

Climate Adaptation and Mitigation Web Application

Version 1.1

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Introduction

The study of social networks are fairly new but are quickly becoming a multidisciplinary area that involve social, mathematical, statistical, and computer sciences. An analysis can be performed on these social networks that can help illustrate patterns and important parameters that relate real-life data. A *social network* refers to a grouping of social relationships among people, places, communities, religions, etc. Each of these are represented as a node in a graph, and a social network analysis ties all the nodes together to create edges using network and graph theory. Once an analysis is done, you can use existing tools to visualize your newly analyzed data.

For our capstone project, we will build a database that holds information on institutions and organizations that deal with climate control and mitigation. This database will be dynamic so that additional institutions can be added after review of an administrator. We will then perform a social network analysis on the data to finally visualize it on the web.

Purpose

The economic status of Alaska has not been flourishing like it has in the past. The booming days of the oil industry have stunted and our state has been feeling the repercussion. That being said, we are trying to find ways to spend our funds more efficiently, and our project will help do just that. Our social network analysis will help remove redundancy in funding projects that deal with climate control and mitigation. Our analyzed data will show how organizations and projects are connected. From this connection, we can direct our funding to wherever fits best.

Not only will our project help our economy, it will help bring public awareness. This will be achieved by our webpage that anyone can visit. Once there, they will be able to read up on our cause, see our visualized data, and they will also be able to add to our existing database. Our visual representation of our data will be interactive to help with the experience of the viewers. You will be able to click on a certain node which will then lead to more information. Our analysis will be laid out on top of a geographical map so you can see where each node exists in our world.

Requirements and Specifications

Using the Microsoft .Net Core Web Framework, we will:

1. Create a .Net Core application
 - 1.1. Start off with a template .Net Core app and ensure the appropriate files were generated, including the MVC files
 - 1.2. Develop the Home Screen
 - 1.3. Home Screen will show an empty map and the purpose of the project
 - 1.4. The Home Screen will also provide functionality to display data on the map with several different options
 - 1.5. The options will be a multi-choice drop down menu
 - 1.6. The application will have two users, an Admin and a general user
 - 1.7. Admin will have full permissions to the app and data, including editing and adding to the dataset
 - 1.8. The general user will only have the ability to look at the interactive map

- 1.9. However, a form will be available for the general user to add more data, which the admin will verify the authenticity of the form and add to the dataset.
- 1.10.
2. Build a secure, dynamic database using Entity Framework Core
 - 2.1. Import existing data using reverse POCO
 - 2.2. Make any additional changes to generated database classes
 - 2.3. EF Core should take care of the rest
3. An interactive visualization Graphical User Interface
 - 3.1. Import D3.js Javascript library for data visualization
 - 3.2. After the choice(s) is/are selected, the map will be populated with a visualization of the data
 - 3.3. From this point, the user will be able to zoom in and out of the map, as well as move it side to side
 - 3.4. While zoomed in, detailed information of the nodes such as the Name, address, will be displayed
 - 3.5. A key (or legend) of the displayed information will be shown on the bottom right of the screen
 - 3.6. The legend will show what options the user chose
 - 3.7.

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