RECOMMENDER SYSTEM FOR HIGHER EDUCATION(Website)

Technical Answers for Real WorldProblems (TARP) (CSE3999)

Slot: TF1

ASSESSMENT NO. 05

Submitted by:

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Methodology and Framework

1 Deciding the Core-Logic of Website

Our website aims at providing a service useful for all students planning for higher studies in universities outside of India. My means of our website we aim to provide set of guidelines as to how the application process proceeds and what type of universities a particular student can get. As an initial information page we provide the various necessities for getting an admit (just information). Our website main focus and chief proponent is a probabilistic model that can help a student to gauge which universities are more suitable. For a given student if the model is provided GRE scores and GPA based on this we can provide a list of suitable universities. Following up to this given a university and scores we can give a probability of whether or not a admit is possible. Our last feature for the website is a GPA converter which can be used to convert a common Indian GPA 10-point system to an internationally standard 4-point scale.

2 Deciding the best suited Machine Learning Algorithm

Since the dataset that we have is comprehensive and provides adequate amount of data regarding the colleges which provide admits; based on the GRE and GPA scores. Since our prediction is two pronged, one consisting of providing a list of suitable universities based on the ranks that we provide. The second being a probabilistic score which tells the user if the chosen tier/college is suitable for providing an admit based on his or her scores. For the first task, we do not have sufficient data for each and every university which causes a skewness in the data; in order to overcome this problem, we tend to initially form clusters of the colleges based on the similarity of GRE scores and GPAs of admitted students; thereby categorizing our colleges into 4 tiers. Following this we shall use a multilayer perceptron that takes our scores and GPAs as valid input and provides a graded probability of which tier such a score is most suitable of obtaining.
For the second task, wherein we provide a probability measure for a suited college by means of estimating the spatial closeness of the data points within a particular tier. Such a method is classifies as being a content-based recommender system.

Since the data is sufficient in quantity (36,000 valid entries), it doesn't qualify as a cold start problem.

3 Coding of Data Science

1. Language used: Python 3.6 on Visual Studio Code

2. Libraries :

a. Keras – making our neural net architecture.

Keras is an open source neural network library written in Python. It is capable of running on top of TensorFlow, Microsoft Cognitive Toolkit, Theano, or PlaidML. Designed to enable fast experimentation with deep neural networks, it focuses on being user-friendly, modular, and extensible.

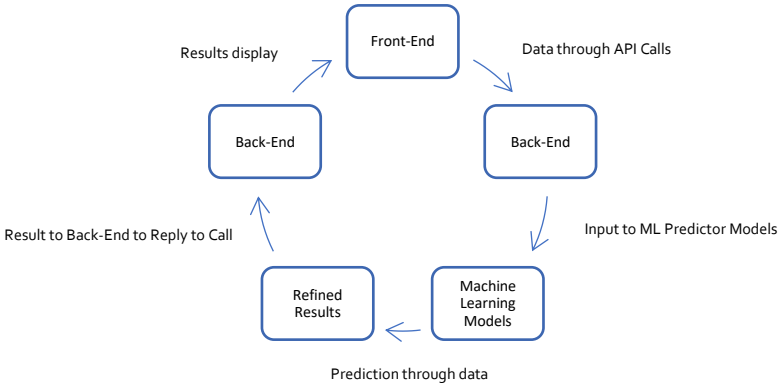
b. Tensorflow – backend for Keras.

TensorFlow is an open-source software library for dataflow programming across a range of tasks. It is a symbolic math library, and is also used for machine learning applications such as neural networks.

c. Scikit-Learn – Similarity measures and Clustering.

Scikit-learn (formerly scikits.learn) is a free software machine learning library for the Python programming language. It features various classification, regression and clustering algorithms including support vector machines, random forests, gradient boosting, k-means and DBSCAN, and is designed to interoperate with the Python numerical and scientific libraries NumPy and SciPy.

4 Deciding the Flow of Modules



5 Development of backend server to interact with Front-End and Database

The Backend server will serve as a mediator for the Frontend to connect with the codified Machine Learning model. The backend server will be hosted on a free hosting server with Sandbox plans. The connection will be made through API calls. The server will be responsible for sending back all the desired results through remote calls to the system.

Backend Server will be developed using Django, a popular backend framework that uses Python. It makes easier to make APIs and system calls to Front-End using various libraries freely available.

6 Deciding on Front-End Framework

There are multiple frameworks currently available. The one which we will be using is Angular.js, which makes it easier to make the website responsive and interactive, along with the support of Bootstrap. To increase the responsiveness of website, we can use Ajax and Json libraries. Custom UI design will be incorporated and implemented into the Front-End.

7 Development of UI for the System

- The User Interface will have the following the components/modules:
    - A dedicated Homepage for the website which conveys the aim, objective and goals clearly. It focusses on target audience and highlights it's uses and advantages.
    - A Login/Sign-up page to only gather important and required information from the user. Google and Facebook logins are also provided for user convenience.

- A College prediction tool which helps users to find best the college based on examination-type, scores, GPA, college and other factors.
- College requirements analysis based on previous year standards.
- GPA convertor from different rating scales to International 5.0 standard.

8 Integration of Modules

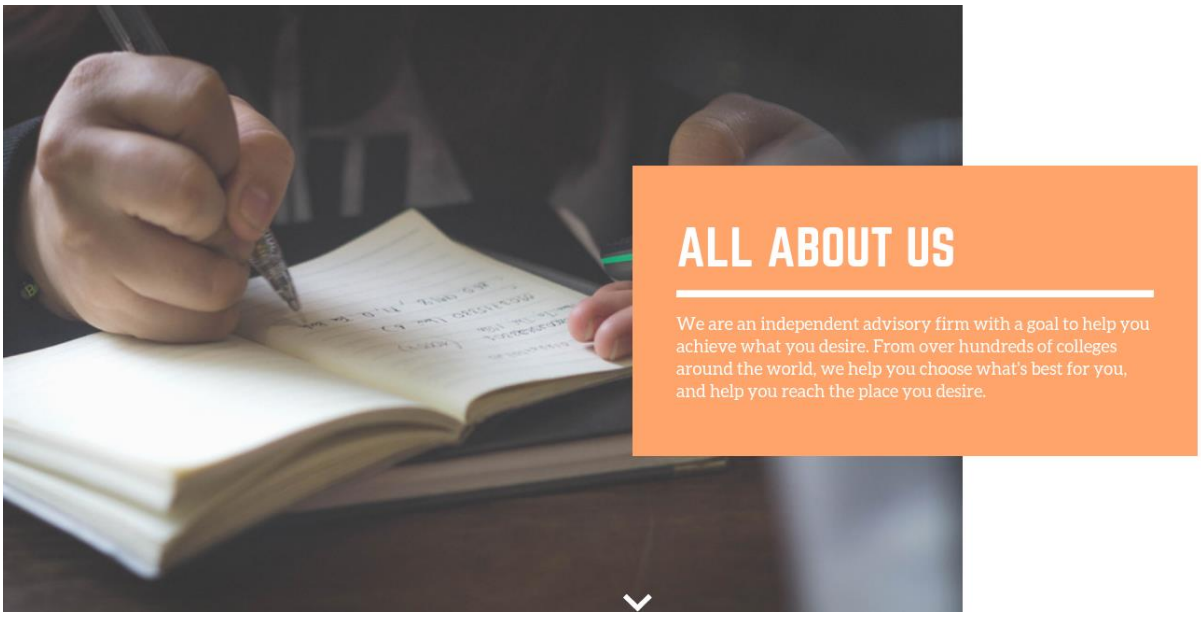
The Frontend will be integrated with the Backend by making use of API calling mechanism. Backend will also be linked to server database and machine learning models where the main recommendation logic works. The Data is input to Machine Learning models from Front-End through Back-End via API calls.

9 Deployment of Website

For Demonstration Purposes, the website will be initially hosted on free hosting websites and servers with Sandbox plan. Later on, it may be shifted to private domains and dedicated database and integration support.

Website UI and Wireframes

Home page UI:



SERVICES OFFERED

COLLEGES PREDICTION FOR HIGHER STUDIES

We filter out colleges which are best for you based on your profile.

REQUIREMENTS ANALYSIS

We'll let you know everything you need to get into your dream college.

PREDICTIVE ANALYSIS AND RESULTS

Go through past data and trends and shape your path tow

TESTIMONIALS

XYZ

Testimonials are short quotes from people who love your brand. It's a great way to convince customers to try your services.

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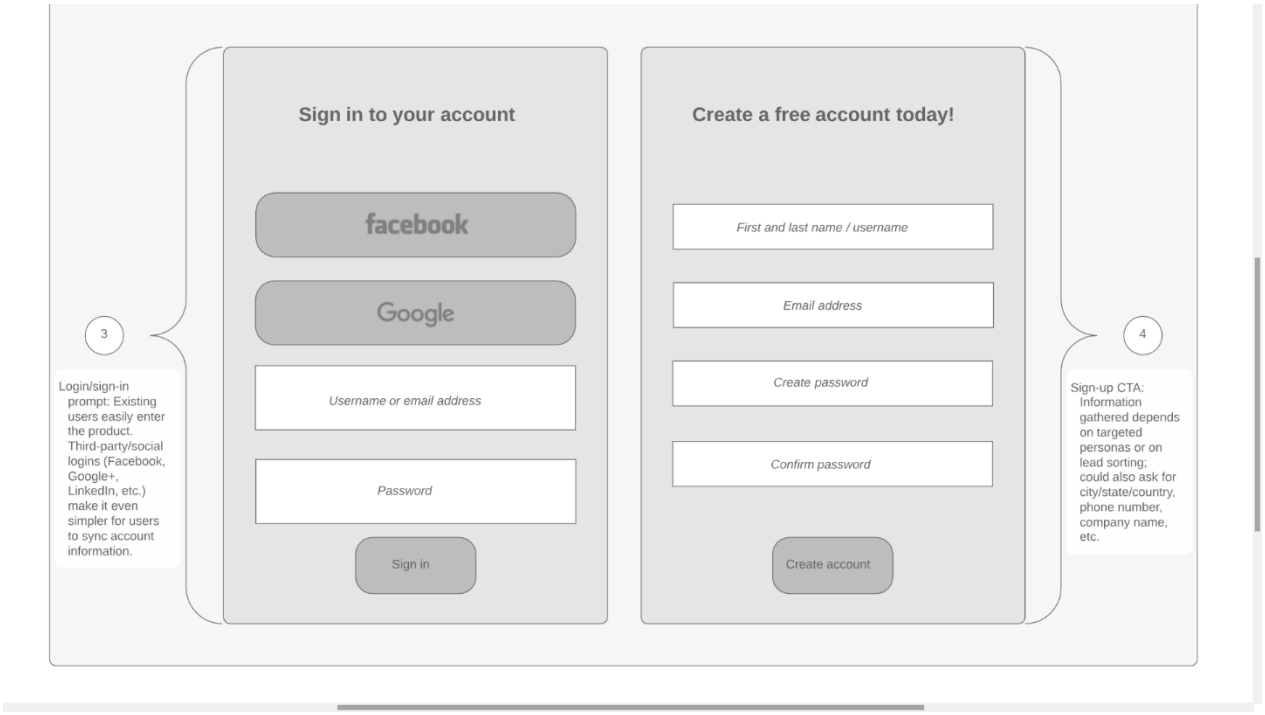
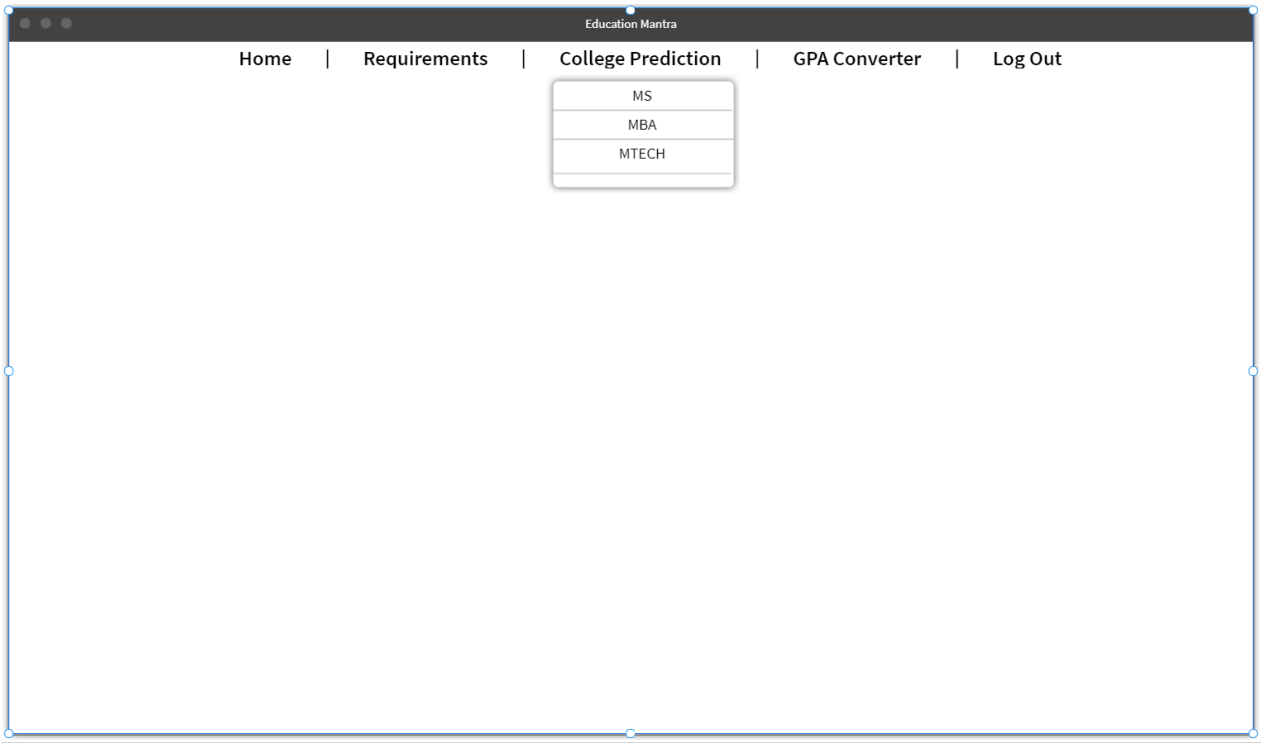
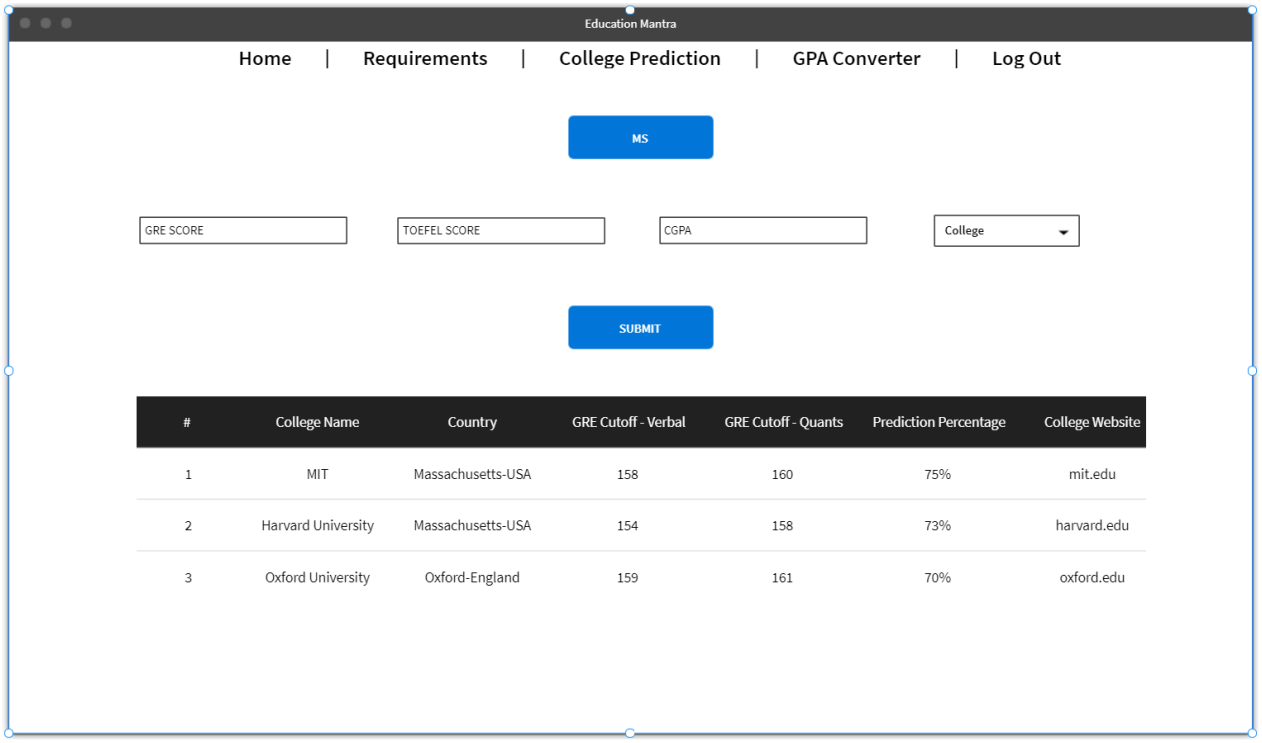
Login/Signup Framework:

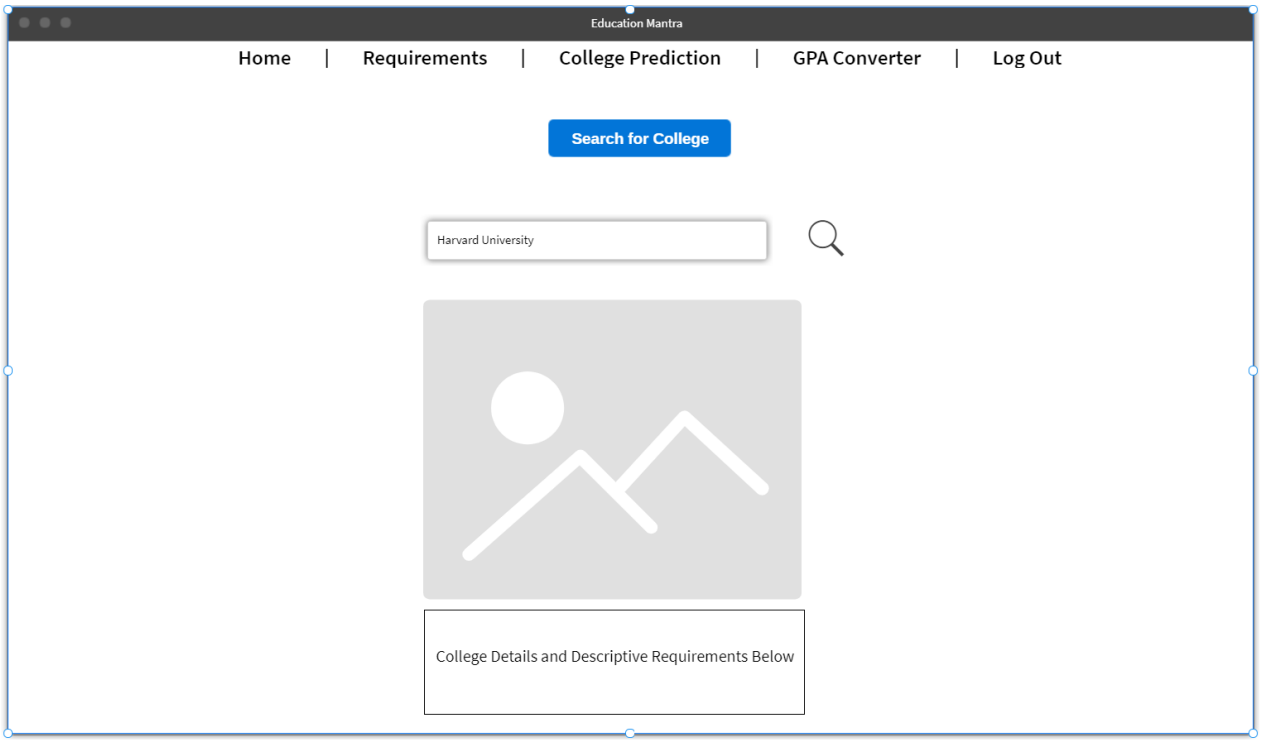


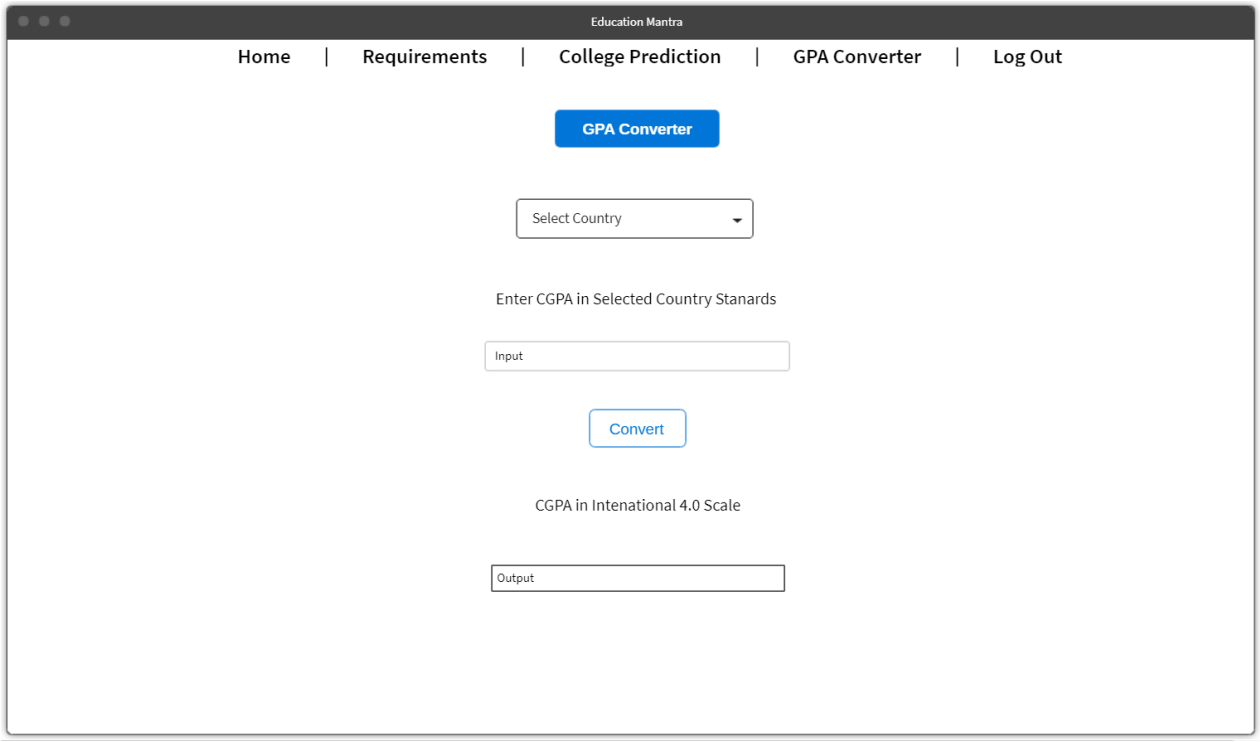
Website Wireframe's:

A website wireframe, also known as a *page schematic* or *screen blueprint*, is a visual guide that represents the skeletal framework of a website. It helps to






Education Mantra
Home | Requirements | College Prediction | GPA Converter | Log Out
Search for College
Harvard University
College Details and Descriptive Requirements Below


Education Mantra
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GPA Converter
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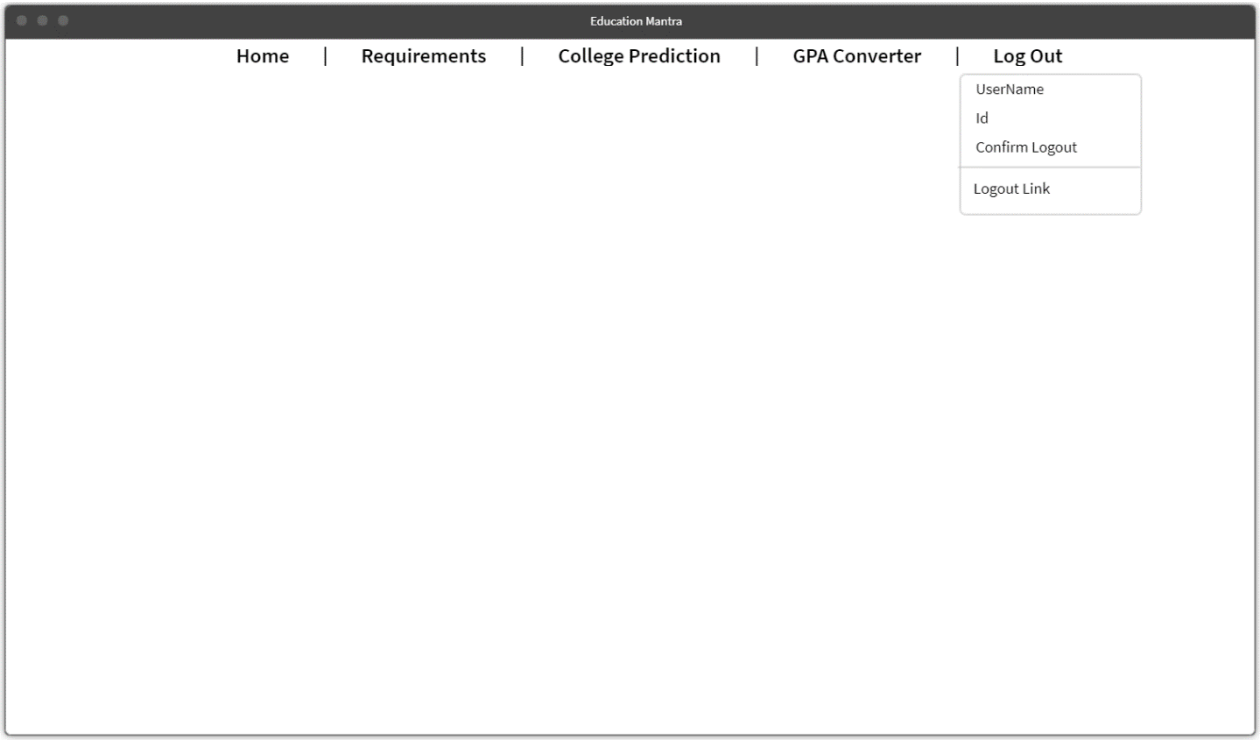
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Confirm Logout
Logout Link