

INFSCI 2930 - INDEPENDENT STUDY

Another modification of Reading System in Open Corpus Personalized Learning Project

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1.Overview

Inspired by Professor Peter Brusilovsky and Dr. Jordan Barria Pineda, my topic of independent study in 2017 Spring is try to develop a new way for data visualization in our current Reading System.

(Open Corpus Personalized Learning Project's Reading Circle:

http://adapt2.sis.pitt.edu/wiki/Open_Corpus_Personalized_Learning)

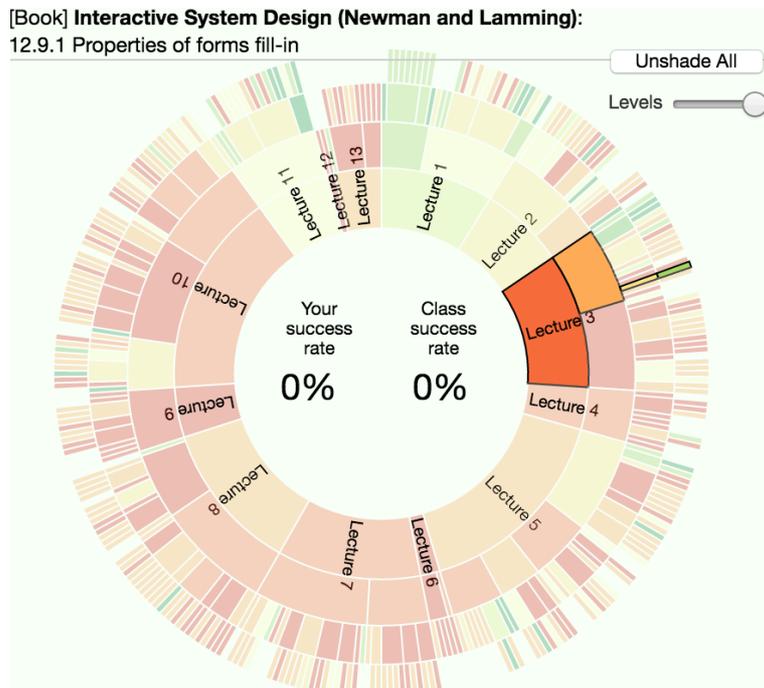
In this minor alternation version, we mainly focus on the presentation tier's modification, try to make the information displaying better for peer comparison.

2.Used Techniques:

PHP, MySQL, HTML, CSS, JavaScript, jQuery, Bootstrap and d3.js.

3.What we did:

In current system, all the reading information basically gathered in a “Color changing Circle”(like the pie chart) on the left top of the page:



2.1 Current reading system’s “circle” info part

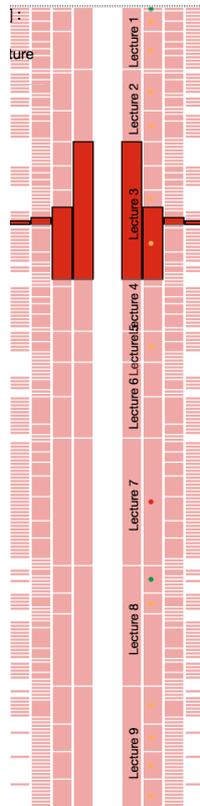
Users can easily track their reading progress by seeing the color changing in the hierarchical circle – The greener the more accomplishment they have. Besides, users can find out their question success rate in each lecture part in the middle of the circle by hovering the responding section.

After our modification, the new version will be look like this:

The image shows a software interface for reading a document. On the left is a sidebar with a hierarchical structure of lectures, labeled 'Lecture 1' through 'Lecture 9'. The main area on the right displays the text of '12.2 The query likelihood model'. The text includes a paragraph about the query likelihood model, a formula (12.8) for $P(q|M_d)$, and a list of three steps for retrieval based on a language model. The interface also shows navigation controls like '<<' and '>>' and a search bar.

2.2 New reading system

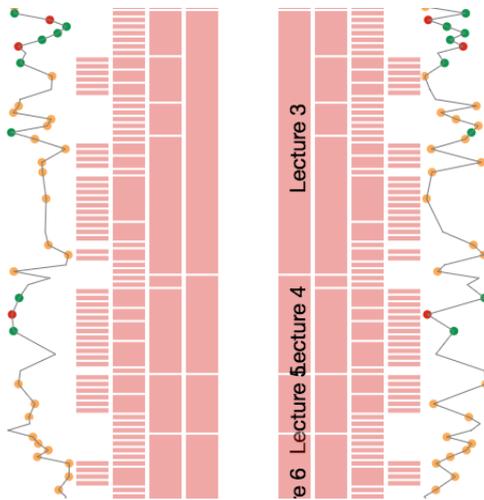
There are three main changes:



2.3 Comparison hierarchical rectangles

- (1) The progress information is no longer presented in a circle, instead, we display it in two vertical hierarchical rectangles (see graph 2.3): The left one (which can be fold by clicking the side button) shows the class average reading progress while the right one shows the user's progress. These two rectangles are generated by d3.js after we connected to the database and retrieve the data.

They are actually in two svgs but in reverse generating order. We put them opposite because in this way, the overall progress comparison would be more straight forward than if they are in the same direction.



2.4 Correctness nodes and the trend line graph

- (2) Next to the progress bars, there existing some nodes both user and class average sides (see graph 2.4):

The nodes indicate: In those sections, the system will give user some questions as practice. The distance between one node and its neighbor square means the correctness the user have in this question section -- The more far away position the node is, the higher correctness the user have in this section.

On the class average part (left side), the nodes indicate the average correctness of students in the rest of the class.

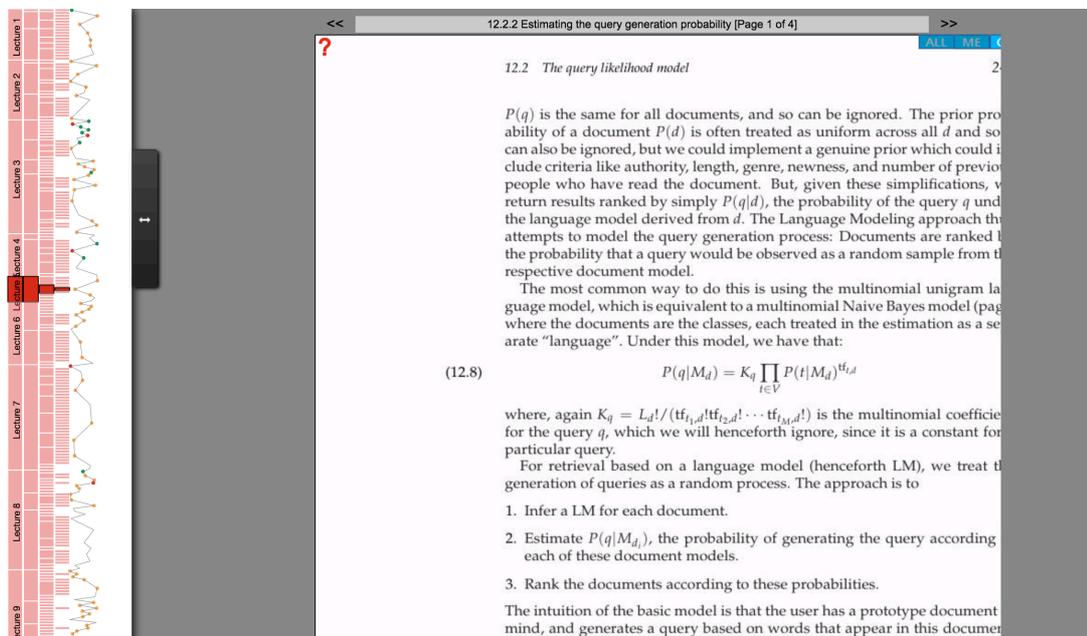
In our current development, the nodes' positions are generated randomly by JavaScript. However when we actually put the system in use, we will use user's question answering data to generate the nodes.

The line graph goes through those nodes means the correctness trend of this user (The left one is for class average). By doing this, the user can easily find out his or her overall question-answering status – “Do I perform better than before?” and “Which parts of the material I learn better and which parts I still need to pay more attention to?”

The class average side can help with the instructor building a clear vision knowing the overall reading and understanding trend – Which sections'

knowledge need more explanations during class.

The line graph is also generated by d3.js based on the position of the nodes.



2.5 Foldable left side panel

- (3) The user may not always want to see the comparison. If the user wants to have a clear interface just showing his own information, he can just click the side button to hide the comparison part (see 2.5). He can also, if he wants, hide the whole left panel by clicking the button one more time.

4.Future Improvements:

After our modifications, the new reading system has another displaying way.

However, our work is just a prototype which only at its start point. We need these improvements in the future:

- (1) The text index will be added to the left control panel, which will help users to locate their content. We will make it foldable, so that if the user doesn't want to see it, he can simply hide the text index.
- (2) The current book contents are displayed in pdf format, from which the user cannot select text inside the content by using his mouse. We are trying to convert the pdf content to html elements before the page being completed loaded, so that user will finally have a "text" content to read. When I first using this system, it was very hard to do the searching when I have some problems during reading, because it was impossible to directly copy the text you want to a searching engine or website. By converting the content to real text, user can select and copy the text they want, and paste it to their notes or searching engine for further study, which will be helpful in learning.

5. Postscript:

Although the system is still in prototype stage and my work might not help a lot in future improvements, I have to say, this is a very valuable independent study experience. I did better in jQuery and website developing and learnt a lot in PHP. My special thanks to Professor Peter Brusilovsky for providing this learning opportunity, and Dr. Jordan Barria Pineda for teaching and helping me out when I had difficulty in learning.

6. Codes:

<https://github.com/YichaoChen/Reading-System>