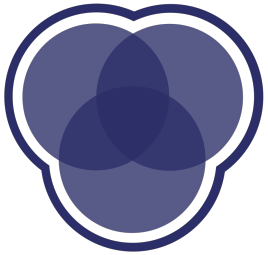
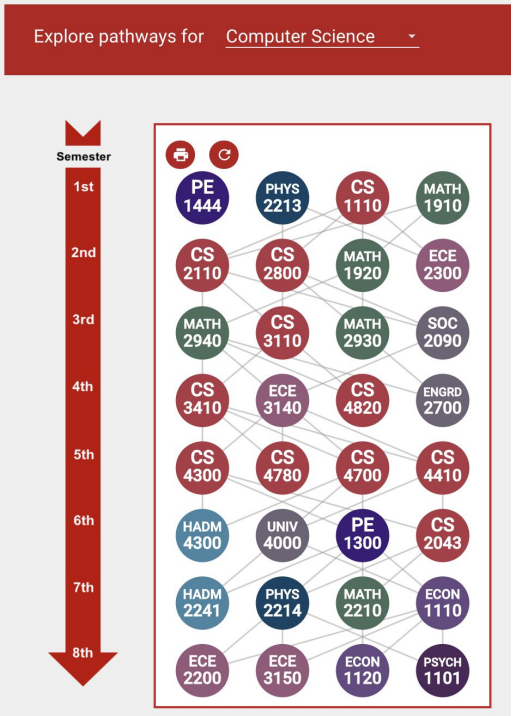


CORNELL
FUTURE OF LEARNING
LAB

Pathways

Overview Presentation

Danny Yang, Eric Sun, Sam Fuchs
CDS Insights FA19



Background

- Working with Prof. Kizilcec and the Future of Learning Lab
- Project started last semester with a team of 8 masters students
- Our idea was different enough that we decided to go back to the drawing board and start from scratch

Main Use Cases

1. Freshman who does not know what major to pick, want to see typical courses for each major
2. Upperclassman who wants to know what classes to take next semester
3. Upperclassman who wants suggestions for fun classes outside of major

Data

Registrar data of CIS majors' course enrollment in the last decade

Row: student, course, semester

Preprocessing:

- remove labs/discussion sections
- remove courses not offered after 2017
- load into a bipartite graph where students/courses are represented as nodes
- further processing into courses-only graph

Graph Model

Separate graphs for each major, each course is a node.

Co-enrollment (undirected):

A<->B weight = # students who took A concurrently with B

Post-enrollment (directed):

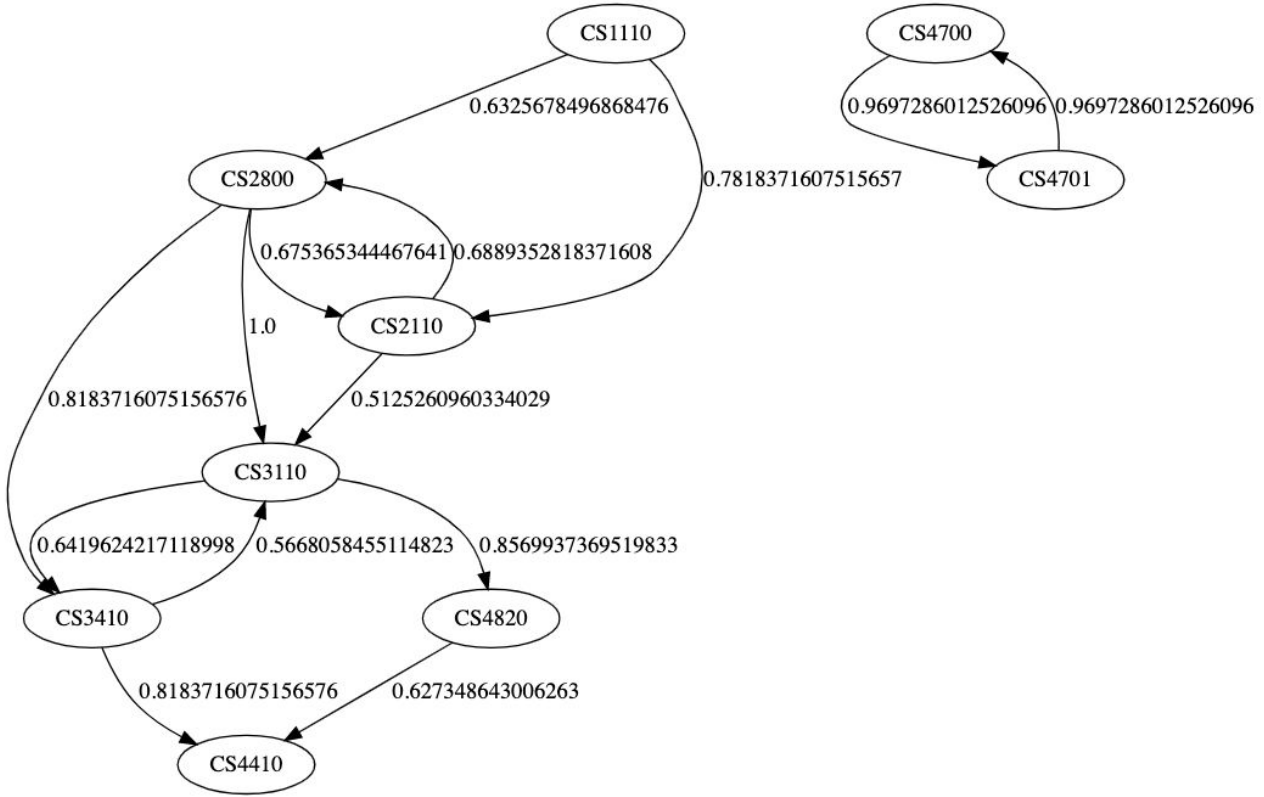
A->B weight = # students who took A one semester before B

Some restrictions on forward/reverse edges for stronger directionality hints. Edges can be reversed to make pre-enrollment graph.

Core Courses

- Core courses were found using a heuristic of the # of students who had taken a class / # of students in that major
    - This gave us pretty good results because it identified the “popular” courses
- Our dataset gives us no way of identifying pre-requisites, so we have to follow the structure of our graph and hope it gives good results

GraphViz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0.5668058455114823
0.8569937369519833
CS3410
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0.8183716075156576
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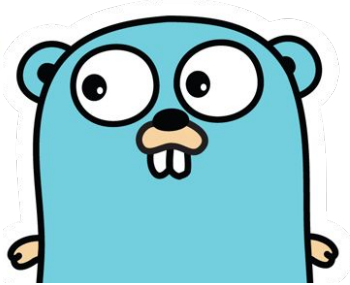
CS4410

Technology/Architecture

Client: grid-based vis, course search

Server:

- graph model
- recommendations
- user interaction logging (local SQLite DB)



Use Cases (revisited)

1. Freshman who does not know what major to pick, want to see typical courses for each major
    - fill entire schedule with sample courses someone in X major might take
2. Upperclassman who wants to know what classes to take next semester
    - focus on specific semester for recommendations
3. Upperclassman who wants suggestions for fun classes outside of major
    - tune recommendations to emphasize department diversity v.s major relevance

Demo

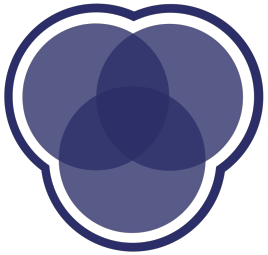
Try it yourself @ pathway.cis.cornell.edu

Potential Future Work

Features where the effort v.s. impact tradeoff didn't make sense in a 3 person team with time constraints

- building an IR system instead of relying on course roster API for course search
- saving user data between sessions
- improvements to modeling
    - crosslisted courses, anti-coreqs

Questions?



CORNELL
FUTURE OF LEARNING
LAB

Pathways

Update Presentation

Danny Yang, Eric Sun, Sam Fuchs
CDS Insights FA19

Use Cases

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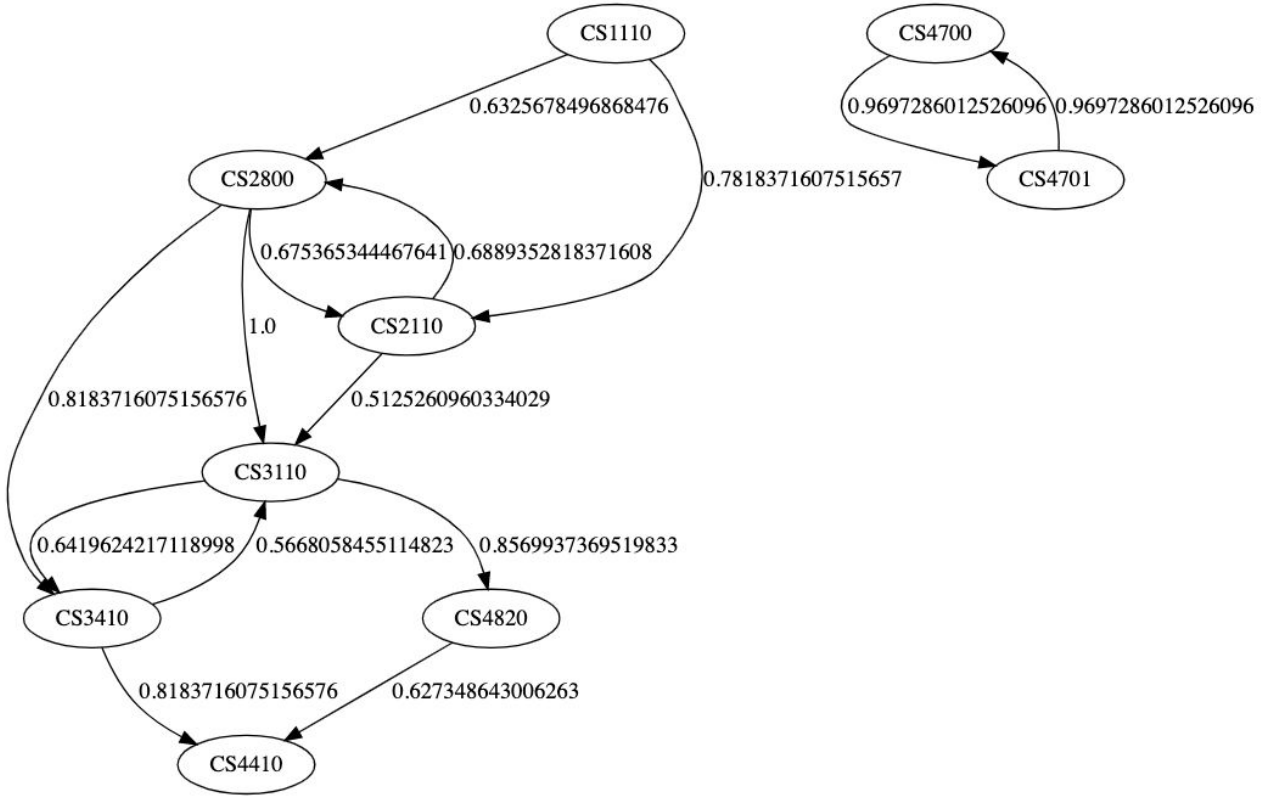
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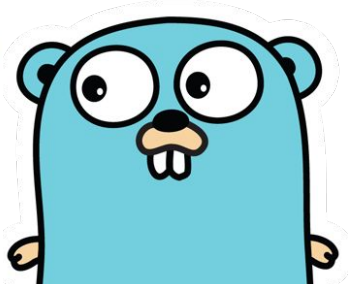
Technology/Architecture

Client: UI, grid-based vis

Server:
- graph model
- recommendations
- user interaction logging (local SQLite DB)

Deployed using Apache, on pathway.cis.cornell.edu



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UI Changes

- More logical toolbar design/layout, based on user feedback
- More robust search functionality
- Improved bulk-add UI
- General visual/loading improvements

Demo

Try it yourself @ pathway.cis.cornell.edu

Potential Future Work

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