CS 411 Lab 1

Monarch Course Explorer Product Description

Team Silver

11 October, 2023

Version 1.0

Table of Contents

List Of Figures

List of Tables

1. Introduction

1.1 Problem Background

Many students face problems and confusion when dealing with class registration and scheduling. Students often have ideal schedules, learning values, and preferred location (whether that be in person or asynchronous learning) already in mind when signing up for classes. While some schools offer a descriptor of classes pre-registering, it often leaves the student wondering about how the class is conducted.

1.2 Problem Characteristics

ODU and most other Universities do not utilize a tool that faculty and students can use to create more customizable and productive learning experiences. Faculty and students lack a way to communicate how classes are taught, as well as detailed information about how the class is conducted (Asynchronous learning or synchronous class times), learning aspects (reading material or project oriented), and workload/efficiency (Weekly assignments, bi-weekly assignments, or course project oriented) that the student may face.

Current Process Flow

Figure 1 Current Process Flow
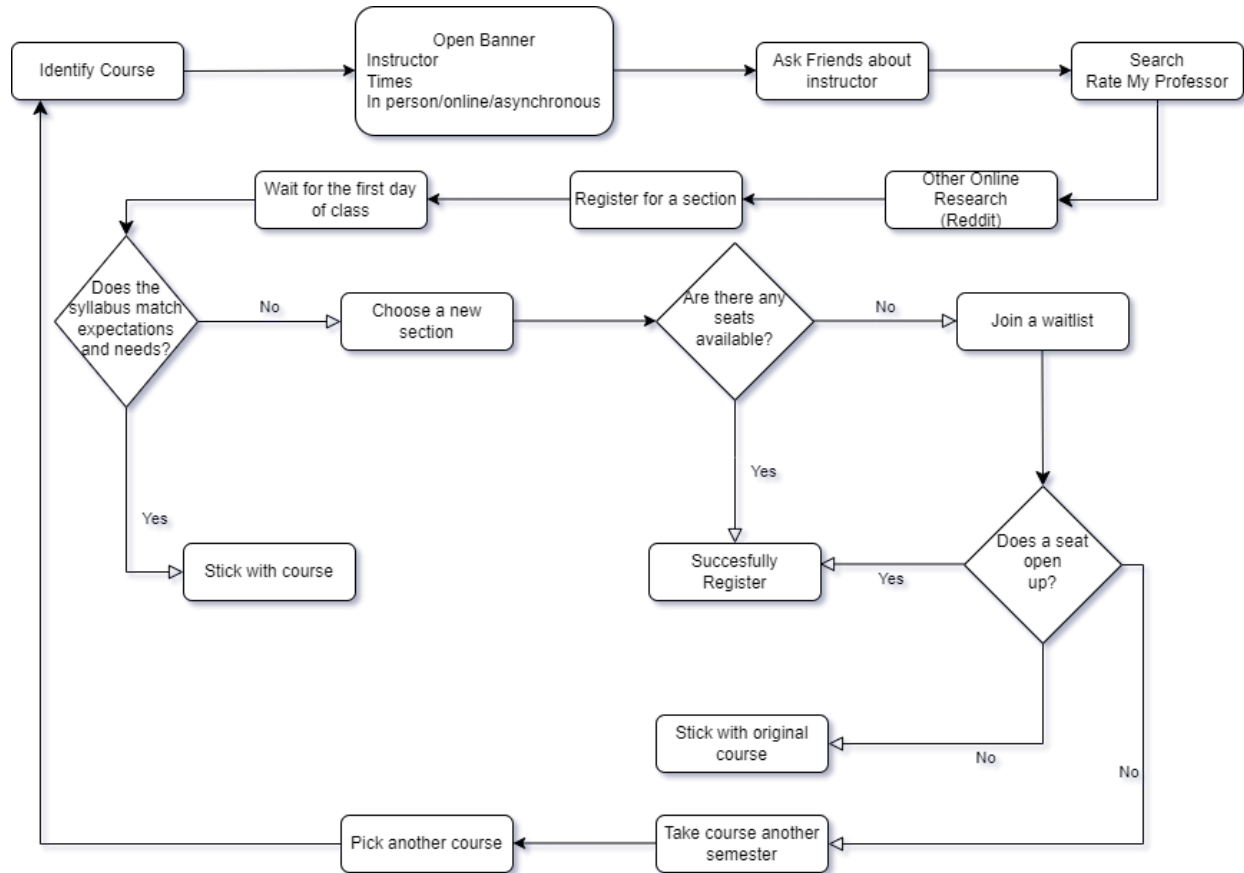
2. Monarch Course Explorer Product Description

In the above figure (Figure 1) the current process flow requires students to obtain

information on classes they intend to register for by using a variety of sources.

2.1   Solution

Monarch Course Explorer will supplement the course registration process by

providing a moderated platform for providing and viewing feedback, viewing

automatic comparisons of courses by semester and professor, and allow the
student to access and upload syllabi of the selected course. The solution aims to
condense the exaggerated process seen in Figure 1, and provide the student with
clearer objectives and goals when looking to enroll in classes.

2.2 Solution Characteristics

Monarch Course Explorer will execute this solution by providing a central
repository of course syllabi. Students will then be able to provide feedback about
courses and be viewed by other authenticated users. Monarch Course Explorer
will also be balanced by allowing faculty to view and comment on feedback from
students. Feedback will be moderated by staff but will not be removed unless it is
found violating our guidelines. This allows faculty to provide retorts to feedback
as well as make possible changes to their courses. Monarch Course Explorer is
heavily driven and built for course syllabi. Faculty will be able to upload their
syllabi as well as submit current syllabi for aid curriculum review committee.

Proposed Solution Flow
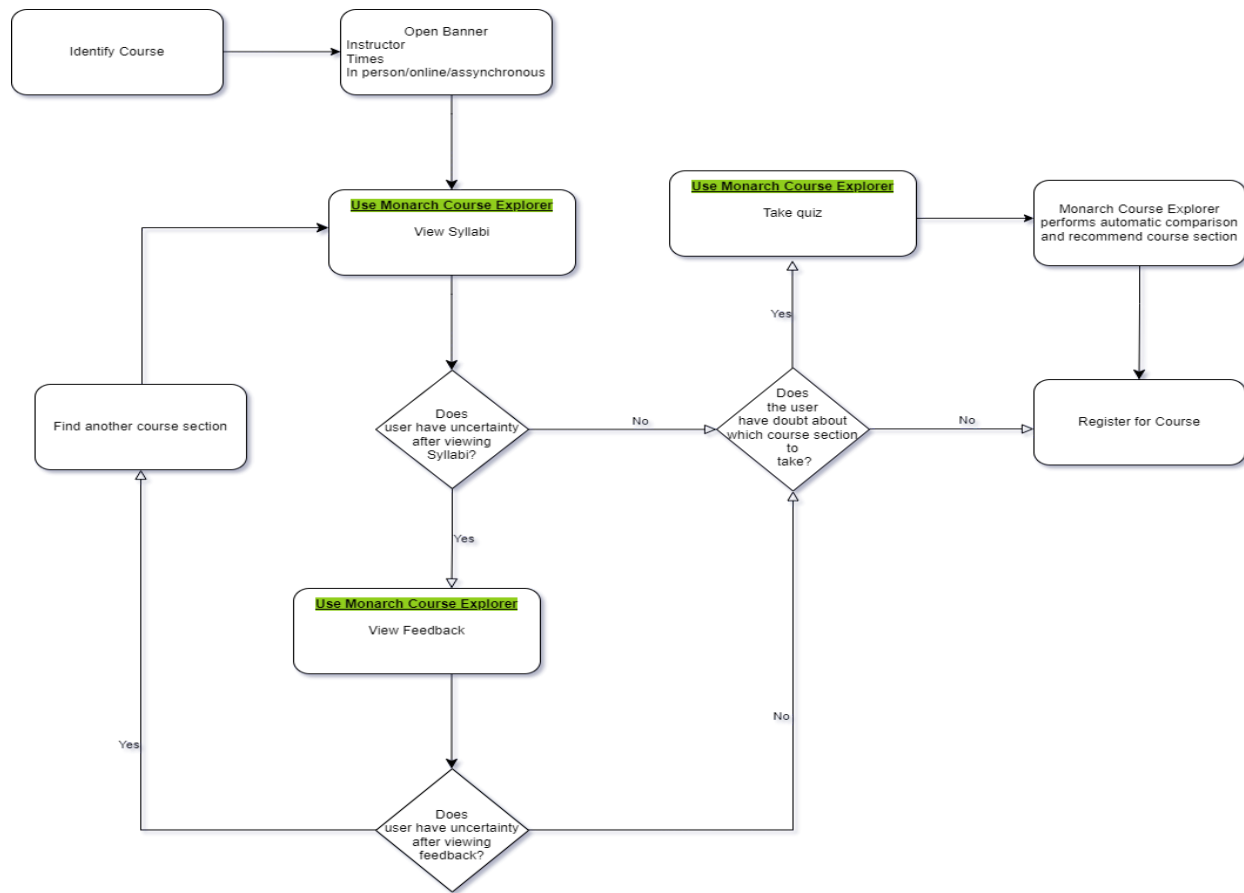
Figure 2 Proposed Solution Flow

2.3 Key Product Features and Capabilities

This section aims to signify key features that will be found in Monarch Course Explorer.

2.3.1 Core product features

Monarch Course Explorer's main focus is providing the student with materials and access to course syllabi and learning foundations. Students will be able to

verify their identity with the school through Monarch Course Explorer. Only authenticated students will be able to provide and comment on feedback within any course offered on the platform.

Students will be able to identify the course and professor's learning objectives, learning styles, and scheduling goals when using Monarch Course Explorer. After a student has completed the course they will be able to provide feedback that can be seen by other authenticated students and faculty. Faculty can then provide additional comments or clarifications on feedback, allowing more insight into the course. Another main goal of Monarch Course Explorer is aiding faculty and advisors in constructing and reviewing syllabi for all courses offered on the platform. Monarch Course Explorer will analyze and review uploaded course syllabi, allowing faculty and advisors to quickly and efficiently adjust outdated curriculums.

2.3.2 What is unique

Monarch Course Explorer will provide in-depth information on courses and detail them through professor and semester comparisons. Students who have authenticated themselves by MIDAS or verified ODU email will then be able to view and provide feedback on listed courses.

As well as providing information already gathered and built by other verified students and syllabi, Monarch Course Explorer will also provide a "Recommendation Quiz" that will suggest recommended courses based on a short

quiz. This quiz will analyze the students needs and select the best fitting courses tailored to the requirements set by the student.

2.4 Major Components (Hardware/Software)

On the user interface side, individuals can access syllabi, compare them, and read feedback without needing to create an account. However, certain functions like uploading syllabi, providing feedback, and reporting feedback will require user registration. On the technical backend, syllabi will be collected, standardized, analyzed, and saved in a database. Users will need to authenticate themselves using their MIDAS credentials for access.

Major Functional Component Diagram
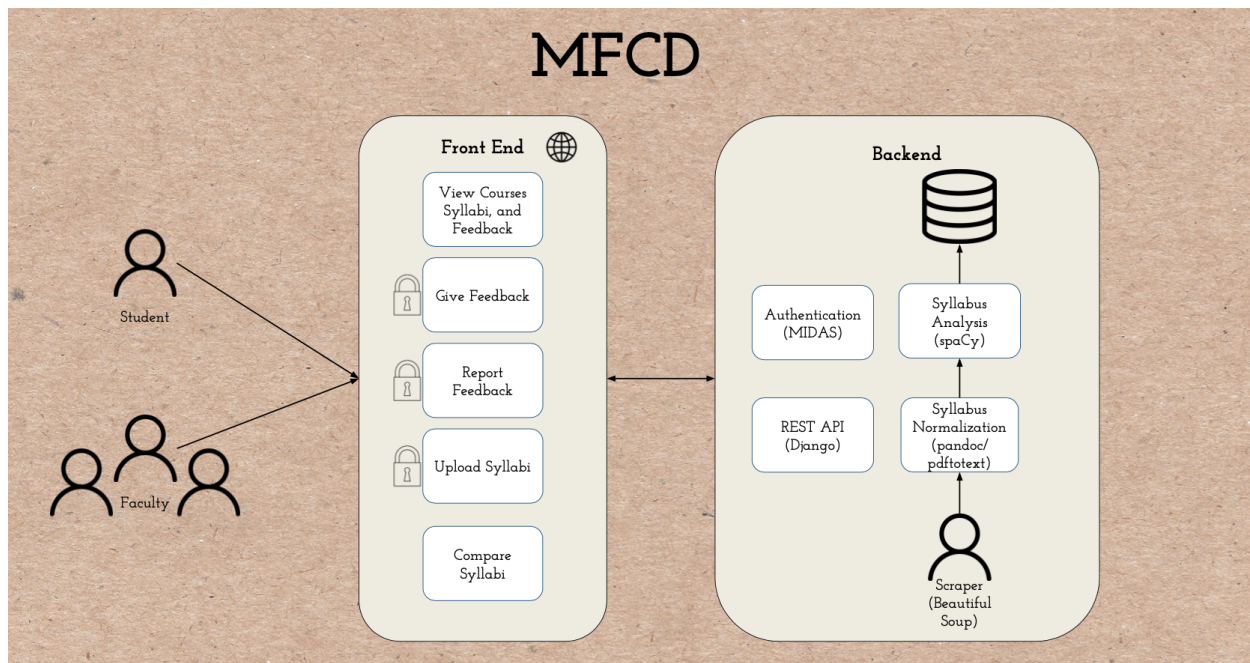
Figure 3 Major Functional Component Diagram

I. Website

Monarch Course Explorer will be viewed primarily as a website. This platform will consist of HTML as the user display, CSS for formatting and design, and Javascript to dictate user interaction. II. Python The platform will be provided information in the form of Python libraries. Beautiful Soup is used for web scraping of pre-defined courses and feedback submitted by other users on existing platforms. To obtain information from uploaded syllabi, spaCy will use an NLP transformation to convert files viewable within the webpage. Finally, Django will exist as our Rest API allowing connection and redirections.

III. Databases

Both feedback and syllabi information will need to be stored securely, and remotely to avoid possible attacks and threats against the data. Postgres will be used to contain information found on the platform. This allows secure and efficient database storage.

IV. Authentication

Authentication will be conducted through MIDAS. ODU students are required to enroll and set up MIDAS authentication and will be implemented as a secure option to 2FA.

3. Identification of Case Study

3.1 Old Dominion University

Old Dominion University provides an increasing diverse population of students. Online and non-traditional students such as active military are enrolling with limited time schedules. This provides difficulty in choosing the best possible

solution to courses that Monarch Course Explorer looks to satisfy. Faculty such as Professors, Advisors, and the Curriculum Committee will greatly benefit from this platform. They will be able to engage students and verify feedback and information found about the courses. These three parties can also collaborate on syllabi and provide clear and efficient curriculums available to the students.

3.2 Future Adoption

Monarch Course Explorer may be available to other universities in the future. Many universities lack the same additional materials needed to ease and satisfy student confusion and difficulties with course selection and feedback.

4. Monarch Course Explorer Product Prototype Description

Table of features and functionality, including comparisons between RWP and Prototype

Table 1 Syllabi Features Functionality

Features	Student	Faculty: Professor	Faculty: Advisor	Faculty: Curriculum Committee Member	Real World Product	Prototype
Upload Syllabi		✓		✓	✓	✓
Scrape Syllabi		✓		✓	✓	✓
View Syllabi	✓	✓	✓	✓	✓	✓
Side-By-Side View	✓	✓	✓	✓	✓	✓
Analyze Syllabi in Different Formats					✓	Partial

Table 2 Syllabi Features & Functionality

Features	Student	Faculty: Professor	Faculty: Advisors	Faculty: Curriculum Committee Member	Real World Product	Prototype
Verify Inclusion of Required Sections				✓	✓	✓
View Report of Missing Sections				✓	✓	✓
Fitler by Sections	✓		✓	✓	✓	✓
Compare sections	✓		✓	✓	✓	✓

Table 3 Feedback Features & Functionality

Features	Student	Faculty: Professor	Faculty: Advisor	Faculty: Curriculum Committee Member	Real World Product	Prototype
View Feedback	✓	✓	✓		✓	✓
Rate Feedback	✓	✓			✓	✓
Provide Feedback	✓	✓			✓	✓
Filter Feedback by Semester	✓	✓	✓		✓	✓

Table 4 Other: Features & Functionality

Features	Student	Faculty: Professor	Faculty: Advisor	Faculty: Curriculum Committee Member	Real World Product	Prototype
Authentication	✓	✓	✓	✓	✓	Partial
Take Quiz	✓				✓	✓
View Course Recommendation	✓				✓	✓

4.1. Prototype Architecture (Hardware/Software)

Hardware

Available hardware needed to access the project is a computer with an internet connection. The project will come in the form of a website that hosts the content of syllabi and courses through a database. The database will be hosted through a Postgres integrated server and displayed through HTML, CSS, and Javascript.

Software

Software needed for the project will be server and client side; while HTML, CSS, and Javascript will be used for the client side. Python, Databases, and Development tools such as VSCode and Github will be used for server side instructions. Python libraries consist of:

- Beautiful Soup for web scraping

- spaCy for NLP transformations of syllabi

- Django for use as a rest API.

Databases and development tools will be used to store data collected through Beautiful Soup web scraping used for user feedback and syllabi.

4.2. Prototype Features and Capabilities

4.2.1 Analyze and extract information from syllabi

Analyzation and extractions of syllabi information will be offered and displayed in the terms of analysis of syllabi in different formats, aid curriculum review committee with evaluating course syllabi, searches for specific syllabi and access, accessing original syllabi, and filter and compare syllabi by sections or semester.
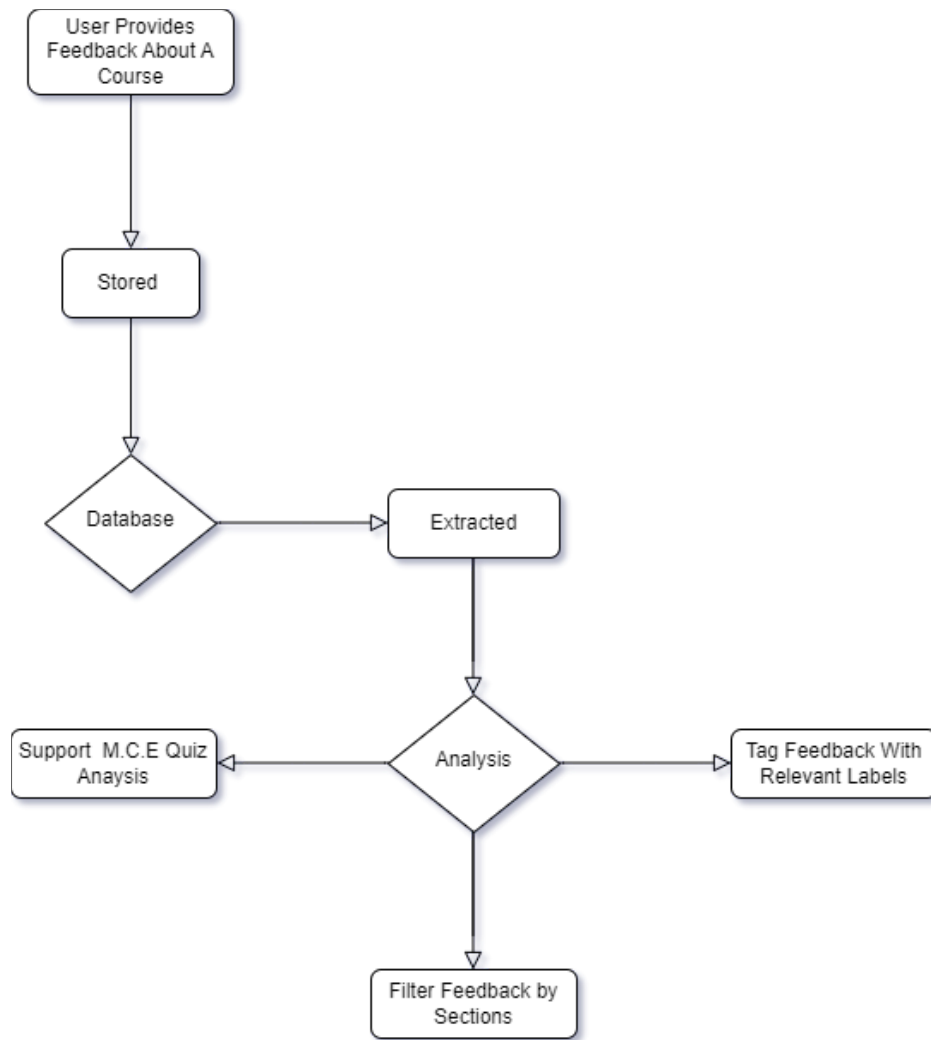
15
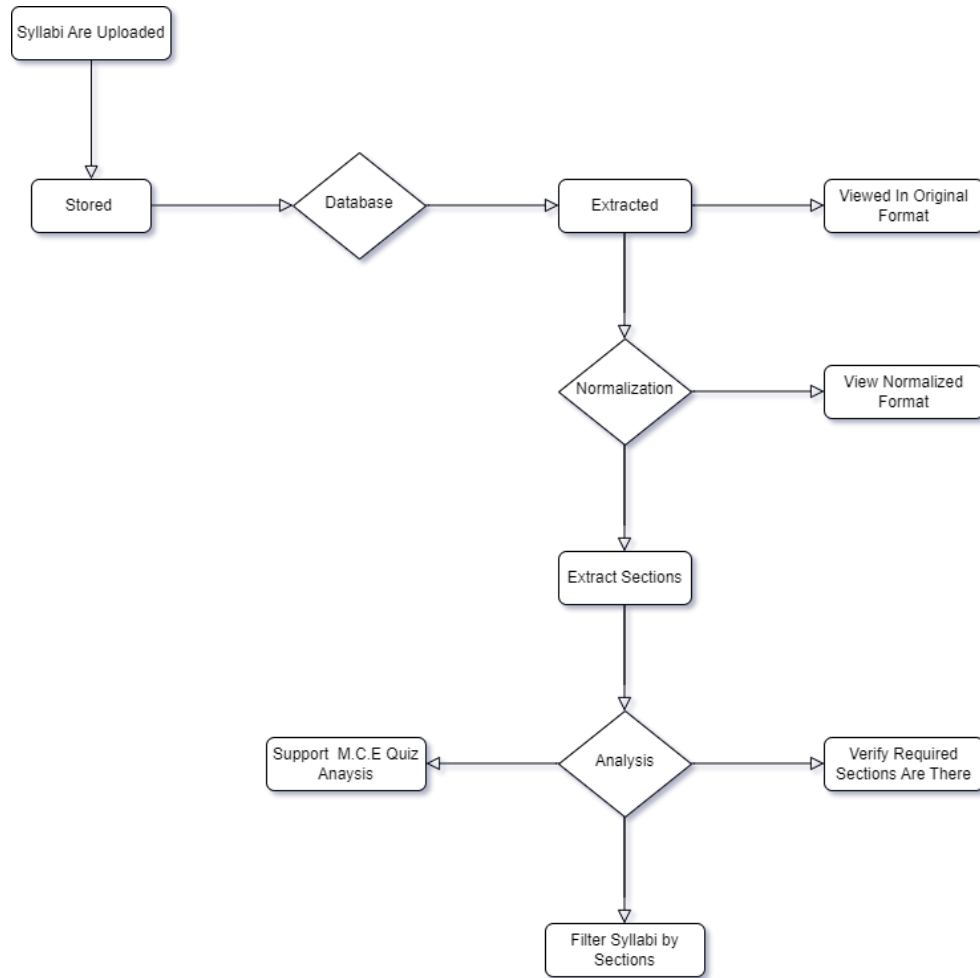
Figure 4 Syllabus Algorithm Flow Chart

4.2.2 Feedback on courses

Feedback will be implemented in the terms of: allowing current and past students
to provide feedback on courses; allowing professors to view, rate, and respond to
feedback; and allow advisors to view and filter feedback.

Figure 5 Feedback Algorithm Flow Chart

4.2.3 Assist students in finding courses that fit their learning style and personal schedule

Monarch Course Explorer aims to help students discover courses that align with their unique learning preferences and availability. This assistance includes providing syllabi and collecting feedback to enhance the learning experience. Additionally, a course recommendation feature, implemented through the MCE quiz, aids students in selecting the most suitable courses to meet their academic needs and personal schedules.
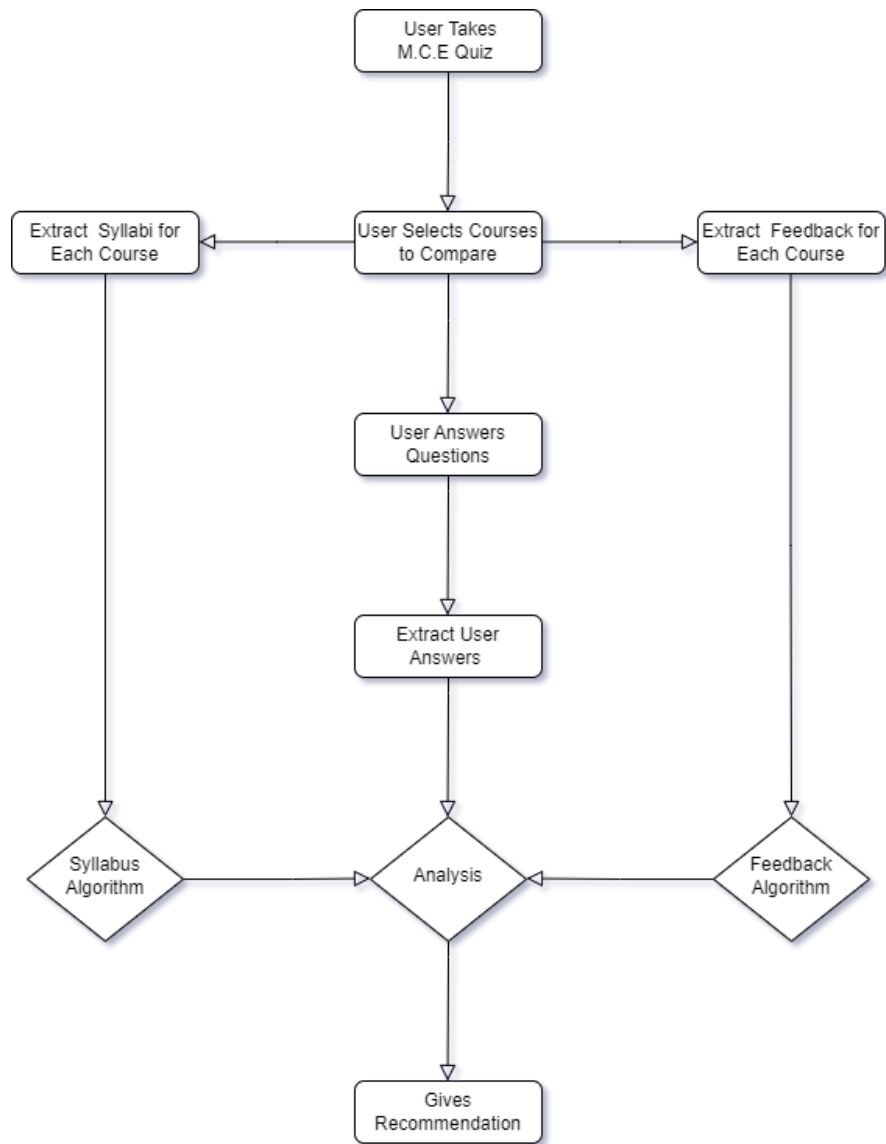
Figure 6 Recommendation Algorithm Flow Chart

4.2.4 Authentication

Monarch Course Explorer plans to implement authentication by use of ODU's

MIDAS system. MIDAS offers ODU student authentication and 2FA.

4.3. Prototype Development Challenges

4.3.1 Accuracy of NLP

Possible challenges include analysis of syllabi being inaccurate and analysis of feedback being inaccurate.

4.3.2 Data collection

Possible challenges of data collection include obtaining syllabi that are not already online and motivating students to provide feedback for courses.

4.3.3 Normalization

Normalization of syllabi may cause some information to be left out

4.4 Real World Product Risks

4.4.1 Customer Risks

The reliance on students and/or faculty to upload syllabi that are not already online, as reliance on students to give feedback for courses that do not already have feedback online poses a great challenge. Coordinate with ODU for release, so current syllabi can be uploaded by faculty, while using ODU mailers to advertise to current students.

4.4.2 Technical Risks

Abuse of platform, such as inappropriate or inaccurate fee mix of human and automated moderation.

4.4.3 Security Risks

Producing a scraper for each website requires time and effort. Automatic moderation may hide good feedback. Prioritize high value websites, such as the ODU website and Course Hero Use industry best practices to protect against tactics such as review bombing

4.4.4 Legal Risks

Cease and Desist from scrapes websites may require requests from websites. Reviewing respective ToS before scraping website to avoid any copyright, and honor any requests

5. Glossary

Beautiful Soup: A Python library for parsing structured data.

Django: A free and open-source, Python-based web framework that follows the model–template–views architectural pattern.

HTML: Hypertext Markup Language, standard markup language for documents designed to be

displayed in a web browser.

MIDAS: Monarch Identification and Authorization System, Old Dominion University's log-in

and password management system.

NLP: A subfield of computer science and artificial intelligence (AI) that focuses on the

interaction between computers and humans in natural language.

PostgreSQL: A free and open-source relational database management system emphasizing

extensibility and SQL compliance.

RWP: Real World Product that will be developed and used.

spaCy: An open-source software library for advanced natural language processing, written in the

programming languages Python and Cython.

6. References

Anderson, K., & Chinowsky, G. (2020, January 30). Students should have access to course

      syllabi before classes begin. The GW Hatchet. Retrieved January 23, 2023, from

      https://www.gwhatchet.com/2020/01/30/students-should-have-access-to-course-sy

      llabi-before-classes-begin/

Boccaccio, Eric. "Debunking Myths about RateMyProfessors.com and Course Evaluations."

      Medium, 18 April 2018,

      https://medium.com/@green4172/debunking-myths-about-ratemyprofessors-com-

      and-course-evaluations-dd91453535aa. Accessed 14 February 2023.

Cartwright, S. (2016, September 28). *Syllabi to be available online for students to preview before*

      enrolling in classes. The Lantern. Retrieved January 22, 2023, from

      https://www.thelantern.com/2016/09/syllabi-to-be-available-online-for-students-to

      -preview-before-enrolling-in-classes/

Park, Y., & Sprung, J. M. (2013). Work-School Conflict and Health Outcomes: Beneficial

      Resources for Working College Students. Journal of occupational health

      psychology, 18(4), 384-394. https://doi.org/10.1037/a0033614

Wan, M., Feng, L., Meng, X., Zhai, M., & Konopaske, R. (2022). Working College Students'

      Time Pressure and Work-School Conflict: Do Boundary Permeability and

Dispositional Mindfulness Matter? Psychological reports, 125(6), 3100-3125.

https://doi.org/10.1177/00332941211029621