Lab 2 - Product Specifications

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1 Introduction

College students, especially ODU college students, lack the necessary information required to create a class schedule that fits around their personal or work schedule. Since 81% of students in the U.S. work jobs while in college, according to Min (Maggie) Wan (2022), it is imperative that students know complete class schedules and syllabi information weeks before the college semester starts, not when college is starting again, for adequate time to avoid conflicts between work, school, and other personal commitments.

One of the major components of the problem is that ODU currently does not have 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 what is taught, leading to poor feedback for professors and losses of time and money for students. This current process is shown in Figure 1.

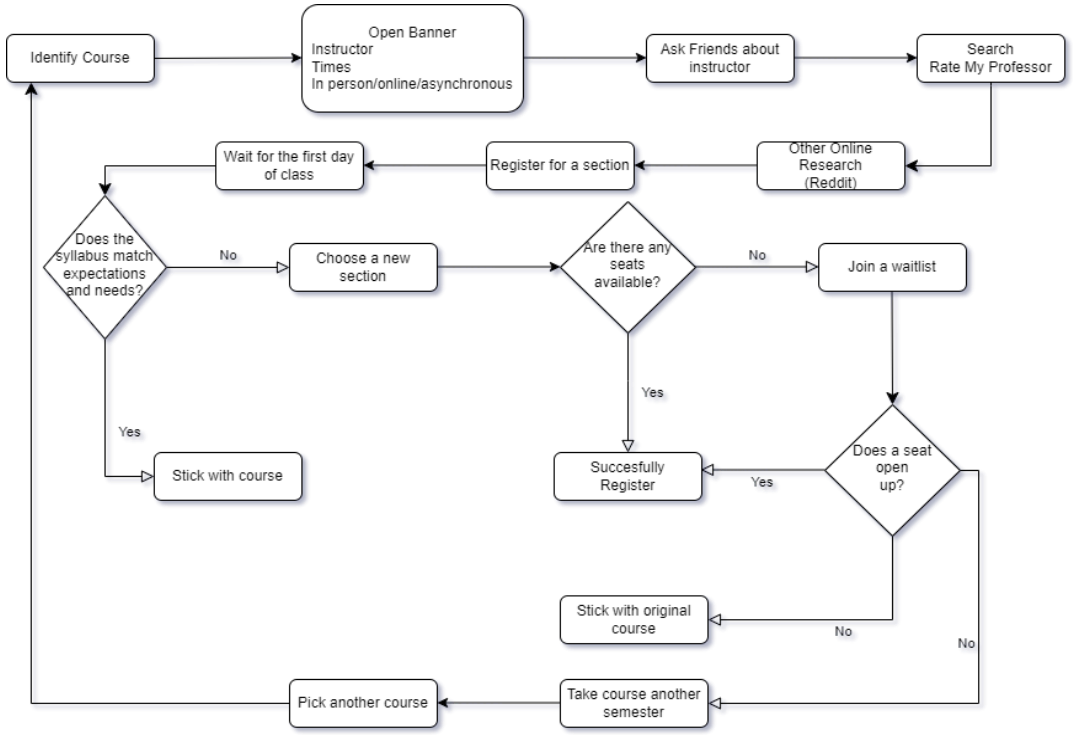

Figure 1 Current Process Flow

1.1 Purpose

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.

1.2 Scope

There will exist a central repository of course syllabi, which students and faculty can view. Students can provide and view constructive feedback about classes, which can be sorted by semester and faculty. Faculty will be able to view and comment on feedback from students. Faculty will also be able to make changes to their courses based on feedback from students as well as make their syllabi more accessible to students. This will ultimately aid Curriculum Review Committee members (also known as Curriculum Committee members or CCM's) with evaluating course syllabi for future courses. The proposed scope for this is shown in Figure 2.

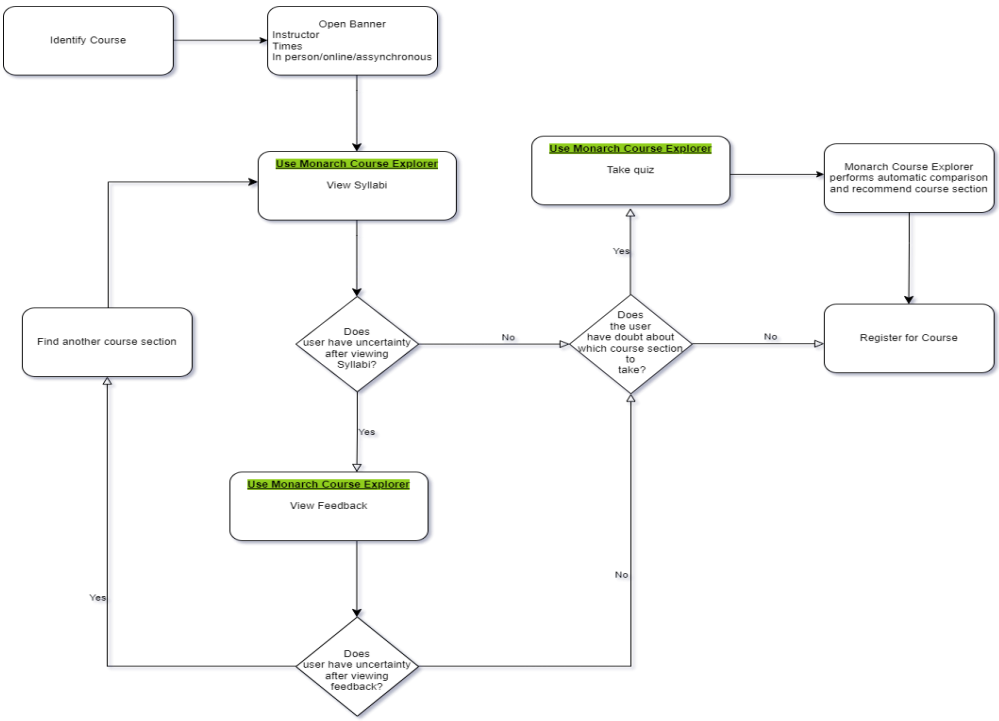

Figure 2 Proposed Scope

1.3 Definitions, Acronyms, and Abbreviations

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.

1.4 References

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1.5 Overview

This product specification provides the hardware and software configuration, external interfaces, capabilities and features of the Monarch Course Explorer prototype. The information provided in the remaining sections of this document includes a detailed description of the hardware, software, and external interface architecture of the Monarch Course Explorer prototype; the key features of the prototype; the parameters that will be used to control, manage, or establish that feature; and the performance characteristics of that feature in terms of outputs, displays, and user interaction.

2 General Description

Monarch Course Explorer is designed for students and faculty for reviewing class syllabi and providing feedback efficiently. The prototype for Monarch Course Explorer is currently a proof of concept which will implement key features and capabilities of the Real-World Product.

2.1 Prototype Architecture Description

The software will allow access to course syllabi and syllabi comparisons. The software will provide a platform for verified ODU students to provide feedback on courses, and also provide students with more information about courses to fit their learning style. For faculty, timely feedback is provided for professors, which also aids curriculum review committees with evaluating course syllabi. The Monarch Course Explorer gives advisors the tools and resources needed to create a more personalized advising experience.

The unique features for the Monarch Course Explorer are as follows. Comprehensive course information ensures students have the correct information to choose the classes they need. Automatic comparisons between semesters or faculty allows students to decide which professors are best for their preferred learning style. Verified ODU emails confirm that only ODU students

and facility are able to access the Monarch Course Explorer and its resources. Concluding these unique features is the ability to receive customized recommendations for a set of classes to take for an upcoming semester. Figure 3 Major Functional Component Diagram shows the Major Components.

Major Functional Component Diagram

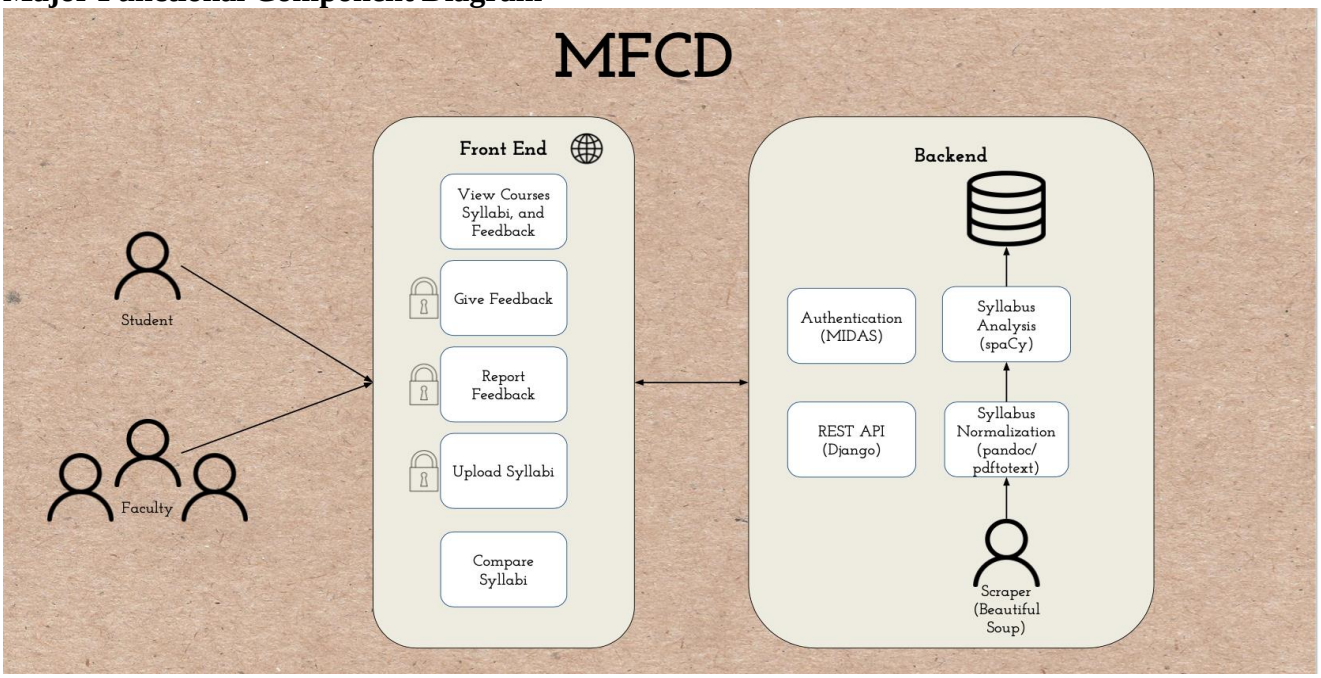

Figure 3 Major Functional Component Diagram

2.2 Prototype Functional Description

Monarch Course Explorer is designed for students and faculty for reviewing class syllabi and providing feedback efficiently. The prototype for Monarch Course Explorer is currently a proof of concept which will implement key features and capabilities of the Real-World Product. These features are shown in Table 1, Table 2, Table 3, and Table 4.

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	✓				✓	✓

The Monarch Course Explorer prototype will allow Faculty Professor and Faculty Curriculum Committee Members (CCMs) to upload their syllabi and have it scraped by the prototype, as well as being able to view and compare them side by side. This process will be partially implemented due to the vast variety of different syllabi formats currently at ODU. These features will aid CCMs to evaluate course syllabi and make future changes when needed.

Student users and faculty users will be able to easily search and access syllabi for all courses listed in Monarch Course Explorer. All users will be able to access all original syllabi as well as their normalized forms. All users will be able to filter syllabi by sections, as well as comparing sections of different syllabi. The algorithm for supporting these processes is shown in Figure 4 Syllabus Algorithm Flow Chart.

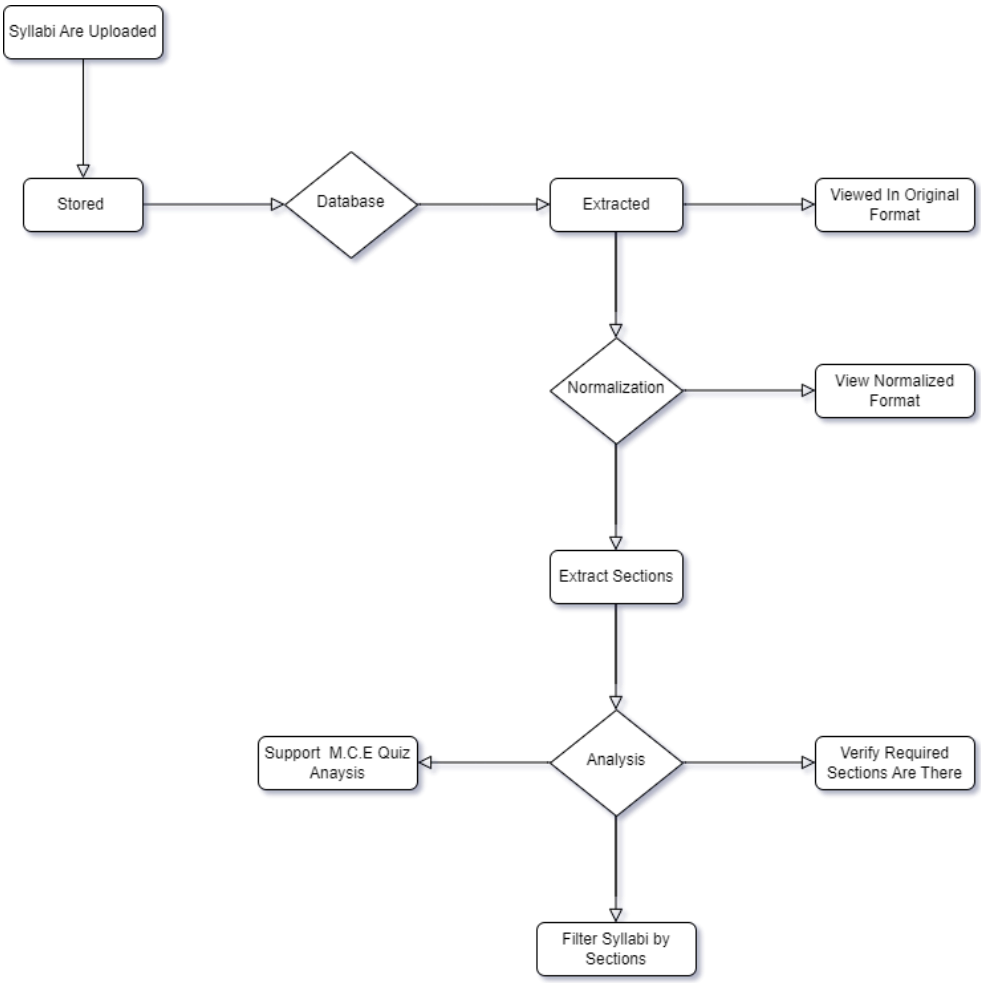

Figure 4 Syllabus Algorithm Flow Chart

For Feedback on courses listed in Monarch Course Explorer, the students will be able to provide feedback on courses as well as filter feedback to find applicable feedback from previous students. Professors will be able to view, rate, respond to, and filter feedback as needed to find the most applicable feedback. Lastly, advisors will be able to view feedback and filter to find applicable feedback for their advising needs. The algorithm to support these processes is shown in Figure 5 Feedback Algorithm Flow Chart.

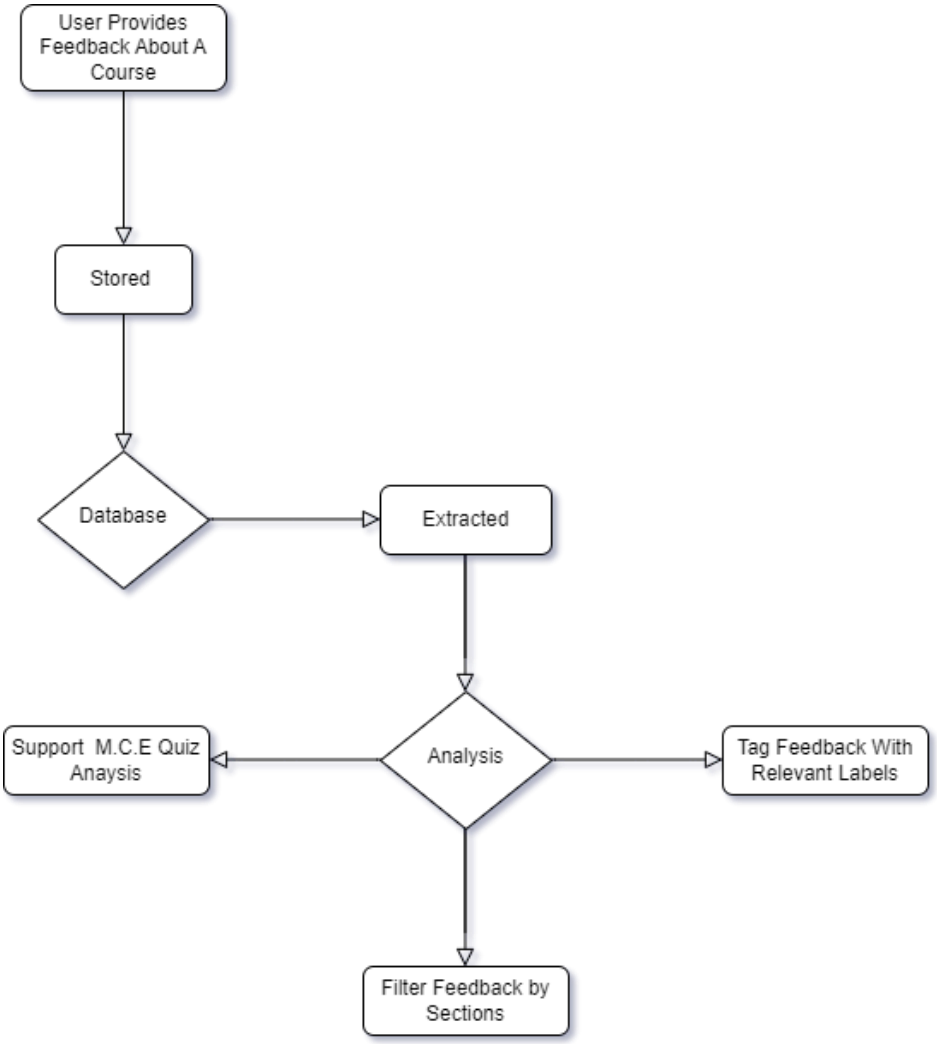

Figure 5 Feedback Algorithm Flow Chart

The Monarch Course Explorer will assist students with finding courses to fit their learning style and personal schedule. It will do this by allowing students to take the Monarch Course Explorer Quiz (M.C.E Quiz), which will guide students in recommending the correct classes to sign up for. The algorithm that supports these processes is shown below in Figure 6 Recommendation Algorithm Flow Chart.

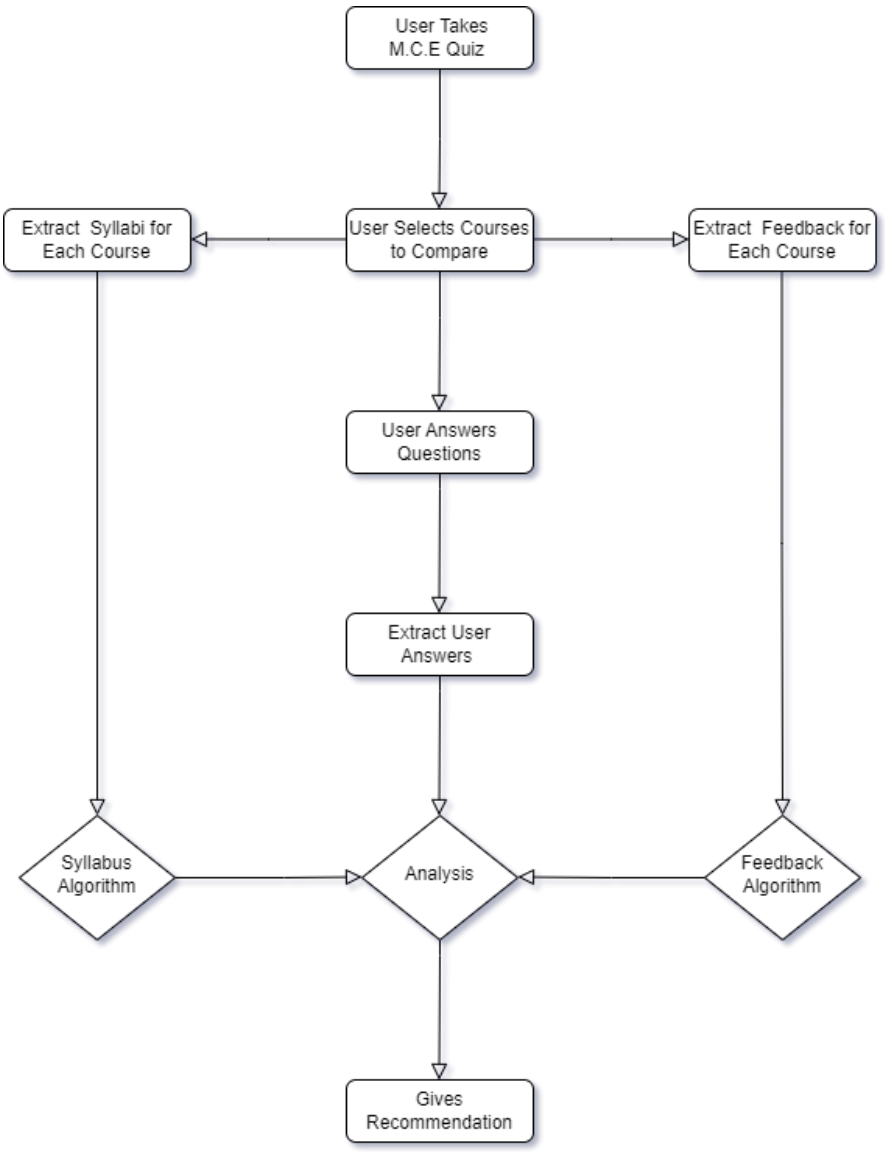

Figure 6 Recommendation Algorithm Flow Chart

Authentication to verify that a user is either an ODU student and or ODU faculty member will be needed for the integrity of Monarch Course Explorer. This feature will be partially implementation because it is highly unlikely that ODU will give us access to the MIDAS API for security reasons.

2.3 External Interfaces

The external interfaces for the Monarch Course Explorer prototype are listed below in subsections 2.3.1, 2.3.2, 2.3.3, and 2.3.4.

2.3.1 Hardware Interfaces

The hardware interfaces needed for running Monarch Course Explorer are as follows. A server node and an Uninterruptible Power Supply (UPS), needed to ensure at least 99.9% uptime for the real-world product.

2.3.2 Software Interfaces

The software interfaces needed for running Monarch Course Explorer are a Linux Distro capable of running Docker Containers, the Docker Containers, and Github for pushing code changes to Monarch Course Explorer.

2.3.3 User Interfaces

The user interfaces needed for accessing Monarch Course Explorer are a computing device manufactured in the year 2007 or later with an operating system that can run a modern web browser such as Google Chrome, Mozilla Firefox, or Microsoft Edge. This can include either a desktop pc with mouse and keyboard, a laptop, a smartphone such as Android or Iphone, or tablet such as Android or Iphone.

2.3.4 Communications Protocols and Interfaces

The communications protocols and interfaces needed to run and access Monarch Course Explorer are as follows. For the internet connection, TCP/IP via 100mb via Wired Ethernet, Wi-fi Wireless, Cellular Network, WISP, Radio Frequency internet, or Satellite internet similar to Starlink.