Reed Klein

Professor Annexstein

CS Senior Design – CS5001

Individual Capstone Assessment

My team will be creating a web-hosted sentiment analysis bot for our senior design project. The general idea of the project is to allow a user to enter a word or phrase and give back a public sentiment breakdown based on geographic locations. In order to infer on public sentiment and relative locations, we plan to use APIs from social media companies like Twitter that allow for easy cross-referencing between posts' text and geographic data. This project could have many use cases from marketing teams using it to understand locational public sentiment to individuals researching customer satisfaction of a product before buying. Unlike more traditional approaches to these use cases, such as polling data and user forums, the sentiment analysis bot will have a massive advantage with the volume of information posted on social media every day. In addition to this, the AI will be able to distill the information of the topic into more specific categories than just "one to five stars" or "positive or negative experience."

During my time at UC, there are a few courses that have helped guide me in learning concepts that will prove useful for this project. First, I believe Discrete Structures (CS2071) and D&A of Algorithms (CS4071) have been foundational to helping me visualize problems and come up with solutions like a programmer. Though neither of these courses require any programming per se, they foster critical thinking and algorithmic approaches to solving difficult mathematical problems. Python Programming (CS2021) helped develop my understanding of the Python programming language from the rudiments that we learned earlier. This is important because much of AI today relies on Python for its construction. Finally, Data Structures (CS2028C) was perhaps the most important class for my understanding of computer science because it combines complex theoretical data storage processes and grounds it in many practical coding projects. Not only was this class the most helpful for important computer science principles, but it also grew my confidence in my abilities.

My co-ops have been a great learning experience for myself as a programmer and they have prepared me well for this project. My first three co-ops I was working on full-stack web development at Siemens Digital Industries. During these co-ops, I used HTML, CSS, Javascript, PHP, and SQL to build and maintain an internal web application for the sales force. I was lucky enough to work with some great people, and after working on the same project for three rotations, I was asked to take on a leadership role on the team. This unique opportunity taught me how to approach and resolve differences in coding habits and manage my time between my larger projects and helping others with their assignments. My last two rotations were with Siemens Digital Industries as well, but as a machine learning researcher with the R&D team. These rotations opened the door to machine learning to me and taught me how accessible it is. Mainly using Python and Tensorflow, I learned a lot about machine learning algorithms and strategies, especially some of the more academic applications of machine learning. These two co-ops also helped me learn to motivate myself to work rather than relying on points or objectives to guide my development process.

I am excited to work on this project because it is a great combination of my work experience with web and machine learning development. I also see this as an opportunity to further my knowledge in both fields by hopefully becoming more acquainted with either the React or another front-end framework and learning more about natural language processing rather than focusing on computer vision. I am also glad that I will be working with a team on a decently sized project. Most of my coding experience comes from my work experiences or for school, so the scope of my previous projects have pertained only to small homework/project tasks or very large, ongoing work projects. My goal for this project is to learn enough to confidently work with React and natural language processing on my own in the future.

The preliminary project approach will be to get the necessary components working, then fully explore what we can manage to add to the project before our deadline. This project has two main components: the web development component and the artificial intelligence component. I believe it would be good to subdivide the team to work on each of these components separately in the initial stages and come together at the end to implement these two components together. From there, it will be easier to build out secondary features and implement interesting ideas we think of along the way. The expected results will be a good quantity and quality of sentiment data being returned to a user who enters in a keywork. The data should be labeled on a map to show where the hotspots are for different sentiments about a given topic. Also, the UI/UX of the website should be intuitive, especially when trying to navigate the results of the returned data. My contributions will be tracked, most likely through the repository software we use. My aim is to contribute to at least half of one big feature (one of the large components listed above) and add the equivalent of two small to medium sized features after we get the essentials working. I will know if I’ve done a good job if I meet my requirements by either fully implementing said features or providing enough help and contributing to other features to make up an equivalent amount of work.