Lab 2 - Product Specification Outline

CS 411W Lab II

Product Specification

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Version 2

Table of Contents

List of Figures

1 Introduction

Students at ODU currently do not have access to the resources that they need to create the most optimal class schedule that can fit with all of their other personal responsibilities. They usually cannot view their courses' syllabi until the semester has begun, and there is no official course feedback hub where students can share their course experiences with each other. As a result, students are going into classes knowing only what is said about them in ODU's course catalog and whatever information they can find about the courses from random websites online. Figure 1 shows the current process of signing up for classes at ODU and how it leads to students wasting their time and money. Monarch Course Explorer was created with the idea of giving the ODU community a platform to share and view the ways courses are offered and conducted at ODU.

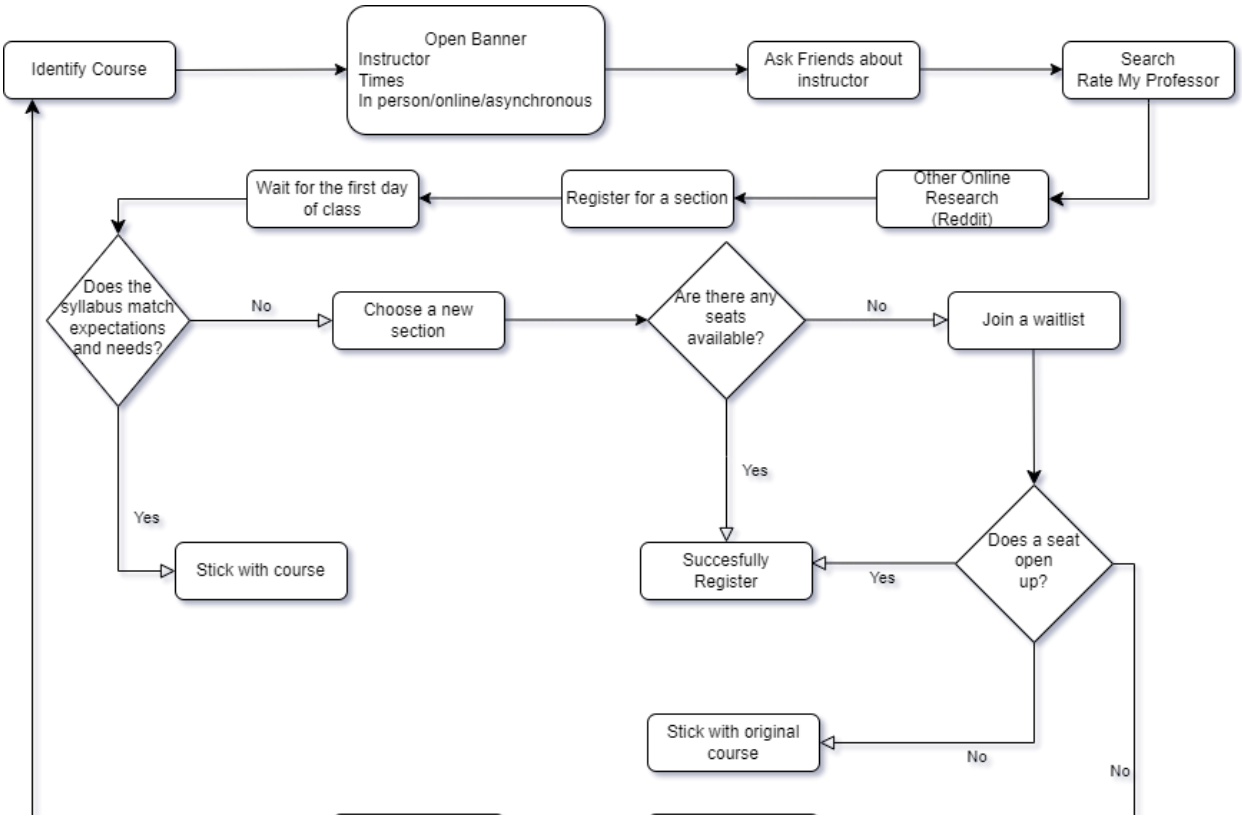

Figure 1: Current Process Flow

1.1 Purpose

The Monarch Course Explorer web application is intended to be used by ODU students and faculty to create personalized class schedules and post information pertaining to classes being offered at ODU. The website will be implemented as an extension of the ODU's primary course catalog and will serve as a nexus for all information related to ODU courses. The main purpose of this prototype is to aid students in making well-informed decisions when deciding how to structure their schedules for upcoming semesters. Another purpose of this prototype is to give all ODU students around the world, both on campus and online, a feeling of togetherness. The Monarch Course Explorer prototype is not meant to replace advisors but instead to assist them in finding classes that best fit a student's lifestyle.

1.2 Scope

The Monarch Course Explorer prototype will not have as many features as the real-world product but will contain every feature required to showcase the product's key functionalities. These functionalities include viewing course syllabi, uploading course syllabi, viewing feedback about a course, and providing feedback about a course. One of the main goals of this prototype is to simplify the process of signing up for classes for students, as shown in Figure 2. This prototype will benefit professors as well, as they will have an easy way to spread information about their courses to all ODU students and can upload syllabi for their students to observe whenever they want.

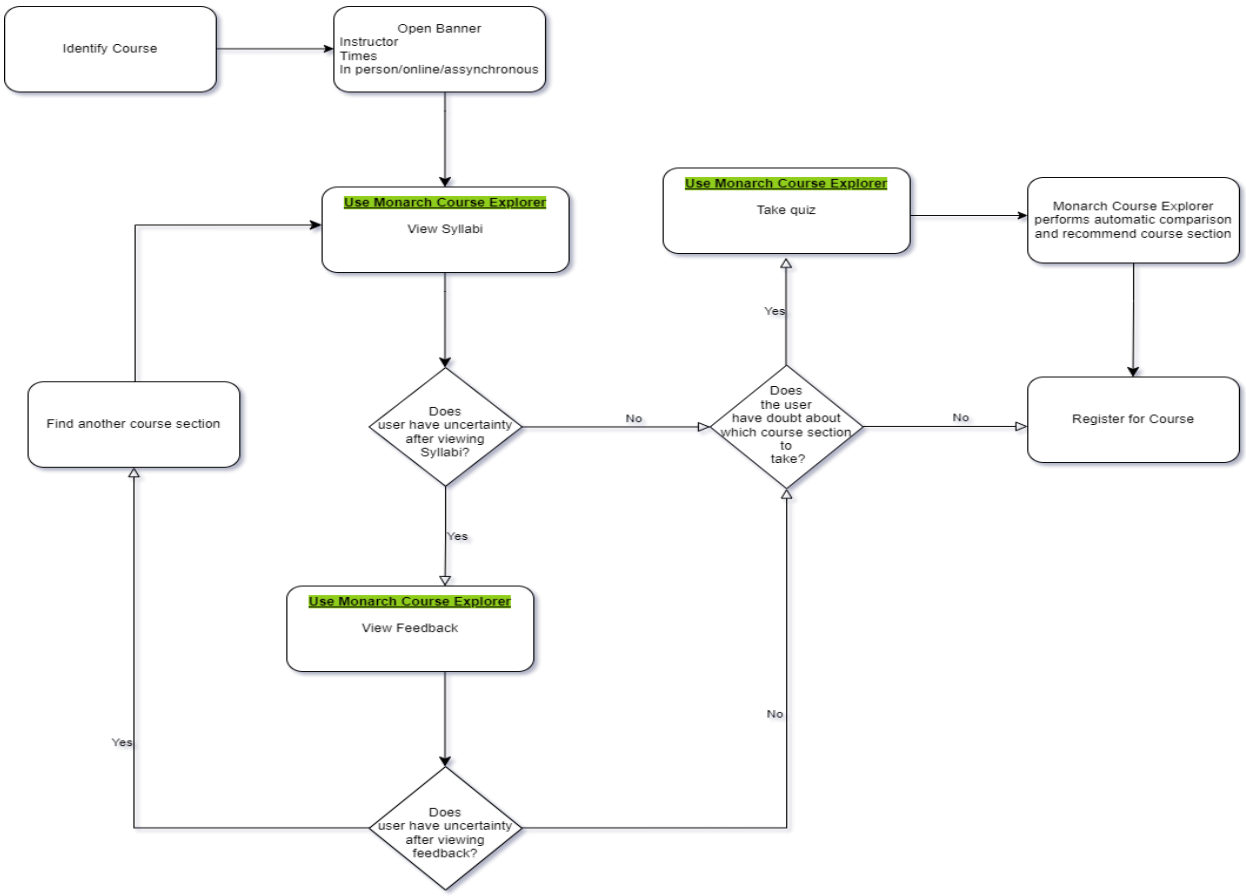

Figure 2: Proposed Solution Flow

1.3 Definitions, Acronyms, and Abbreviations

BeautifulSoup: Python library released in 2004 that is used to parse HTML pages.

CSS (Cascading Style Sheets): A language used to control how HTML elements are displayed in a web browser.

Django: Python web framework that was released in 2005 in order to help developers create secure and maintainable web applications.

Firefox: A cross-platform web browser developed by Mozilla and released in 2002.

GitHub: A software version control service released in 2008.

Google Chrome: A cross-platform web browser developed by Google and released in 2008.

HTML (Hypertext Markup Language): A standard markup language used to display documents in a web browser.

HTTP (Hypertext Transfer Protocol): An application layer protocol that is used to load webpages.

Microsoft Edge: A cross-platform web browser developed by Microsoft and released in 2015.

NLP (Natural Language Processing): A subfield of computer science, artificial intelligence, and linguistics that revolves around computers interpreting, understanding, and manipulating human language.

ODU (Old Dominion University): A public research university established in 1930 and based in Norfolk, Virginia.

PostgreSQL: A relational database management system released in 1996.

SpaCy: Python library used for advanced natural language processing and was released in 2015.

URL (Uniform Resource Locator): The address of a webpage.

1.4 References

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1.5 Overview

This product specification provides the hardware and software configuration of the Monarch Course Explorer prototype. No external interfaces will be required to implement the Monarch Course Explorer prototype. The information in the remaining sections of this document describes the architecture, the key functionalities that the prototype will provide, and the technologies that are used to make those features possible.

2 General Description

The Monarch Course Explorer prototype stores and displays resources that are relevant to ODU courses, so it can be used by ODU students and faculty. But students and faculty will also play a part in populating the prototype with information. Students will play their part by adding their course feedback to the prototype, and professors will have the ability to upload course syllabi. As of right now, this prototype is only intended to be used by the ODU community, but it could potentially be adopted by other universities in the future.

2.1 Prototype Architecture Description

The Monarch Course Explorer prototype will have a custom-designed frontend interface. From the home page, users have the ability to sign in through the student or staff login pages. The prototype's home page will also contain links to other pages where all of the prototype's key functionalities can be carried out, as seen in Figure 3. As mentioned in previous sections, professors have the ability to upload syllabi so students can view them. While viewing the syllabi, students can also filter through them by professor and semester.

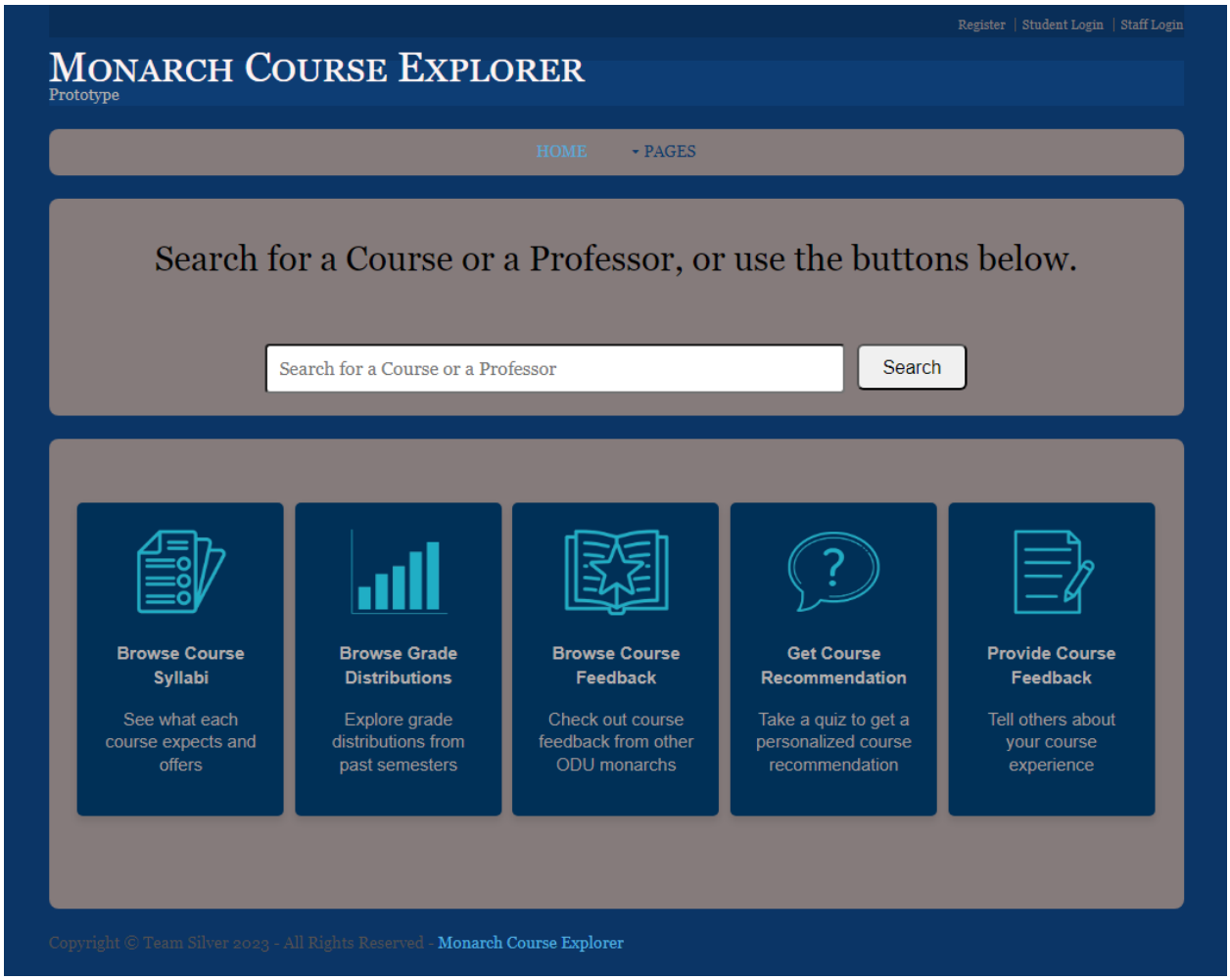

Figure 3: Monarch Course Explorer Homepage

2.2 Prototype Functional Description

When a user accesses the Monarch Course Explorer homepage, they are greeted with a text box that prompts them to search for a course or professor. Upon clicking search, the prototype will search its databases for any course information, syllabi, or feedback that is relevant to their input. Actions that involve modifying the website, such as uploading syllabi or providing feedback, will require users to authenticate themselves with their MIDAS credentials, as seen in Figure 4. Due to time constraints, MIDAS authentication will only be simulated in the prototype using sample email addresses and passwords. Any syllabus that is uploaded is stored in a database, where its text will be scanned for the important sections that students often look for. On the provide feedback page, users can select the course number, course title, instructor, and semester they are providing feedback for, and then type and submit their course feedback. Feedback that is posted will be scanned for any harmful content and will be discarded if any is found.

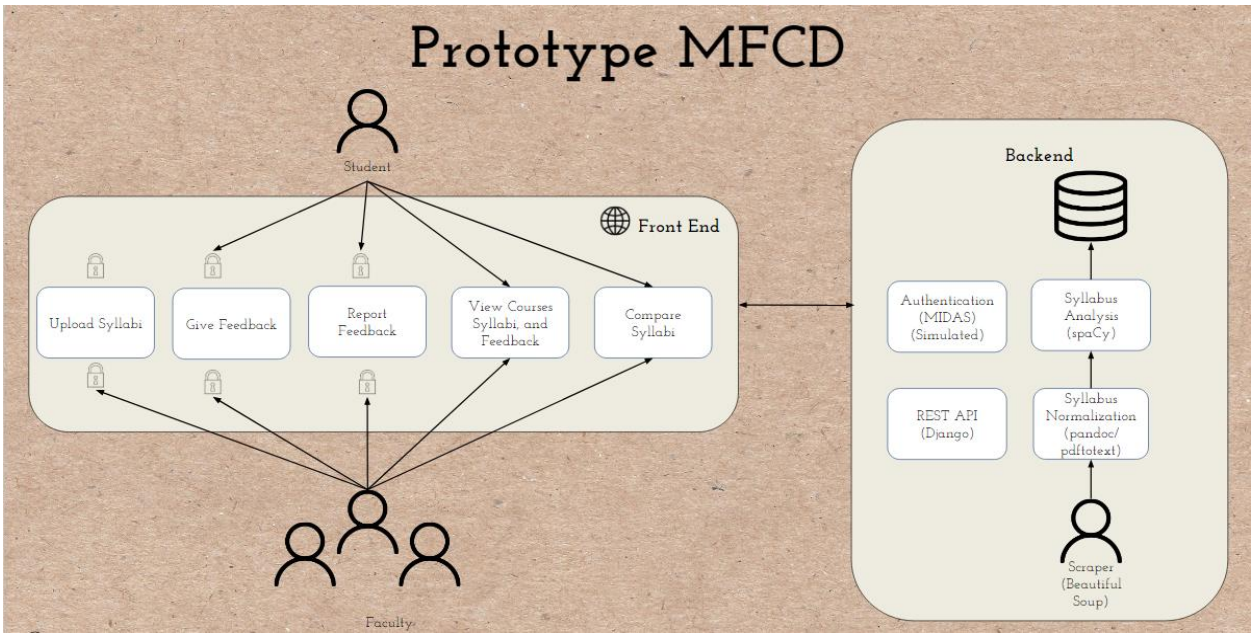

Figure 4: Major Functional Component Diagram

2.3 External Interfaces

The Monarch Course Explorer prototype uses the ODU course catalog in order to keep a record of each course that is offered at ODU, along with that course's subject, number, title, and description. Although the user authentication feature will only be simulated in the prototype, the ODU MIDAS authentication system will be required to authenticate users in the real-world product.

2.3.1 Hardware Interfaces

Users can interface with the Monarch Course Explorer prototype using desktop computers and laptops, as well as other smart devices such as tablets and smartphones. The prototype is accessible to computers, laptops, and tablets running the latest versions of Windows, MacOS, and Linux, as well as smartphones using the latest versions of Android and iOS.

2.3.2 Software Interfaces

The software for the Monarch Course Explorer prototype was typed using Visual Studio Code and was source controlled using GitHub. The prototype's frontend is built using HTML, formatted using CSS, and handles user interaction using JavaScript. The prototype uses the Python Django REST framework along with PostgreSQL databases as the foundation for its backend. The prototype's backend uses other Python libraries, such as BeautifulSoup to scrape important information from syllabi and SpaCy to perform NLP transformations on syllabi.

2.3.3 User Interfaces

The main user interface for the Monarch Course Explorer prototype is the prototype's homepage. From there, the user can direct themselves to any of the prototype's main pages, where they can test out the prototype's key features. Users can access this homepage using a web browser such as Google Chrome, Firefox, or Microsoft Edge. The interface of the prototype will be slightly different for faculty, as they will have the ability to upload syllabi.

2.3.4 Communications Protocols and Interfaces

The Monarch Course Explorer prototype's communication protocols and interfaces are handled by the Django REST framework. Django processes HTTP requests from users as well as communication between the prototype's webpage and databases. Django also keeps a list of all of the URLs that can be accessed when using the prototype.