Anna Chambers
MARV
CS Senior Design – CS5001
Individual Capstone Assessment

For our senior design project, our team is making a web application that harnesses analytics and sentiment analysis to help users make informed decisions. We plan to take in a keyword or phrase and return the public opinion shown by location. We will do this by using sentiment analysis APIs to analyze if tweets are positive or negative and then display the results on a map. We believe that this web application will be helpful to companies looking to expand, students deciding on a college, and professionals in the job market. This project has the potential to expand to involve more social media other than Twitter and have increased analysis beyond just positive and negative. This project excites me because I have always been fascinated with sentiment analysis and believe it can be a powerful tool when applied to real-world situations.

I have had five main courses that have shaped my computer science education throughout my college career. The first course was Computer Science I (CS1021C). This class was my first real exposure to programming and object-oriented concepts. During this class, I learned the basics of C++, OOP, pointers, and working on a team through designing and programming an Arduino Robot that competed against other teams. The basic concepts that I learned in this class were crucial to my growth as a programmer. The next two classes, Data Structures (CS2028C) and Python Programming (CS2021) continued to expand my knowledge of basic concepts while also giving me specific knowledge I could apply to become a better, more efficient programmer. By learning what data structures were and how to apply them I gained an understanding of the power that programming could have. Python Programming prepared me for future Co-Ops and gave me an in-depth understanding of the difference between statically and dynamically typed languages. The last two classes are Design and Analysis of Algorithms (CS4071) and Software Engineering (EECE3093C). These classes took me beyond the basic into more advanced computer science concepts. Algorithms taught me how to use data structures to solve problems and how to think like a programmer. Software Engineering taught me how to work as

part of a team to build an application from the ground up. Each of these courses helped prepare me for my Co-Ops and gave me the knowledge that I needed to grow as a developer.

I have been fortunate to have great Co-Op experiences that have prepared me for this project. I did my first four Co-Ops at Northrop Grumman as a Cyber Software Engineer. My first Co-Op at Northrop Grumman was my first exposure to front-end development. I used C++ and CSS to update dialogs for a desktop application. Although these skills will not directly translate to this project, I did gain a deeper understanding of the concepts involved with front-end development. During this Co-Op, I also learned how to work as part of a team and how to communicate with remote co-workers. These soft skills will apply to this project by helping me work efficiently with my other three team members. My next three Co-Ops at Northrop Grumman focused on web development. I learned to do full-stack development using Ruby, Java, Python, JavaScript, and React by adding enhanced features and new pages to various web applications. I expect to apply these technical skills directly to the web development we are doing for this project. Also, on these three Co-Ops, I actively contributed to agile teams by doing PI planning, making user stories, and completing sprints. I plan to apply these skills by helping organize our team and keep us on track. My last Co-Op was at Microsoft as a Software Engineering Intern. During this Co-Op, I gained technical skills in C# and JavaScript. I also learned critical soft skills during this Co-Op. I helped lead a team of three interns and gained experience in project management, leadership, communication, and teamwork. I plan to utilize these skills throughout this project by communicating well with my team members and listening to their ideas and struggles.

I have been interested in sentiment analysis for a long time. I first learned about the research being done with Twitter and sentiment analysis in 2019 and was fascinated by the concept. I am excited for this project to build upon the work already done in this area to use analysis to determine public opinion based on location and visualize this data in an easy-to-understand manner. I am excited to build a web application from the ground up and use the lessons I have learned from my past Co-Op

experiences to create a dependable, modern, and efficient application. I hope to grow my understanding of external APIs and learn more about data visualization with UI/UX design. My goal for this project is to gain new technical skills, sharpen my knowledge of languages I already know, and create a reliable and useful software product.

My preliminary approach to designing a solution for this project is to start simple and expand upon features as we go. During the early phase of our project, I believe it would be good to split our group into front-end and back-end teams. The front-end team will set up the application, sketch out ideas for data visualization, and implement simple widgets. The back-end team will research sentiment analysis and Twitter APIs and then implement them. The teams will then combine their work and integrate the pieces. Once we have sentiment analysis on Twitter working, we can expand to deeper analysis and more social media platforms. The expected result of this project is to have a working back-end that analyzes tweets that include a word or phrase defined by the user and a front-end that displays the results of this analysis on a geographical map. I will self-evaluate my contributions by the quality of my work. I will strive to do my work with excellence and not just for completion. I will judge whether I have done a good job by if my work can be easily understood and expanded upon by my team members and if it holds up in dynamic situations.