]. We focused on creating a simple interface for StoryTime that caters to children’s preferred interface experience and simulates a similar result as interacting with a librarian. The design of StoryTime was informed with input from KidsTeam, a child participatory design group at Boise State, who we worked with during the development phase.

2 EXISTING SOLUTIONS

The closest interface to StoryTime is the International Children’s Digital Library (ICDL) user interface/ visual book search. This interface is geared towards children with its use of large icons and images to account for the wide range of reading abilities present in its audience [2]. Buttons are used for input and are loosely grouped into categories, with each having 2 to 6 options. Once an option is selected, buttons of options that do not mix with the current selection are grayed out. After every selection the results window updates to reflect matching books and continues to update each time an option is added or removed. This is one of the few, well-known environments targeting children for finding books. However, it visually supports boolean queries, as opposed to offering recommendations based on children’s interests.

Recommendation strategies that most align with StoryTime’s include Rabbit (Readers’ advisory-based book recommendation tool) [3] and BReT (Book Recommendations for Teachers) [4]. Rabbit mimics the reader’s advisory process offered at libraries by considering description, appeal factors, library of congress subject headings and reading levels of books. It uses users’ historical data, in the form of ratings, to personalize suggestions. However gathering this kind of historical data for children is challenging making it not always feasible to use.

Like StoryTime, BReT does not require user data in order to generate recommendations. Instead, it depends on grade level, content description, theme, and literary element descriptions provided by teachers in order to suggest books for students. We argue that while it may be intuitive for teachers to descriptively state preferences and use domain-specific terminology, children will likely find it challenging. The StoryTime recommender simplifies this input process to be usable directly by children. It also eases the process of gathering users’ choices, which are the cornerstone of StoryTime’s suggestions.

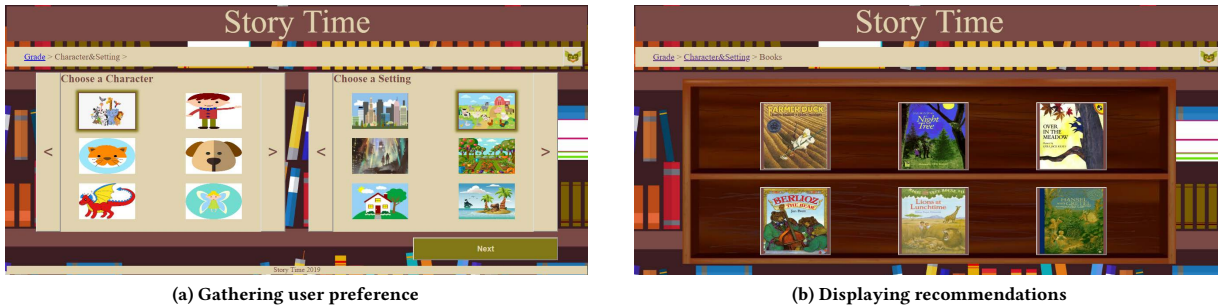


Figure 1: StoryTime user interface screens

3 SYSTEM OVERVIEW

We strive for an environment that is simple for children to use and generates recommendations relevant to their interests. The system is developed using HTML, CSS, JavaScript, PHP, and Python.

Initially, we meet with KidsTeam, who offered feedback through participatory design activities. We prepared several options for them to evaluate in regards to how to elicit their choices to ensure our approach is usable by children. This resulted in a narrative approach for gathering data about what content the child is wanting, this is not something we have seen in other children’s interfaces related to books. From home page to recommendation, our site has a consistent layout and theme, building a visual language similar to libraries to create a sense of familiarity. When a child first sees the site, they provide their grade level, which must be entered before the user can move on. To reflect the age range of the participants we had available for our usability study, the grade option are *2nd-7th*.

Next, as seen in Figure 1a, the child chooses a character and setting², one of each, which again must be selected before progression can happen. From the meetings with KidsTeam we found that being able to select more than one created some confusion. This page uses images to represent content, unlike the grade buttons which have a text representation of the grades, to cater to children’s preferred interface experience. Each section provides 12 images to choose from, each related to a keyword, i.e. magic or cat. These images gather preference data from the user since these images represent ideas of content, internally linked to keywords.

Candidate books (among the ones available for recommendation) are ranked based on aggregated *content* similarity (using book content descriptions) and *appeal factor* similarity (inferred from book reviews³) with respect to indicated user preferences—much like BReT [4] and Rabbit [3]⁴. Candidate books are further filtered using the selected grade level⁵.

On the last screen, seen in Figure 1b, we display the top 6 ranked books. The child sees an image for the cover for each book. When they select a book related metadata, i.e., title and summary, will be displayed, so they may gauge their interest in the book. Having

²There are no titles or associated text on the user side for preference elicitation, as from KidsTeam we discovered that it was not something they needed.

³Reviews can contain keywords for topics not in the book, causing unusual suggestions.

⁴When the combination provided does not apply to any candidate book, then books matching at least one of the options are used.

⁵Grade level is defined by the dataset metadata.

separate pages for grade, narrative, and recommendations was a design decision for a few reasons: to create a flow and to not overwhelm the user. The child can navigate the site by using the breadcrumb menu, allowing them to return to previous screens. To get help the *gremlin* button can be used; when clicked, it provides a short explanation of what needs to be done to progress.

4 EVALUATION

During the course of development, KidsTeam participated in a usability test for StoryTime. We wanted to gauge the effectiveness of our design, by having users representing our target audience attempt to use the interface. This was done to show that the design does cater to children. The results of the completed survey were generally positive with an average of 4.8 out of 5 for the test. The free answer feedback provided useful input, and we have since began implementing the suggested changes.

5 FUTURE WORK

Helping children find books that pertain to their interests and are within their reading level is a task well suited for a web-based recommender. StoryTime is a foundation on which we hope to build a more expansive tool to help children engage in reading, without the need for historical user data. Future work includes adapting the site to perform seamlessly on multiple devices, performing more user studies and evaluations to streamline the environment, understanding children’s needs and preferences, as well as exploring the possibility of expanding to account for preference evolution.

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