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Assignment 5

Major Changes: There have been no major changes to the goals or implementation of the project since the proposal.

What I have accomplished so far:

To date, most of my accomplishments have been focused on my milestone achievement for 15-300 outlined in assignment: literature review and laying the foundation for the website.

For the literature review, I have created a Powerpoint for myself containing a detailed literature review of eight of the sources listed in my Assignment 3 writeup, with particular emphasis on the work McDonald and Best, Wang, Chen et. al, Bangia et. al and Chikina et. al. Through this review, I learned about different mathematical tests that are proposed to quantify gerrymandering in a state, as well as a few new protocols that would be interesting to try out. Though I have yet to speak with him (scheduled to meet after break), I also closely reviewed some of the work of Wesley Pegden contributions of this area. Additionally, I have identified a significant amount of literature from political science journals that focus on this topic, and have added it to a reading list that I intend to continue to review over the next few semesters.

For the website, I have built and implemented a strong architectural foundation, including a React client server to deliver the frontend, a Node JS backend that accesses a secure database and serves authenticated clients with user data, and an AWS Database for storage of privileged user information. For the frontend server, I am using a nice material UI package alongside bootstrap which will allow me to have an aesthetic single view for each simulation. For user authentication, I have integrated Auth0. This will allow us to track the performance of individual users to allow for competitive play and there will be no API costs as this is an open-source non-profit project. This combination of user log-in with secure data storage allows us to enhance competitive play and allows us access to much more insightful data, as we will be able to implement features, such as facing off players of high skill levels, that will provide better information about the protocols' effectiveness in real world scenarios. For the backend, the Node server determines if a user has been authenticated, and, if so, accesses the secure backend database and serves the user appropriate data. I have created a usable API for the groundwork that I have established, meaning that I will be able to more easily build simulations that store and retrieve important privileged user data. Currently, the two servers run, but it should be relatively straightforward to change the endpoints after I have the resources to launch the project.

Meeting My Milestone:

I have met all of my milestones for the project. In fact, I have exceeded the amount of development I expected for the backend server, as I had not anticipated being able to accomplish so much UI work on the front end and have successful database integration by the milestone.

Surprises: The work has gone surprisingly smoothly.

Revisions to my 15-400 milestones: There have been no revisions to my 15-400 milestones.

Resources I need:

I have purchased a domain for the project because it was relatively cheap (<$10 a year), but I have not migrated off my local machine as hosting fees are significantly more expensive. In order to easily scale the project, I am thinking about hosting it on Heroku, and just allocating more dynos based on geography as load increases. Until the project reaches scale, costs should remain minimal unless it is determined that outside support will be needed. For instance, if its determined necessary that designers are needed for the UI/UX work, costs may increase substantially.

If the project obtains a large user base, costs will substantially increase. Based off of back of the envelope calculations and advice from StackExchange, I think that a conservative estimate is that $50 a month Performance Heroku Dyno should be able to support around 200 concurrent users. Thus, if the project grows, further grant money or user donations will be required to keep it going. Fortunately, if we reach this scenario we will already have enough data to answer many of the more interesting open questions.