UBCourse VIS: INTERACTIVE VISUAL REPRESENTATION OF UBC COURSE PRE-REQUISITES

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INTRODUCTION

How can we visualize pre-requisites of UBC courses?
BACKGROUND

• Derive complex relationship of pre-reqs from plain text
  • Mandatory groups pre-requisite courses.
  • Either-or selections about groups of pre-requisite courses.
  • All courses or one of courses in these groups should be selected to satisfy required.
• E.g., 22 courses directly related to CPSC 340, with 6 groups of pre-requisite relationship in total.
BACKGROUND

- Pre-requisite courses of pre-reqs makes situation more complex
- Not all pre-requisite courses are needed depending on users’ selection
- Duplicated/satisfied pre-requisites might appear
- Trade off between showing all information and neat design idiom

One-hop pre-req

Two-hop pre-req

Multi-hop pre-reqs and duplicated pre-reqs
DATA TO VIS AND DERIVED RESULTS

• Dataset: UBC course schedule and description from UBC Student Service.
• Course pre-requisite relationship among courses provided by UBC
  • 7,521 courses; 8,381 relationships;
  • 6,931 mandatory pre-requisites;
  • 1460 either-or selections.
• Derived results
  • An interactive vis system, for exploring and making selections of courses

<table>
<thead>
<tr>
<th>VAD Idiom</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>What: Data</td>
<td>Network data with vertex and different types of edges</td>
</tr>
<tr>
<td>What: Derived</td>
<td>Pre-requisite courses and interactive selection</td>
</tr>
<tr>
<td>Scale</td>
<td>Thousands of courses and relations</td>
</tr>
</tbody>
</table>
OVERVIEW

VAD Idiom

How: Facet

Partition into multiple views: detail, overview and description
OVERVIEW
INTERACTIVE COURSE SELECTION

- By entering the course name, direct pre-requisites will be shown with detailed relationship.
  - Only one of courses in the vertical groups needs to be taken
  - Horizontal groups means mandatory pre-reqs or groups to be satisfied
  - Courses of different faculty has different color
  - Gray box means only one of either-or group should be satisfied
- Choose pre-reqs by name
INTERACTIVE COURSE SELECTION

• After selecting preferred courses (orange ones), pre-requisites will automatically presented

Selection of two-hop Pre-requisites

One pre-requisites selection for CPSC 340
# INTERACTIVE COURSE SELECTION

![Course Selection Diagram](image)

## VAD Idiom

<table>
<thead>
<tr>
<th>How: Encode</th>
<th>Node–Link Diagrams</th>
</tr>
</thead>
<tbody>
<tr>
<td>Colors for different courses</td>
<td></td>
</tr>
<tr>
<td>Duplicated/satisfied pre-reqs elimination</td>
<td></td>
</tr>
<tr>
<td>Select courses to take</td>
<td></td>
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<tr>
<td>Spatial position for mandatory and optional course</td>
<td></td>
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</tbody>
</table>
COURSE DETAILS

• Course details will be shown in this section:
  • Full course name
  • Course credits
  • Detailed course description

**CPSC340: Machine Learning and Data Mining**

Credits: 3

Description: Models of algorithms for dimensionality reduction, nonlinear regression, classification, clustering and unsupervised learning; applications to computer graphics, computer games, bio-informatics, information retrieval, e-commerce, databases, computer vision and artificial intelligence. [3-0-1]
ILLUSTRATIVE USAGE SCENARIO
CONCENTRIC VIEW

- Query course centered
- Knowledge Hierarchy

**VAD Idiom**

| How: Encode | Map hops(derived) to radial distance |
ILLUSTRATIVE USAGE SCENARIO

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Credits: 3
Description: Models of algorithms for dimensionality reduction, nonlinear regression, classification, clustering and unsupervised learning; applications to computer graphics, computer games, bioinformatics, information retrieval, e-commerce, databases, computer vision and artificial intelligence. [3-0-1]
## USER GENERATED NETWORK

### VAD Idiom

<table>
<thead>
<tr>
<th>How: Encode</th>
<th>Edge width encode logical relation strength</th>
</tr>
</thead>
<tbody>
<tr>
<td>How: Manipulate</td>
<td>Sort, Select, Add, Remove</td>
</tr>
</tbody>
</table>
ILLUSTRATIVE USAGE SCENARIO

**CPSC340** : Machine Learning and Data Mining

Credits: 3

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OUR PREVIOUS WORK

- Uses containers with different hues
- Encodes complete logical information
- Intuitively difficult to understand
ILLUSTRATIVE USAGE SCENARIO
CONTRIBUTION AND FUTURE WORK

• Contribution
  • Novel vis system for UBC course registration
  • Exploring and making selections of pre-req

• Future work
  • Course Explorer (Displaying prerequisites(predecessors) and post-decessors on demand)
  • Redesign database
Thank you!