

Code and data online

Github repo for all the data and mined association rules:

<https://github.com/leo42k/CourseRecommenderApp>

App link on jhubiostatistics.shinyapps.io:

<https://jhubiostatistics.shinyapps.io/courserecommenderapp>

No raw data stored online. We mined all interesting rules and store these rules.

Why this app?

There are a growing number of courses available in the Johns Hopkins University School of Public health. How do you decide which course is right for you? Different requirements vary from program to program. Besides, the course descriptions are usually concise and content is not available unless you have registered for that class. Currently, no similar app has been developed to our knowledge in JHSPH. Therefore, we develop a course recommendation app for students to help select their courses.

It's free online and it's open to everyone. For prospective students, they can use this app to search for their interested programs and get additional information about the curriculum plan. As for current students, it provides an alternative way to get recommended courses based on previous courses selected by peers from the same program.

How to use this app: a user manual

There are two main tabs on the app: the preference settings and the Recommender.

Course Recommender App	Preferences	Recommender
Choose a program:		
<input type="text" value="BA/MHS: Environmental Health Sciences"/>		
Choose a term:		
<input type="text" value="1"/>		
Please update your course plan on the Recommender Tab		

1. "Preferences" tab

Under the “Preferences” tab, users can search and select the program they are interested in and the term they need course recommendations for.

Course Recommender App

Preferences

Recommender

Choose a program:

bio

MHS: Biostatistics

PHD: Biostatistics

SCM: Biostatistics

SS-PDF: Biostatistics

MHS: Biochemistry and Molecular Biology

PHD: Biochemistry and Molecular Biology

SCM: Biochemistry and Molecular Biology

MHS: Molecular Microbiology and

Recommender Tab

For example, we could choose “PHD: Biostatistics” and the 2nd term.

Course Recommender App

Preferences

Recommender

Choose a program:

PHD: Biostatistics

Choose a term:

2

Please update your course plan on the Recommender Tab

2. “Recommender” tab

After selecting program and term, the Recommender tab will provide the main functionalities of the recommender.

Planned Courses

Note: please select/unselect courses in this table

Show 5 entries

Search:

course_id	course_name	term
700.602.01	TOPICS IN BIOETHICS	2nd
700.604.01	METHODS IN BIOETHICS	2nd
700.623.01	ETHICS OF HEALTHCARE DECISION- MAKING: THEORY AND PRACTICE	2nd
120.601.01	BIOCHEMISTRY -- AN INTRODUCTORY COURSE II	2nd
120.601.02	BIOCHEMISTRY -- AN INTRODUCTORY COURSE II	2nd

Showing 1 to 5 of 363 entries

Previous 1 2 3 4 5 ... 73 Next

Recommended Courses

Show 5 entries

Search:

course_id	course_name	term
140.732.01	STATISTICAL THEORY II	2nd
140.752.01	ADVANCED METHODS IN BIostatISTICS II	2nd
550.865.81	PUBLIC HEALTH PERSPECTIVES ON RESEARCH	2nd
140.722.01	PROBABILITY THEORY II	2nd
140.712.01	ADVANCED DATA SCIENCE II	2nd

Showing 1 to 5 of 14 entries Previous 1 2 3 Next

All Selected Courses

Show 5 entries

Search:

course_id	course_name	term
No data available in table		

Showing 0 to 0 of 0 entries

Previous Next

Time Conflicts:

2.1 “Planned Courses” area

The upper left is “Planned Courses”.

Users are allowed to search, select and unselect courses for their plan.

2.2 “Recommended Courses” area

The upper right is “Recommended Courses”.

The courses users have selected will be crossed out so that they could easily view other recommendations.

Links to the course websites are provided in the “Recommended Courses” and “All Selected Courses” area. Users can click on any course number they are interested in and visit the course website.

< [BACK TO SEARCH RESULTS](#) | [NEW SEARCH](#)

140.722.01 PROBABILITY THEORY II

Department: Biostatistics

Term: 2nd term

Credits: 2 credits

Academic Year: 2015 - 2016

Location: East Baltimore

Class Times:

> Tu Th, 3:30 - 4:20pm

Auditors Allowed: No

Grading Restriction: Letter Grade or Pass/Fail

Contact: [Cristian Tomasetti](#)

Course Instructor:

> [Cristian Tomasetti](#)

Recommendations are updated with every change in the “Planned Courses” area. For example, users can select “ADVANCED DATA SCIENCE II” in the “Planned Courses”. It is then crossed out in the recommendation area.

Course Recommender App

Preferences

Recommender

Planned Courses

Note: please select/unselect courses in this table

Show 5 entries

Search:

course_id	course_name	term
140.712.01	ADVANCED DATA SCIENCE II	2nd

Showing 1 to 1 of 1 entries (filtered from 363 total entries)

Previous 1 Next

Recommended Courses

Show 5 entries

Search:

course_id	course_name	term
140.732.01	STATISTICAL THEORY II	2nd
140.752.01	ADVANCED METHODS IN BIostatISTICS II	2nd
550.865.81	PUBLIC HEALTH PERSPECTIVES ON RESEARCH	2nd
140.722.01	PROBABILITY THEORY II	2nd
140.778.01	ADVANCED STATISTICAL COMPUTING	2nd

Showing 1 to 5 of 13 entries Previous 1 2 3 Next

All Selected Courses

Show 5 entries

Search:

course_id	course_name	term
140.712.01	ADVANCED DATA SCIENCE II	2nd

Showing 1 to 1 of 1 entries

Previous 1 Next

Time Conflicts:

Another functionality is when users choose some course that is in the mined association rules the associated courses in that rule will be prioritized in the recommendations. For example, if a user chooses “STATISTICAL THEORY II”, then a probability course will be prioritized.

Planned Courses

Note: please select/unselect courses in this table

Show 5 entries

Search: ADVANCED METHODS IN

course_id	course_name	term
140.752.01	ADVANCED METHODS IN BIOSTATISTICS II	2nd

Showing 1 to 1 of 1 entries (filtered from 363 total entries)

Previous

1

Next

Recommended Courses

Show 5 entries

Search:

course_id	course_name	term
140.722.01	PROBABILITY THEORY II	2nd
140.732.01	STATISTICAL THEORY II	2nd
550.865.81	PUBLIC HEALTH PERSPECTIVES ON RESEARCH	2nd
140.778.01	ADVANCED STATISTICAL COMPUTING	2nd
330.805.01	SEMINAR ON STATISTICAL METHODS FOR MENTAL HEALTH	2nd

Showing 1 to 5 of 12 entries

Previous

1

2

3

Next

All Selected Courses

Show 5 entries

Search:

course_id	course_name	term
140.712.01	ADVANCED DATA SCIENCE II	2nd
140.752.01	ADVANCED METHODS IN BIOSTATISTICS II	2nd

Showing 1 to 2 of 2 entries

Previous

1

Next

Time Conflicts:

2.3 “All Selected Courses” area

The lower half is “All Selected Courses”.

Links to the course websites are provided in the “Recommended Courses” and “All Selected Courses” area.

The scheduling function is also provided in the “All Selected Courses” area. When there is time conflict between courses, the conflicted courses will be listed below. The courses selected later by users will rank higher in the “Time Conflicts” area so that they can easily decide whether keep the latest selected course.

All Selected Courses

Show 5 entries

Search:

course_id	course_name	term
140.712.01	ADVANCED DATA SCIENCE II	2nd
140.752.01	ADVANCED METHODS IN BIOSTATISTICS II	2nd
140.778.01	ADVANCED STATISTICAL COMPUTING	2nd
180.650.01	FUNDAMENTALS OF CLINICAL ONCOLOGY FOR PUBLIC HEALTH PRACTITIONERS	2nd
140.732.01	STATISTICAL THEORY II	2nd

Showing 1 to 5 of 5 entries

Previous

1

Next

Time Conflicts:

140.732.01 is conflicted with 140.712.01

Algorithms and discussions

Our raw data consists of course enrollment information of 2015-2016 academic year for all JHSPH students. We have for each person, a random ID, the academic program he/she is in, all courses he/she takes for this academic year and the corresponding term of each course. We apply association rule mining method to this dataset to find “interesting rules”. Then we give recommendation based on the mined rules. We implement the association rule mining using R package “arules”, which applies “Apriori” algorithm to find the association rules.

The main functions of our App:

- Course recommendation: User select his academic program and current term. Then select courses he is interested in taking for the current term. Our App recommend courses he may also want to consider to take for the current term.
- Time conflict: Check if the recommended courses have time conflict.

Discussion:

Depends on what data we would be able to collect in the future, our future work may include:

- Extend our App to flexibly handle multi-year enrollment data. Need to make sure data of different years are consistent (e.g. Deal with bi-yearly courses or change time schedule of the same class).
- Extend our App to predict courses for next term based on current term preference. Need to develop new algorithm for prediction.