

The title for your project.

Yang Liu, Zhenge Zhao

Abstract—

We present a visualization tool for demonstrating the relations between different courses based on students' grades in these courses. The goal of this visualization tool is to show the hidden connections among courses. Having effective visualizations of course data is valuable for understanding how one course benefits another and will be useful for setting up the prerequisites in a university, building recommendation systems or academic advising. Using enrollment data from a research university in Canada, we implement a robust mathematical comparison model to calculate correlation coefficient between two records. We evaluate our design choices through engagements with professors and students.

1 INTRODUCTION

The real world scene is that coursework contents can be related, making one course as the prerequisite of the other will help students better learn knowledge and obtain better grades. Academic advisor, for example, deals with these issues a lot. While some course dependency have already been explicitly annotated in practice, more remain unclear and potential. We'd like to design a visualization view to group related courses in clusters based on student enrollment history, and another view to show correlations between the discrete grades of student enrolled in two related courses.

The aims of this research are:

- provide a tool to visualize coursework contents similarity based on student membership.
- study ordering of neighbours in the node-link diagram to highlight interesting neighbours.
- study similarity metrics of two courses based on grade history of one student and multiple students.

2 BACKGROUND

There're many existing approaches to compare two entities. The comparison can be user-based, that is, comparing similarity of two users; or item-based, that is, comparing similarity of two objects. Item-based comparison techniques are more close to our need. Well known metrics include Euclidean distance, Jaccard similarity, cosine similarity etc.

2.1 Related Work

The problem of coursework similarity has been studied in the context of course recommendation system. Bendakir et al. [1] proposed a recommendation system based on decision tree of course history. Their approach, however, does not consider students' grades at all. Thus, their tool may wrongly correlate totally different courses simply due to historical mistakes. Sandvig et al. [2] did use the GPA information, but GPA, as an average metric, doesn't say much about each specific class.

When it comes to the visualization problem. Since our goal is to cluster similar classes together, a node-link diagram naturally jumps into our mind. D3 library has a force-directed graph that is close to our needs. But we are hesitant about its fisheye distortion and curved link variant because these variants make it hard to click on nodes or edges for further details. We are also aware that force directed drawing is criticized for local minima. A multilevel approach [3] might fix it but we are not focusing on algorithmic style improvement in this proposal.

• Your Name is a graduate student at the University of Arizona. E-mail:[your NetID]@email.arizona.edu.

Manuscript received xx xxx. 201x; accepted xx xxx. 201x. Date of Publication xx xxx. 201x; date of current version xx xxx. 201x. For information on obtaining reprints of this article, please send e-mail to: reprints@ieee.org. Digital Object Identifier: xx.xxx/TVCG.201x.xxxxxxx

3 PROPOSED WORK

Describe your proposed work here. You may refer to other sections so as not to repeat yourself – for example, referencing Section 2.

You may want to use figures to illustrate your point, such as Figure 1.

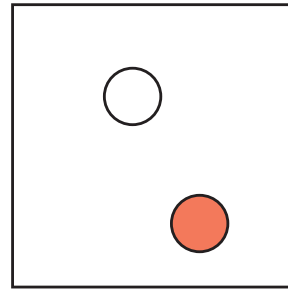


Fig. 1. Figure illustrating some proposed designs.

3.1 Data

Describe the data and your access to it here.

3.2 Evaluation

Describe your plan for evaluating your work, even if it does not fit in the timeframe of this project. Without time constraints, what would you? Do you have the resources (people, time, equipment, data, money) to implement this plan in the future?

3.3 Timeline

Set up milestones for your project and summarize in Table 1.

Table 1. Project Milestones

Date	Milestone (%)
Sep 30	Interviews conducted, initial task abstractions
Oct 2	Five datasets uploaded
Oct 7	Initial design sketches
Oct 14	Paper prototypes of 3 initial designs
Oct 21	Wireframe of central design
Nov 7	Initial prototype of design

4 IMPACTS

Summarize the impact completing this work will have. This ties into why the work is important. What would be possible if this work was completed?

REFERENCES

- [1] N. Bendakir and E. Aïmeur. Using association rules for course recommendation. In *Proceedings of the AAAI Workshop on Educational Data Mining*, vol. 3, 2006.
- [2] J. Sandvig and R. Burke. Aacorn: A cbr recommender for academic advising. Technical report, Technical Report TR05-015, DePaul University, 2005.
- [3] C. Walshaw. A multilevel algorithm for force-directed graph drawing. In *International Symposium on Graph Drawing*, pp. 171–182. Springer, 2000.