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CS5001

9/15/2025

**Individual Captone Assessment**

For the senior design project, our group, NorthStar, has decided to develop a head mounted visual assist system for people with visual impairments. The two general topic areas involving in this project will be Computer Vision and Artificial Intelligence (AI). In addition, hardware design will also prove to be a vital part. This project is a great opportunity to explore beyond what I have learned in college. While Computer Vision is a relatively new topic for me, AI is something that I have had experience with and now I will need take it further in order to help our group achieve success. Specifically, my main task is to develop a Retrieval-Augmented Generation (RAG) feature for the system, which involves a very trending AI-related topic: Large Language Model (LLM).

As a computer science major at UC, I have gone through many difficult courses that require a lot of attention, effort, and most importantly, critical thinking. One of the most challenging courses I have ever taken here is, undoubtedly, Automata (CS 5170). This course has a high demand of not only good understanding of the material taught in class, but also the ability to reason and design effective and efficient solutions in all assignments and exams. There were two other impactful courses that I took, which were Engineer Design Thinking I & II (ENED 1100 & 1120). The projects that I had been a part of over these courses really helped me build project-related skills such as project management, time management, and leadership skills. Overall, most of the classes that I have taken at UC made me more prepared for this upcoming project and my future career path.

Besides coursework, I have also been part of multiple co-op experiences that were absolutely beneficial and essential for this project. In fact, one experience that has directly prepared me for this occasion is my most recent one, where I worked as a Software Engineer Intern at Hybrid Technologies back in my hometown. During that experience, I had a lot of exposure with LLM, and along with that I had a chance to learn and think about the many problems that LLMs are facing in the real world, including RAG. In addition, my experience as a Software Developer Intern in DTriple (Gumi, South Korea) has also been a significant preparation for this project. While my main task was to use LLM to develop a voice user interface, I also got to work with new tools including Raspberry Pi. Without a doubt, these co-op positions will play to my key strength as I focus on my task for this capstone project, building a RAG feature. At the same time, I know that my adapting skills, which have proven handy throughout my experiences, will help me do well in performing tasks with unfamiliar topics, such as Computer Vision in this case.

I am incredibly excited to take part in this senior design project. This is the biggest chance for me to demonstrate every skill that I have gained and developed throughout my collective college experience. It also serves as a great asset to build myself a strong career path in software developing (particularly with AI). Plus, if the project can be successfully executed, there is potential that our product could bring impact to the real world. At the very least, I have high hopes that we would build a good foundation or reference to support scientists/engineers around the world who are dealing with a similar problem. These are my main motivations for this project, and I am willing to devote as much time and effort as it takes to complete it.

For the preliminary approach, the first thing we need to think about is hardware design. We are looking to provide users with a comfortable experience when using the product, thus making this a crucial part. In terms of software, the biggest task would be to implement computer vision, which contributes directly to the main purpose of the vision assist system. Another programming feature we have is RAG to give users further support. This will require a large understanding of LLM and searching algorithms. There are few other features including text-to-speech and speech-to-text to help users interact with the system using voice. In general, this project has a high demand for multiple technical skills, therefore it is vital for everyone in the group to actively take part if we are to thrive.