GROUP3 PROJECT PROPOSAL

Chinese University Timetable Editor (CUTE)

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1. Problem

This project focuses on the CUHK course timetable problems, including course timetable arrangement, course timetable access, and course assessment.

1.1 Tedious Course Timetable Arrangement

For a long time, timetable arrangement has been a critical and conspicuous problem that most CUHK students will encounter in the course enrolling period. As in most CUHK course enrollment applications, the class search and enrollment procedure would take a long time. It is often the case that a student goes through several times of the tedious class search procedure due to enrollment failures, and the time delay may lead to miss the newly selected courses again and again.

Current course timetable applications do the class searching and timetable display separately. This kind of implementation depends on users' memory to correctly remember all the courses' time slots during the arrangement. When selecting a new course, if the user misremembers other courses' time, clash may happen. Otherwise, users need to make a copy of current timetable to remind them. It makes the arrangement procedure rather tedious. Therefore, a new design which can bind class searching and timetable display together is needed.

1.2 Inconvenient Course Timetable Access

Every semester before students can entirely remember their course timetable, which usually takes several weeks, they must check the courses' time and location online. Instead, some of them prefer to take a screenshot of the online timetable and save it in their photo album or set it as their mobile phone background to make it more portable. But both have some drawbacks. Obviously, checking online is unwieldy as users are required to login every time and navigate through several pages that they would not have to. And the screenshot is static thus inflexible, that each time students make some changes on their timetable, a new screenshot is required. Thus, a tidy application which gives the user the direct access to their current timetable would be useful.

1.3 Limited and Inflexible Course Information

To enroll a suitable course, students need to gather information from resources such as previous material and assessments from seniors. But for most students, the previous material is hardly achievable. And the number of accessible and experienced seniors is rather limited. Students are only available with a deficient amount of useful resources. Thus, making a good decision in course enrollment could be a tough problem.

2. Goals

The objective of CUTE is to help CUHK students arrange their course timetable, alleviate their course enrollment burden and give them a more comprehensive perspective of each course. CUTE uses its agile features to facilitate the timetable management procedure. Its user-friendly interface provides an easy access to the real-time course timetable. And its client interaction

mechanism can offer students more complete course information.

3. Solutions to Problem

3.1 Arrangement Portability Enhancement

To facilitate the timetable arrangement, the class search and timetable display functionalities are close related in CUTE, so that users can search courses referring to the current timetable without navigating through too many pages. Through timetable initialization, instead of manually typing in each course, CUTE can automatically import the user's current timetable on the CUSIS. Moreover, the timetable editing functionality can further save users' time by helping users directly change a course to its alternative timeslot without searching the same class again.

3.2 Timetable Accessibility Improvement

As CUTE users can import current timetable from CUSIS, the tedious web-page navigation can be avoided. To further improve the accessibility of the timetable, our system provides a saving and sharing functionality which allows users to save their timetable on local machine. Users can further import the timetable file to calendar applications, such as google calendar.

3.3 Course Information Comprehensiveness Reinforcement

Rating and material uploading mechanisms are applied to complement the limited course information. Users can get information from other users by accessing the uploaded files and viewing the comment and rating.

4. Functionalities

4.1 Account Management

In CUTE, some functionalities are only available to authenticated users. To use these functionalities, CUHK students are required to login with their OnePass account. For the sake of privacy and intellectual property, guests who are not from CUHK are not allowed to use these functionalities.

4.2 Timetable Arrangement

This functionality gives users a simple interface to create and edit their timetable. It has four components:

- Display Timetable
  Index page shows the current course timetable, with basic information of each selected course.
- Initialization
  The authenticated user can initialize the timetable by replacing it with the one in user's CUSIS account. Guest will get an empty timetable after initialization.
- Editing
  Users can add one or more new course by searching. If several courses are chosen

to be added, they will be automatically arranged in the least conflicted way. Or change the time of existed courses by mouse drag on the timetable. A selected course can also be removed from timetable.

- Saving and Sharing
  The timetable could be saved on the local machine as a Google calendar or Mac calendar, or shared to others as a picture. The final timetable can be directly loaded into CUSIS.

4.3 Class Searching

A user can search a course by typing in course code or name to the search box above the timetable. The basic information of that course will be shown and the user could choose whether adding this course into timetable.

4.4 Course Information

After a user successfully searches a course, the information of that course will be shown to the user. The information includes the following three parts:

- Basic Information
  The class description, meeting information, enrollment information, and other fundamental information of this course will be shown in this module.
- Available Seat and Waiting List
  The available number of seats is shown. If the user is authenticated and in the waiting list, she can also see her current position.
- Material
  CUTE allows authenticated users to upload previous course materials, such as course outline, so that later other students could refer to them.

4.5 Course Assessment

- Comment and Rating
  The authenticated user who has taken the course can comment and rate under that course.
- Automatic Suggestion
  The system will make course suggestions according to the rate and popularity of the course, and the similarity of users.

5. Technical Details

5.1 Front-end and UI Design

We use HTML, CSS, JavaScript to implement our interface. To facilitate the timetable arrangement process, we allow users to do class searching and timetable editing without refreshing the page. Therefore, AJAX is also needed to interact with our web server and update part of our page accordingly.

5.2 Back-end

Our project utilizes Node.js to build our back-end server and relational database MySQL to manage our data. Requests sent to database and replies are mostly text. Thus, a relational database would then be able to dynamic update of the data.

A relational database provides a mechanism for storage and retrieval of data which is modeled in means of the tabular relation. Therefore, MySQL is more suitable for our project comparing with NoSQL.

5.3 Web Scraping

Web Scraping is a technology to extract data from webpage. This technology is the foundation for our project because most of data related to course and individual schedule are not available publicly. In this project, we will use some classical web scraping methods, like text-pattern match and HTTP Programming, to fetch some essential information directly from CUSIS. Python is our major programming language for developing web scraping scripts due to resourceful libraries for web scraping.

5.4 Others

Some additional technologies are adopted in this project.

Automatic Suggestion: Suggestion would be done according to the department, the raring and the pre-requisite of the course. Basically, course offered by the same department, with higher rating would be recommended to the student.

Class searching: Our search function based on string searching algorithm. User can search the course by typing in the course code or course name.

6. Novelty

6.1 Easy to Schedule Class

For existing course enrollment system users in CUHK, the way to add courses to their shopping list of courses is not user-friendly. They must check whether the time and venues of different courses conflict or not, which is a sheer waste of time!

CUTE has its course scheduling system which mainly provides two functions to help students select courses with minimal time investment.

- Automatic course arrangement
  CUTE users can directly input the list of course numbers they want to take, and CUTE will output a course schedule timetable if there's no scheduling conflict. But if some courses are conflicting with others, CUTE will ask users to give a rank of conflicted courses and drop some courses with lower rank to output a course schedule without scheduling conflict.
- Flexible course selection
  CUTE enables users to modify their course schedule flexibly. The course schedule in CUTE is not fixed. When users click a course, the timetable will show all the different

sections of the course. With only one click operation on the timetable, users can freely choose one of the course sections.

6.2 Convenient Access to Course Information

CUTE provides users with quick and convenient access to course information which includes the number of available seats, course introduction, position in waiting list and so on. Students are most interested in comments from whom had taken the course to know the difficulty and workload of the course. To provide the latest and best information, CUTE will ask students for comments to the course when users have finished course, and update them in the course information.

6.3 Export to Google Calendar and Mac Calendar

CUTE can export user's course schedule into his/her calendar.

7. Technical Challenge

The major technical challenge in our system is how to retrieve the user's timetable. Our system requires user's username and password for CUSIS. Then the first problem is how to utilize these resources to log into the CUSIS system and retrieve the schedule automatically. Secondly the existing timetable systems are not interactive enough, that is, the system needs too many Sophisticated operations, so the humanization design is another problem we need to issue in our project. Thirdly, the design of course recommendation algorithm can be a great challenge. Finally, how to ensure the security of user information, especially their CWEM password, is also problematic.

8. Social Impact

8.1 Facilitate Course Planning

The course arrangement process under current CUSIS system is tedious and time-consuming. Students have to jump back and forth between different pages to modify and visualize their plan and the course information provided are poor and scattered. Although students only register courses twice every year, it's important to plan it carefully as it determines the study of the whole semester. As CU students, we are all suffering from its inconvenience and feel the urgent to have some tools that help facilitate the course planning process. Therefore, by providing a fast, easy-to-use and information-intensive course planning tool, along with the evaluation from previous students, we believe CUTE would make great impact on students' life and become their indispensable friend.

8.2 Improve Teaching Quality

CUTE provides a platform for students to share their opinions on courses and lecturers among students. Although this project is mainly designed for students, teachers can also see students

comment and therefore make some improvements. Though there's already formal course evaluation for each course, comments from our platform can also be taken as reference as they would mainly focus on aspects that students care about most. Also, students might be more willing to share on the internet. Therefore, CUTE can also help improve the teaching quality of CUHK.

9. Evaluation Plan

Milestones	Deadlines
Milestone 1 - Course Information Extraction	**3.31**
• Basic information extraction	
• Current timetable extraction	
• Waiting list position extraction	
Milestone 2 - Database Design and Implementation	**4.8**
• Schema design and creation	
• Data insertion and database maintenance	
Milestone 3 - Account Management and Timetable	**4.8**
• Timetable arrangement functionalities	
• Login and timetable interfaces design	
Milestone 4 - Course Searching	**4.15**
• Index building and querying	
• Rank result and course information display	
Milestone 5 - Course Assessment	**4.22**
• Reviews and ratings	
• Automatic suggestion	