

Throughout my computer science career, I always felt like I was playing a game of catch-up. From the beginning of my freshman year, I felt like I was behind my peers, who'd had previous exposure to CS concepts in highschool. It seemed like I always had to study twice as long and work twice as hard to achieve the same grades that came naturally to some other students. After 4 years, I finally feel comfortable and confident in my understanding of core and theoretical computer science concepts. While I write my master's thesis to prove my theoretical understanding, this capstone project is an opportunity for me to exercise my core understanding. This capstone project is an opportunity for me to apply what I've learned in all the courses I've taken at UC.

My course curriculum will guide me on this project by giving me a deeper understanding of the algorithms and data structures necessary to achieve our goals (in the most efficient way possible). Data Structures (CS2028) gave me a base understanding of the most common structures in-use in some of the largest applications. Discrete Structures (CS2071) gave me the proofing tools necessary to lay the mathematical foundations of our algorithms. Operating Systems (CS4029) gave me the kernel level understanding necessary to scrape statistics from machines running a -nix like kernel. Both the Design and Analysis of Algorithms I (CS4071) and Advanced Design and Analysis of Algorithms I (CS7081) have given me a deeper understanding of how/where common data structures are used, and how to use them efficiently. Cloud Computing (CS6065) and Big Data Analytics (CS7070) have given me an understanding of scalability necessary to roll this capstone project out to the public smoothly. I expect to apply all of these skills on my capstone project during the design of the application pipeline, client-server architecture, data aggregation, data analysis, and data visualization.

I feel that my co-op experiences have given me more technical knowledge than any course ever did. The courses laid the foundation, but the co-ops finetuned my knowledge and deepened my understanding. My co-op rotations with Speedway LLC as a Programmer Analyst gave me the skills necessary to rapidly design and prototype fullstack applications- which is exactly the skills necessary for my capstone project. I also developed mobile applications, which may not be directly applicable to this capstone (if we create a progressive web-app), but is still useful. My current co-op rotation with Etegent Technologies as a Junior Research Engineer has allowed me to develop my data mining, data analysis and machine learning skills to a level I never thought I could achieve. These skills are directly applicable to this capstone project, because we can mine information that allows us to learn models and perform anomaly detection that can alert users when malicious/unexpected behavior has been detected with their servers or applications.

I'm excited to participate in this project because it allows for an opportunity to apply the theory I've learned throughout my course curriculum to a real-world application that can help people solve some problems (or at least let them know when a problem exists). I feel that a lot of the homework assignments given to us aren't really indicative of how problems will arise in real world scenarios, or how to solve real-world problems. Some of the courses in our curriculum were designed years ago, and still address problems that existed during that time. I think that this project will be a great opportunity to reflect on what I've learned during my time at UC as I attempt to find parallels between what we've learned and the problem my capstone attempts to solve.

My preliminary approach to designing a solution has already been carried out. We've laid out a design requirements document that addresses what needs to be included in the architecture to solve our problem. Then, we will create a design document to meet the requirements described in the previous document. At this stage, we'll be designing the architecture and components that make up the solution, as well as the technologies to be used. Finally, we will begin implementation, with the expected results of some minimum-viable product that communicates with multiple servers, aggregates the data, and presents it to the users. I will evaluate my contributions by completing assigned tasks, at which point evaluation boils down to 2 questions:

1. Does my contribution accomplish what the task requires?
2. Does my contribution accomplish what the task requires in the most efficient and understandable way possible?

I will know I am done when the project is in a state that does all that we claim it does.