CS 411 Lab 1

Monarch Course Explorer Product Description

Team Silver

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1. Introduction

1.1 Problem Background

A. Students lack the necessary information required to create a class schedule that fits around their personal or work schedule.

B. ODU students cannot view syllabi until they have already signed up for the course.

C. 81% of students in the U.S. work jobs while in college (Wan,2022).

D. Students may not know if the classes they signed up for are compatible with their personal schedules until the semester has already started.

1.2 Problem Characteristics

A. ODU does not have a tool that faculty and students can use to create more customizable and productive learning experiences.

B. Faculty and students lack a way to communicate how classes are taught, as well as detailed information about what is taught, leading to poor feedback for professors and losses of time and money for students.

Current Process Flow

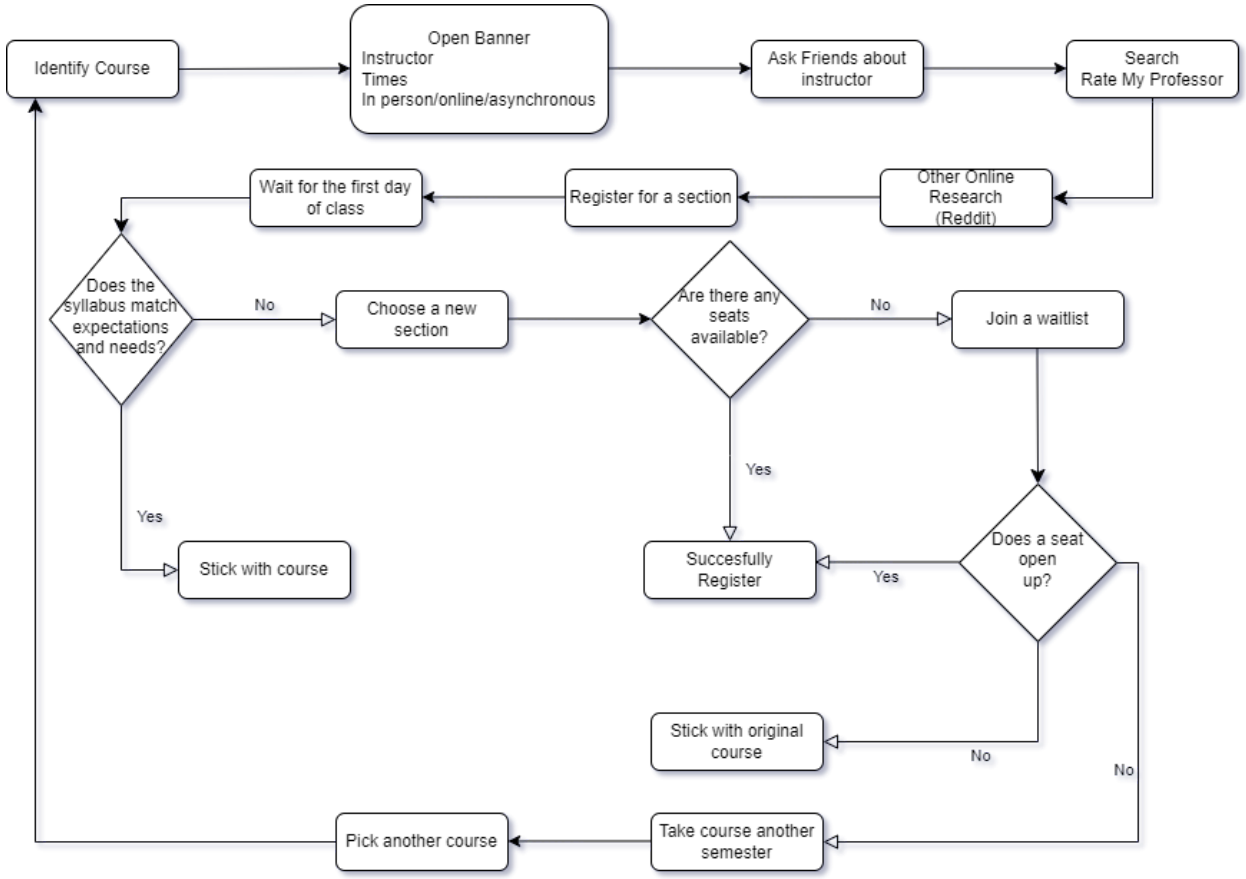

Figure 1 Current Process Flow

2. Monarch Course Explorer Product Description

2.1 Solution

A. Monarch Course Explorer is a moderated platform where students can provide and view feedback about courses, view automatic comparisons between semesters and teachers, and access and upload syllabi.

2.2 Solution Characteristics

A. Central repository of course syllabi

B. Students can provide and view constructive feedback about classes, which can be sorted by semester and faculty.

C. Faculty can view and comment on feedback from students.

D. Faculty can make changes to their courses based on feedback from students.

E. Faculty can make their syllabi more accessible to students.

F. Aid curriculum review committee with evaluating course syllabi

Proposed Solution Flow

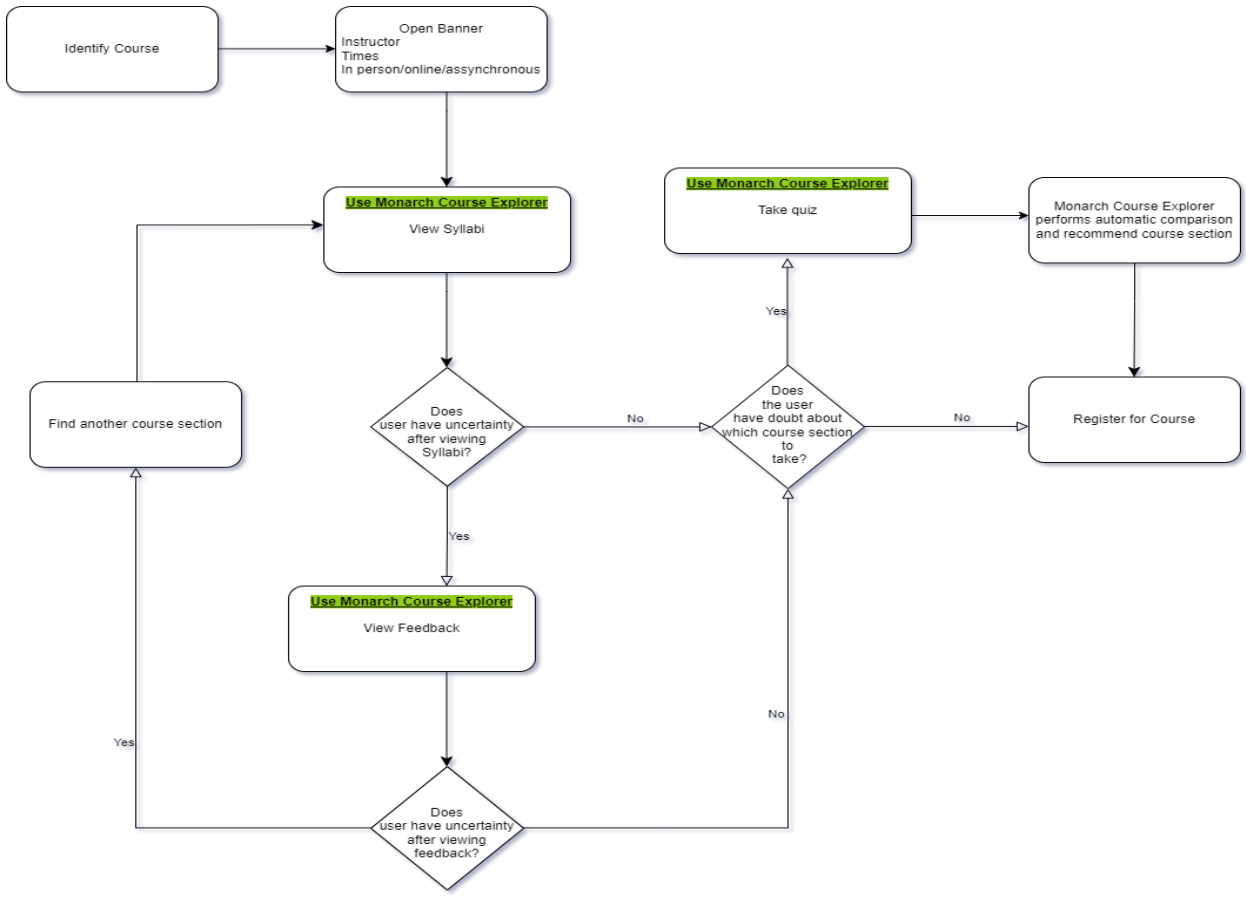

Figure 2 Proposed Solution Flow

2.3 Key Product Features and Capabilities

2.3.1 Core product features

A. Provide access to course syllabi and syllabi comparisons
B. Provide a platform for verified ODU students to provide feedback on courses
C. Provide students with more information about courses to fit their learning style and schedule
D. Provide timely feedback for professors
E. Aid curriculum review committee with evaluating course syllabi
F. Provide advisors with a tool and resource to create a more personalized advising experience

2.3.2 What is unique

A. Comprehensive course information
B. Automatic comparisons between semesters or faculty
C. Verified ODU email
D. Customized recommendations

2.4 Major Components (Hardware/Software)

On the front end, users can view syllabi, compare syllabi, and view feedback without having to sign up. But other features such as uploading syllabi, giving feedback, and reporting feedback will require users to sign up. On the backend, syllabi will be scraped, normalized, analyzed, and stored in a database. Users will be authenticated with their MIDAS information.

Major Functional Component Diagram

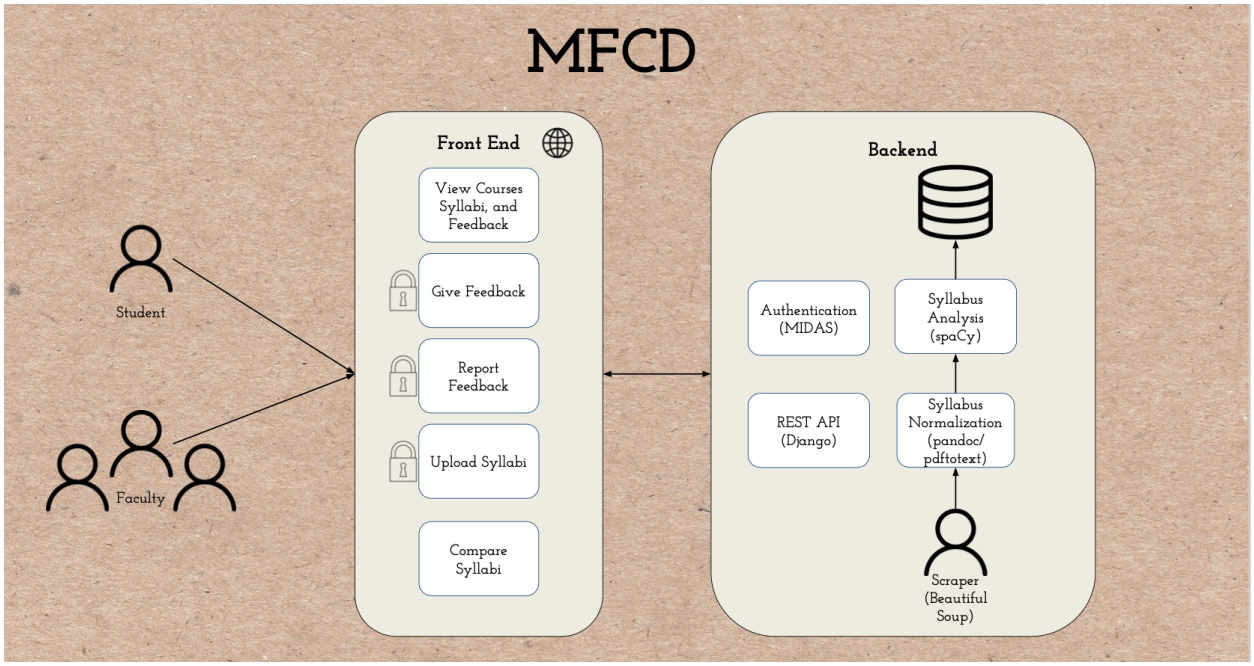

Figure 3 Major Functional Component Diagram

I. Website
   A. HTML - User display
   B. CSS - Formatting and design
   C. Javascript - User interaction

II. Python
   A. Beautiful Soup - Web scraping
   B. spaCy - NLP transformation of syllabi
   C. Django - Rest API

III. Databases
   A. PostgreSQL

IV. Authentication
   A. MIDAS

3. Identification of Case Study

3.1 Old Dominion University

A. A diverse student population, including non-traditional students and online distance learning students

B. Faculty

    a. Professors

    b. Advisors

    c. Curriculum Committee

3.2 Future Adoption

A. Other universities

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)

I. Hardware

A. Computer with internet access

II. Software

A. Website - HTML, CSS, Javascript

B. Python

a. Beautiful Soup for web scraping

b. spaCy for NLP transformation of syllabi

c. Django for rest API

C. Databases - PostgreSQL

D. Development Tools - VSCode, Github

4.2. Prototype Features and Capabilities

4.2.1 Analyze and extract information from syllabi

A. Upload and scrape syllabi

B. Partial implementation of analysis of syllabi in different formats

C. Aid curriculum review committee with evaluating course syllabi

D. Allow users to easily search and access syllabi for all courses

E. Users can access original syllabi as well as normalized syllabi

F. Users can filter syllabi by sections

G. Users can compare sections of different syllabi

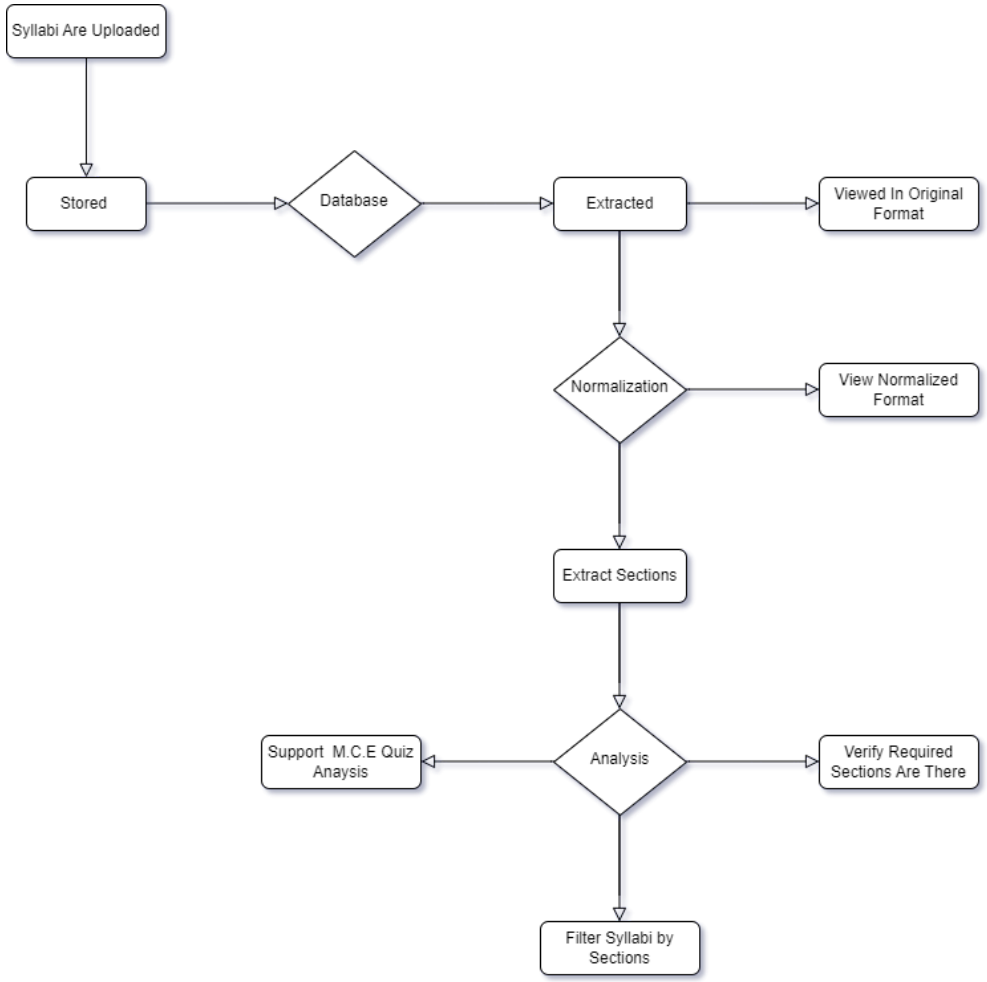

Figure 4 Syllabus Algorithm Flow Chart

4.2.2 Feedback on courses

A. Allow students to provide feedback on courses and filter feedback

B. Allow professors to view, rate, respond to feedback, and filter feedback

C. Allow advisors to view feedback and filter feedback

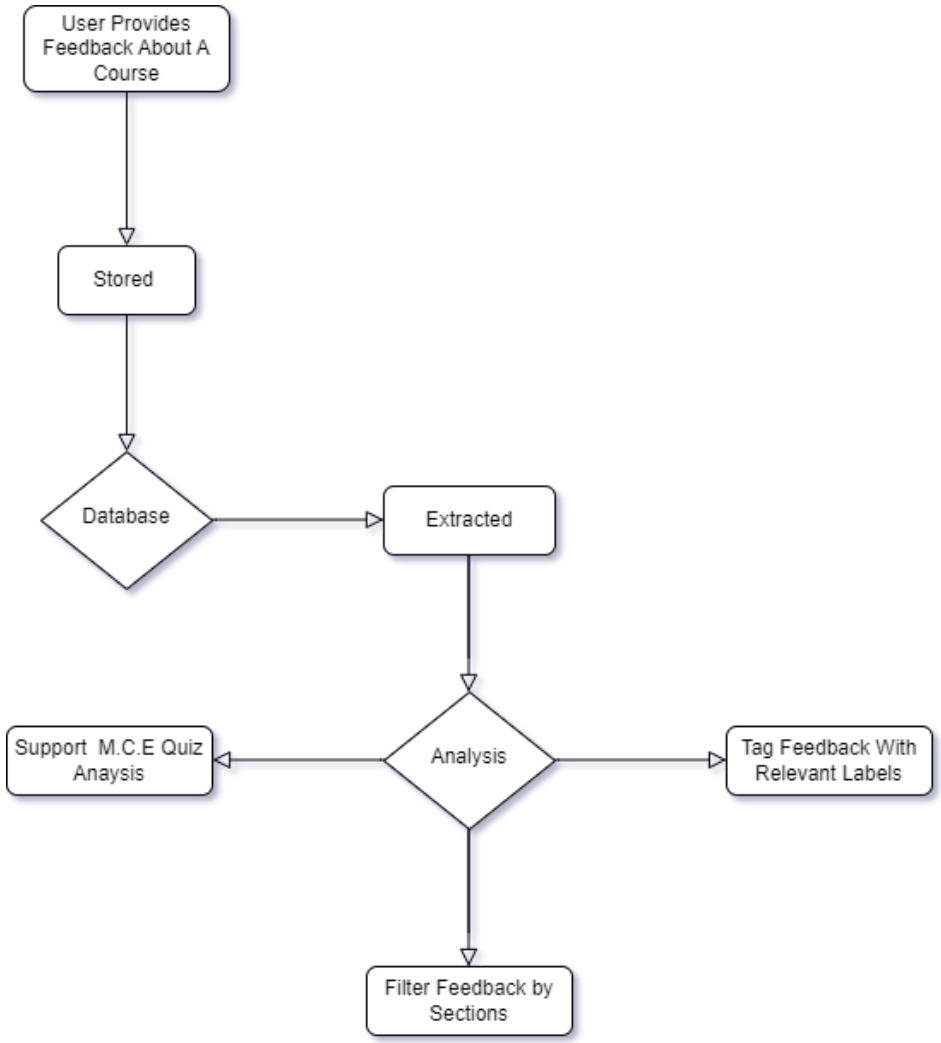

Figure 5 Feedback Algorithm Flow Chart

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

A. Syllabi and feedback provided

B. Course recommendation - MCE quiz

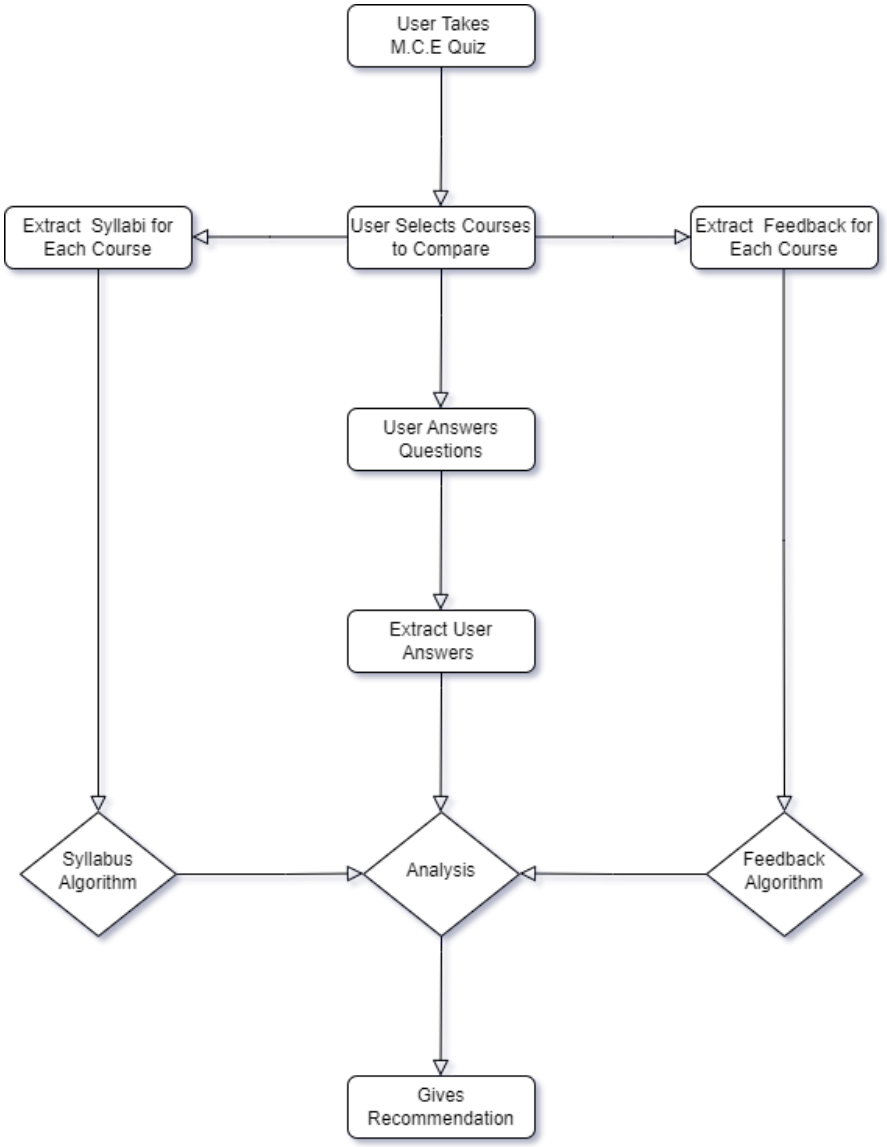

Figure 6 Recommendation Algorithm Flow Chart

4.2.4 Authentication

A. Partial implementation

4.3. Prototype Development Challenges

4.3.1 Accuracy of NLP

A. Syllabi analysis may be inaccurate

B. Feedback analysis may be inaccurate

4.3.2 Data collection

A. Obtaining syllabi that are not already online

B. Motivating students to provide feedback for their courses

4.3.3 Normalization

A. Normalization of syllabi may cause some information to be left out

4.4 Real World Product Risks

4.4.1 Customer Risks

A. Risks
B. Mitigations

4.4.2 Technical Risks

A. Risks
B. Mitigations

4.4.3 Security Risks

A. Risks
B. Mitigations

4.4.4 Legal Risks

A. Risks
B. Mitigations

5. Glossary

Beautiful Soup: A Python library for parsing structured data.

Curriculum Committee Member: A faculty member entrusted with the upholding and revising guidelines for academic programs.

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: Natural Language Processing, 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.

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