# Capstone Assessment

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Our EuchreIQ senior design project aims to create a statistical analysis and AI to predict the probability of playing the popular card game Euchre on a web application. We plan on creating a web application to host the game and allow for our different types of games to be played. As the program architecture is not yet complete, we hope to allow the user to play the game of euchre and then allow the AI model to give predictions of the chance of winning the round. Euchre is a game where the “best move” can often be debatable. There are times when there is the best card to be and are going to assume that no blunders will be made. Therefore, we intend to create an AI agent that finds the best move available, and we then predict the chance of winning from that point on. To find these predictions, we want to create a database of automated games that the agent will learn from and improve upon the more games it analyses. The scale of the database is not yet known but it’s believed that some assumptions will have to be made to allow for the database to be of a reasonable size.

For the development of this project, there are a few classes that we can refer to for insight and guidance. For the planning stages, we will refer back to content taught in EECE3093 Software Engineering. We learned about project development and how to build and plan for a project being built from the ground up. Planning the architecture, the project charter, and the system design are just a few pieces of material that we will apply to our project. CS5152 Intelligent Data Analysis is another class that will we pull information from to create a model to perform our statistical analysis and create our model based on a machine learning algorithm. The exact algorithm is not yet decided. We will use Python as our language for AI development but use HTML and CSS to create and design our web application.

Concerning my co-op experience, I have worked at Siemens Digital Industries Software for 4 co-op rotations, all of which used C++ for their NX CAD Software. I also used Python for scripting to improve the efficiency of collecting data from test parts. The data was then run through a Python script where it was then plotted in Excel for a visual representation and can be analyzed with the team. At Siemens, I also spent hours in meetings discussing the initial project document for a customer. Sitting in those meetings has allowed me to gain insight into the thought and development process of creating the scope of a project and the importance of a strong understanding and foundation of a project from the beginning. I begin my co-op at Honeywell Intelligrated this semester as well and hope to apply some of my simulation experience to this project as I pick it up on the job.

Euchre has been a stapled game in my life for as long as I can remember. Both with my family as well as my college life, it’s a great strategy game that can be fun but also competitive. As I chose to pursue computer science as my degree, I also thought that the analysis of games (whether it be card games, board games, or sports) would be a fun and interesting topic, trying to predict the outcome of a game based on your initial setup and finding the best move. Euchre is the card game I’ve played the most in my life, so performing deep analysis and creating an AI agent to play the game can provide me with insight into how my euchre skills can be improved. Our approach is to define the scope and boundaries of our project that are realistic. Performing an analysis of card games can require lots of data and computing power, therefore a realistic and achievable expectation will be needed.

Our results will to be create a functional euchre bot that can play a competent game of euchre. We then expect to have live statistics and probabilities provided to show the chances of winning assuming a perfect strategy (No blunders and the rules and priorities of the game are satisfied). We hope to have a user interface that is friendly but not over the top as the intended purpose of this project is about the agent and stats, less so the UI design and game flow. In the end, we hope to have a bot that can provide insights into the game of euchre and assist the user in making data-driven decisions on the next best move. We will collectively work on the project together with the roles provided in our contract. When we feel that we are confident that a user, not affiliated with the project, can use the application with ease and understand the information provided to make decisions, and we have learned new technologies and concepts, then we can conclude our project.