**Section 1: Project Data**

**Student Information**

* Student name: Vinay Varma Pericherla
* Contact phone number: +1 443-453-2040
* UMBC email address: HR57897@umbc.edu
* Semester and year of capstone experience: 4th and no capstone experience
* Expected graduation date: May 2024

**Capstone Course Information**

* Capstone faculty: Mohammad Samarah

**Sponsor Client Information**

* Client contact name: Mohammad Samarah
* Client contact title: Professor
* Client contact email address: msamarah@umbc.edu
* Client organization name: UMBC

**Section 2: Project Information**

**Project Title:** **Machine learning prediction model for selecting UMBC graduate programs**

**Problem Statement:** Finding an appropriate graduate program at UMBC can be a challenge for many students. A lot of individuals are confused by the present program selection process, which causes them to either not make a decision or to choose a program that isn't a good fit. Building a machine learning model that can analyze a student's academic record, interests, and professional goals in order to determine which program at UMBC graduate school would be the best fit is the primary objective of this project.

**Short Description of Project History and Evolution:** The idea for this project came from the challenges that students have choosing graduate programs. The focus was on making a tool to help students make decisions and walk them through the choosing process which include making a machine learning model that can make program suggestions that are unique to each student.

**Section 3: Project Background**

**Description of Client and Their Organization:** Mohammad Samarah, Program Director of Software Engineer at UMBC. There are many undergraduate and graduate studies at UMBC, which is a public research university. The UMBC Career Center gives students the tools and support they need to look into career possibilities and make smart choices about their academic paths.

**Description of Client, Stakeholders, Shareholders, and Their Expectations for this Project:**

* I hope that this tool will help with finding students and choosing programs.
* This tool can help program directors find students who would be a good fit for their programs.

**Description of Required Resources and Where They Will Be Obtained:**

* Information about the graduate programs at UMBC, including admission requirements, course content, and job outcomes
* Machine learning software and computing resources

**Anticipated Challenges, Risks, and Mitigation Strategies:**

* Data availability and quality: Make sure that you can get to the appropriate student and program data and fill in any blanks or missing data.
* Model accuracy and bias: Implement techniques to make sure the model's predictions are correct and impartial.

**Section 4: Proposed Solution**

**Requirements Engineering Methods Used:**

* Analyze existing student data and program information to identify relevant factors for model development.
* Requirements can be gathered through stakeholder interviews, surveys, and analysis of existing processes.

**Analysis, Prototyping, and Building of Functions, Features, and System Abilities:**

* Develop a machine learning model that can look at student data and predict which graduate programs at UMBC will be most appropriate for each one.
* Design a user interface that lets students enter information about their education, hobbies, and career goals.
* In addition to the model's suggested programs, the system will show additional details for each one.

**Data Needs and Handling:**

* Student data includes grades, test scores, and job interests that have been made anonymous.
* Program data: admission requirements, curriculum details, and career outcomes for each UMBC graduate program.
* Data will only be gathered with the right permissions and will be kept safe according to UMBC's data privacy policies.
* Data mapping tools will be used to look for connections between data about students and program data.

**Expected Benefits of Functions, Features, Performance Level of Non-functional Requirements:**

* Improved student decision-making: The model will provide personalized recommendations that help students select the most

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| **Req. ID** | **Requirement stated as a user story** | **Expected Completion Date** | **Complexity** | **Risk** |
| R1 | As a student, I want to enter my academic background (GPA, major, etc.) so the system can recommend suitable graduate programs. | 03/30 | Medium | Low |
| R2 | As a student, I want to specify my career interests (research, healthcare) so the system can refine its program recommendations. | 03/30 | Medium | Low |
| R3 | As a student, I want to upload my resume to allow the system to analyze my skills and experience for program matching. | 04/20 | High | Medium |
| R4 | As a student, I want the system to explain the rationale behind its recommended graduate programs. | 04/20 | High | Medium |
| R5 | As a program director, I want to access a dashboard to view the students recommended for my program and their profiles. | 04/20 | High | Medium |
| R6 | As a program director, I want to see the criteria used by the model to recommend students for my program. | 04/20 | Medium | High |
| R7 | As a student, I want to View detailed program information of the program like deadlines, faculty, and career outcomes. | 03/30 | High | Medium |
| R8 | As a student, I want to compare the recommended programs side-by-side to see key differences (e.g., curriculum, cost, application deadlines). | 03/30 | Medium | Low |
| R9 | As a student, I want to save my program recommendations for later review and comparison. | 04/20 | Medium | Low |
| R10 | As a system administrator, I want to monitor the model's performance and accuracy over time. | 05/05 | High | High |
| R11 | As a system administrator, I want to implement mechanisms to detect and address potential biases in the model's predictions. | 05/05 | High | High |
| R12 | As a student, I want to provide feedback on the program recommendations so the system can learn and improve over time. | 05/05 | Medium | Medium |