CourseRank Research

Hector Garcia-Molina
with Benjamin Bercovitz, Filip Kaliszanz, Georgia Koutrika, Robert Ikeda, Henry Liou, Aditya Parameswaran

Stanford University
CourseRank Features

• Rich data
• Collaboration with University
• User identities, closed system
• We can modify & experiment!
CourseRank Challenges

• “Rich” Recommendations
• Academic requirements
• Question/answer forums
• Social issues
• Privacy
• ...
Focus on One Component

• Course Requirements
Course Requirements

• Checking Requirements
• Recommendations Under Requirements
Example

• $R_1$: Take 1 from \{a, p\}
• $R_2$: Take 2 from \{p, d, i\}
• $R_3$: Take 1 from \{i, o\}
Example

- $R_1$: Take 1 from $\{a, p\}$
- $R_2$: Take 2 from $\{p, d, i\}$
- $R_3$: Take 1 from $\{i, o\}$

- Alice has taken: $\{a, p, i, o\}$
- Bob has taken $\{p, d, o\}$
Example

- $R_1$: Take 1 from $\{a, p\}$
- $R_2$: Take 2 from $\{p, d, i\}$
- $R_3$: Take 1 from $\{i, o\}$

- Alice has taken: $\{a, p, i, o\}$  Satisfied!
- Bob has taken $\{p, d, o\}$
Example

- **R₁**: Take 1 from \{a, p\}
- **R₂**: Take 2 from \{p, d, i\}
- **R₃**: Take 1 from \{i, o\}

- Alice has taken: \{a, p, i, o\}
- Bob has taken \{p, d, o\} NOT Satisfied!
• Alice has taken: \{a, p, i, o\}
• Alice has taken: \{a, p, i, o\}

total flow = 4, success!
Bob has taken: \{p, d, o\}
• Bob has taken: \{p, d, o\}
Recommendations

classes taken by Bob

classes NOT taken by Bob
Recommendations

classes taken by Bob

classes NOT taken by Bob
Recommendations

classes taken by Bob

classes NOT taken by Bob

Course i recommended to Bob
Recommendations

classes taken by Bob

classes NOT taken by Bob

costs can be inverse “desirability”

Course i recommended to Bob
Additional Features

• Preference scores for courses
• Units requirements
• Forbidden pairs
  – Example: Take 3 from \{a, b, c, d, e, f, g\};
    forbidden: \{(a,c), (d,e), (d,g)\}
• and many more...
CourseRank Research

- Recommendations under constraints
- Recommendations with pre-requisites
- Sequence mining
- Course Cloud
- Experience & Statistics