Academic Innovation Student Fund Proposal Form

Please answer the below questions, and email this proposal form along with a budget outline to [aif-proposals@umich.edu](mailto:aif-proposals@umich.edu)

## **1. Project Title: Elective and Michigan Online course recommender system**

## **2. Project Summary:**

* **What is the overall focus and scope of the project?**

The purpose of this proposal is to recommend electives, University of Michigan LSA College Requirements courses, and Michigan Online courses for undergraduate students in the LSA BS Computer Science program. The large number and ever-changing course offerings can cause stress to many students to navigate degree requirements, not only within their major but also the board offerings of electives and other college-specific requirements. Mistakes in understanding course requirements of course sequencing can cost students additional time needed to complete the degree, hence can cause unexpected and unnecessary monetary cost, and delay degree completion. The overwhelming selection of courses can also impede students from exploring other suitable courses that they would otherwise enjoy or excel in. Also, the academic consequence (e.g. potential low grade) can impede students from trying and exploring new courses that may align with their academic or personal interests.

In this project, we hope to create a pilot recommender system that reminds students of the courses they should take to meet the college-specific requirements and connect students with courses that they would not have otherwise selected. We provide a survey to a student at the beginning of using the system which asks students about their personal and academic interests, as well as their aspirations. We then use this information to:

1. Remind the students of the course to take next based on their previous and pending completion, and their academic plan
2. Recommend elective courses to students that meet LSA degree requirements
3. Recommend Michigan Online courses to students that are would either support their academic degree, or align with their personal interests

## **3. Team:**

* **Identify the students leading this initiative. List each team member, and provide a short bio for each person describing their relevant expertise, experience, and how they will contribute to the project. (Please identify team lead)**

Yeseul Kim - Yeseul is a student of the Master of Applied Data Science program at the University of Michigan School of Information. She will be working on preparing the data, and building the recommender system using data filtering methods.

Beilei He - Beilei is a student of the Master of Applied Data Science program at the University of Michigan School of Information. He will be working on data cleaning, feature selections, visualization programming, building the recommender system using data filtering methods.

Annette Han - Annette is a student of the Master of Applied Data Science program at the University of Michigan School of Information. Her expertise and experience are in education and learning analytics. She will be working on obtaining the data, and building the recommender system using topic modelling. (team lead)

We also receive advice and support from School of Information faculty: Qiaozhu Mei, Winston Featherly-Bean, Elle O’Brien, and Kirtana Choragudi.

## **4. Success:**

* **What are the key outcomes from this project? What do you hope to achieve? How will you know you’ve succeeded? What mechanisms/tools will you use to measure success? Where possible, please quantify your success metrics (e.g., number of attendees, number of students served, number of users, etc).**

The key outcome from this project is to connect students with courses that they may not otherwise explore and take. The overarching goal is to ultimately support students’ on-time graduation while helping them explore other interests and excel to the best of their abilities.

We will know if we have succeeded if the distribution of students enrolling in LSA elective requirements changes (i.e. more diverse groups of students enroll) and if the number of students enrolling in Michigan Online courses increases.

We will develop a recommender system platform that uses:

* Content-based filtering: recommend based on requirements and courses that match the requirements, other feature of courses could be used as well
* Collaborative filtering: recommend bases on courses other students have taken in the past, infer a user’s interest and preferences from those of other similar users
* Topic modeling: recommend bases on students’ interests and topics of the course (taken from the course description)

The degree elective requirements and LSA elective requirements are only unique to BS Computer Science students since we have to narrow down the project scope. However, we can see the potential for expanding this feature to students of other majors once we have more time and resources to obtain and clean data of other degree majors.

The Michigan Online course recommender system however, can be used by all students who come to our platform and fill out the survey, since the system would recommend courses based on the students’ answers to the survey.

# **5. DEI:**

* **Please describe how your project will help the University of Michigan meet any DE&I goals**

Diversity:

With the key goal of helping students to explore elective courses and Michigan Online courses, the recommender is the path to connect students with courses that help students learn and expand their knowledge about race and ethnicity, gender and gender identity, political perspectives, culture, religion, etc. The recommender can also induce a more diverse sample of students in each course; hence enhancing the opportunities for students to exchange ideas of diverse perspectives within the course/classroom.

Equity:

The recommender system can be an excellent channel that provides students with information regarding learning opportunities that they would otherwise not be aware of. Information changes everything. So, providing students with more information of the course availability and courses that match with their interests is an excellent way to ensure the equity in access to information of quality education resources. By providing students with information regarding the rich education resources available to them that the University of Michigan offers, and that access to them is easy, we believe that we are creating an environment that students would feel that they are given equal opportunities to learn and excel.

Inclusion:

With the success of the recommender system, over time, students will be exposed to opportunities of diverse courses. They will also be able to meet, be friends, learn from, and exchange ideas with diverse groups of classmates. We believe that we are taking a step closer to a respectful learning environment where every individual has a sense of belonging and inclusion.

## **6. Challenges:**

* **What are the potential challenges and/or risks to mitigate?**

If we end up not able to obtain the course requirements and list of degree requirements from the registrar office, scraping the website effort will add to our overall time needed to pursue the project. Also, to recommend a course based on students’ interests, we want to know what their interests are. Therefore, we need to develop a sensible initial survey to ask students about their interests so that we can collect as accurate information as possible.

We also have concerns about the ethical challenges that we might encounter. We are concerned about echo chambers which can happen when popular courses that are taken by other students (such as introductory courses) are reinforced by the system, creating filter bubbles that impede students from exploring other courses that might be just as interesting and enjoyable. A way to solve this problem is to calculate the popularity score of courses (based on the number of students who have taken the course in the past, or the ratio of available seats/number in the waiting list), filter this list by the requirement and interest of student, and present this list in a random order. This will make sure that we present information to students without enforcing or endorsing a particular course (if the student tends to go with the first course on the list).

## **7. Timeline:**

* **Please describe the major phases of the project. Include important dates, milestones, and any constraints.**

Nov 1 - Complete acquiring data

Nov 7 - Clean and prepare the data for filtering, build a pipeline.

Nov 14 - Start analyses

Nov 28 - Complete analyses

Dec 5 - Finish first draft

Dec 17 - Finish final draft, start building website

Dec 30 - Done building website

## **8. Sources of Funding:**

* **If you are planning to use this funding to support an activity funded by other internal/external funding, please indicate the source of that funding and identify how the AIF funding sought increases or changes the scope of the project.**

N/A

# **9. IRB:**

* **If this is a research project, have you obtained an IRB exemption or approval? If so, please attach notice with this application. If not, please describe your plan to do so, or the conditions under which this is not necessary.**

All of the datasets are available publicly online. No IRB approval is required.

# **10. Budget Justification:**

* **Please describe how much funding (up to $2,500) from the Center for Academic Innovation you need to accomplish this work, and what the cost identified will cover. If you are seeking additional funding from outside CAI, please indicate what costs are associated with the CAI proposal and what costs are associated with additional funding opportunities. Be sure to complete the budget form included** [**here**](https://docs.google.com/spreadsheets/d/1772UhF8kn6ZXv5VgTzanMnG3fqZK28d0c74mW2yy214/edit#gid=0)**.**

Completed budget form attached.