Senior Design: Individual Capstone Assessment

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The senior design project that we have decided on focuses on an AI-powered inventory management system that uses deep learning concepts to detect and recognize items from the images and then automates the inventory updates in a database. Looking from my academic perspective, this project is a combination of my interests in Machine Learning, Software Engineering and Data Science. The aim is to create and implement a complete pipeline that consists of capturing images, recognizing the items in the image and updating it in the database in the backend and displaying all of it in a web-based dashboard. This project would be a culmination of both the theoretical knowledge that I have gained so far from my courses as well as the practical experiences that I have gained from my co-ops. Additionally, the project is definitely a scalable one and we can also integrate aspects of robotic automation as well as sensors into this which is a really exciting prospect for me.

I feel prepared after the course and curriculum that I have taken so far. Classes such as Software Engineering and Introduction to Database Management and Database Theory have made me familiar with standard Software Development practices as well as knowledge of Database Management and Database Management Systems. Other classes such as Artificial Intelligence and Deep Learning have introduced me to algorithms and deep learning architectures that I intend to apply towards my project. Other classes such as Technical Writing and ENED have made me familiar with documentation practices which will also help me with planning and management of the project efficiently.

My co-op experiences have also provided me with relevant skills that will definitely be required for this project. I worked as a Data Science Intern at Lincoln Electric where I was introduced to working with machine learning models for data collection, data refinement and data analysis using tools such s Pandas, TensorFlow NumPy, and Scikit-learn for Python to process and visualize large datasets. I have also gained experience in working in a collaborative environment and following Software Engineering standards during my time as a Software Engineering co-op at Fox Sports where I worked in the mobile team for Fox Sports App.

I am motivated to work on this project as it allows me to combine all of my interests that are machine learning, software engineering and creating a practical tangible design. The real world aspect of automating inventory management would reduce human error if the image recognition model is successful and would improve operational efficiency. This also has an aspect of robotics involved that I had briefly touched upon during one of my co-op rotations and is something I find exciting. This is an excellent opportunity to challenge myself technically while also producing something that has real world application. Creating an integrated system that combines AI, backend database and frontend dashboard all working seamlessly is something that I am looking forward to.

My initial approach towards this involves creating a stepwise development pipeline. This would include creating a reliable deep learning model for item recognition, building a backend API and database to handle inventory and then creating a dashboard to visualize relevant data. The expectation for the system is that it automatically updates the inventory count based on the input from the sensors. I intend to self-evaluate my contribution by setting up measurable goals for each phase as we keep making progress on the project. The assessment for the completion will be the full integration as well as the testing of the system on both its' functionality and code quality.