

# Capstone Project Proposal



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## Business Goals

<p><b>Project Overview and Goal</b></p> <p>What is the industry problem you are trying to solve? Why use ML/AI in solving this task? Be as specific as you can when describing how ML/AI can provide value. For example, if you're labeling images, how will this help the business?</p>	<p>My project will be an AI academic Advisor which will advise students on the best classes to take the next semester based on many factors such as academic standing and preferable workload and the availability of classes next semester. This system will allow those students to get the best possible advice on selecting their classes based on the choices of previous students who took the class before them and their performance on them. Also, such a system will allow busy professors to have time to focus on their research or their administrative work as a good number of them struggling to find the time in the mid of their classes and duties as professor.</p>
<p><b>Business Case</b></p> <p>Why is this an important problem to solve? Make a case for building this product in terms of its impact on recurring revenue, market share, customer happiness and/or</p>	<p>This AI would help many parties at universities. In my experience, professors sometimes overestimate the students' abilities to pass with good grades, and unintentionally overwhelming them with classes might lower their GPA. On the other hand, students are confused when</p>

other drivers of business success.	<p>it comes to their selection of classes. The planned curriculum doesn't fit everyone's needs and abilities. Therefore, AI can help students to make better judgments of the level of difficulties in the classes, and when it is better to take them based on historical records.</p> <p>On the other hand, this AI system will help professors to find time to do their research work rather than be overwhelmed with many appointments with many students of the advising session.</p>
<p><b>Application of ML/AI</b></p> <p>What precise task will you use ML/AI to accomplish? What business outcome or objective will you achieve?</p>	<p>The model will be able to advise students on the right classes they should take based on their academic standing and level towards graduation.</p>

## Success Metrics

<p><b>Success Metrics</b></p> <p>What business metrics will you apply to determine the success of your product? Good metrics are clearly defined and easily measurable. Specify how you will establish a baseline value to</p>	<ul style="list-style-type: none"> <li>• The ratio of passing students in their classes compared to the ratio before it.</li> <li>• The performance done by professor</li> </ul>
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provide a point of comparison.

and if such a system help them find time for their work

- The student satisfaction with the AI choices and the level of overload recommended by the AI should be surveyed after every semester.
- The semester GPA of students who followed the system recommendations.

## Data

### Data Acquisition

Where will you source your data from? What is the cost to acquire these data? Are there any personally identifying information (PII) or data sensitivity issues you will need to overcome? Will data become available on an ongoing basis, or will you acquire a large batch of data that will need to be refreshed?

The source of data will come from the historical data in the university system of students. Every transcript shows the journey of students and their GPA every semester and the number of classes and their level too. The university has around 30,000 academic records of students, for that, the number of train/test data of students will be around 30,000. In terms of PII, the data will be extracted in terms of academic levels. Then, they will be shuffled in the train set, not only as a consequence of PII policy but also to get the best possible features for every level which will help the model to get the best result.

<b>Data Source</b>  Consider the size and source of your data; what biases are built into the data and how might the data be improved?	There is a slim possibility of bias on the data. But there could be a bias based on GPA or a type of class. Since new data will be introduced after the end of every semester, I'm certain such a problem can be overcome by looking at the recommended classes in which students got lower than C in them.
<b>Choice of Data Labels</b> What labels did you decide to add to your data? And why did you decide on these labels versus any other option?	The kind of classes and level will be the label since the model's main function is to advise students to choose the correct number of classes.

## Model

<b>Model Building</b>  How will you resource building the model that you need? Will you outsource model training and/or hosting to an external platform, or will you build the model using an in-house team, and why?	I will do it in-house for many reasons. First, as a good software engineer and based on my lectures and work in the ML club in the university I'm capable of delivering such a system. Second, the university takes the issue of privacy seriously and since data are private it is better to keep it locally. The model used will be customized to deliver the best results, and such customization is rarely found in platforms like Google AutoML.
<b>Evaluating Results</b>  Which model performance	Precision, recall students' overall performance will play a big role here as

metrics are appropriate to measure the success of your model? What level of performance is required?

metrics that need to be evaluated regularly. I believe such a model will require updates in its first year. If it's the initial accuracy is around 90% I will be satisfied with its result.

## Minimum Viable Product (MVP)

### Design

What does your minimum viable product look like? Include sketches of your product.

### AI Advising System

You have taken this semester



Class 1



Class 2



Class 3



Class 4

The recommended class for next semester



Class 1



Class 2



Class 3



Class 4

### Use Cases

What persona are you designing for? Can you describe the major epic-level use cases your product addresses? How will users access this product?

The AI will be designed for the student which will help them pick the right courses for upcoming semesters and give them an overall idea of their path towards graduation based on their current GPA. Students can access the system via their accounts at the university's website.

<p><b>Roll-out</b></p> <p>How will this be adopted? What does the go-to-market plan look like?</p>	<p>The system is designed to benefits many parties and to cut waste time for both students and professors. The goal of the system is to raise the overall students' GPA and give professors the time for their research work.</p>
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## Post-MVP-Deployment

<p><b>Designing for Longevity</b></p> <p>How might you improve your product in the long-term? How might real-world data be different from the training data? How will your product learn from new data? How might you employ A/B testing to improve your product?</p>	<p>Every semester new data will be produced to better the system overall and enhance its ability to recommend classes. The students' feedback is essential to better its result after every semester by asking them if they felt if they were ready to take the recommended courses. The A/B testing might make us introduce new features to every class such as difficulty level and overall workload. Moreover, the professor's input in the case of the students' performance will add value to the model. For example, we will need to know if they think that the advising session should be mandatory for some students like for example, students with low GPAs.</p>
<p><b>Monitor Bias</b></p> <p>How do you plan to monitor or mitigate unwanted bias in your</p>	<p>Biases based on GPA could be an issue with the model. Which according to my experience is happening which</p>

model?

professors make every semester based on their impressions of their student and their abilities. We can monitor biases by looking at recommended classes in which students got lower than C in them.