Main Project Self-Reflection

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Description

The QEW CCTV project began with the simple question: How to make Ontario's busiest highway safer? For a software engineering student, I know there will be a lot of iterations and increments for our project to achieve optimal.

I worked with Lauren, Natalie, and Zhicong, each of us has different strengths based on the stream we are in. My focus was on Hardware Architecture which comparing ARM, x86, and GPU processors. At first, I thought the powerful GPU would be the obvious choice, since the performance on the graphic could smash that of CPU but the numbers surprised me. Those energy consumption calculations (ARM used just 10W per camera vs GPU's 200W!) completely changed how I saw the problem.

Lauren and Natalie handled the mounting type of camera , figuring out which materials could withstand years of Ontario weather and material to build up the pole to support camera. Zhicong worked on the floating point calculation per watt which is the computing task per watt. My job was to connect these technical choices to the actual costs by researching electricity cost and unit price of hardware and also scaling things like "75 AI performance score" into dollar values that made sense for our budget.

Feelings

I was feeling confident about the technical parts but nervous about the economics. Those first Net Value Function calculations seemed impossible which do not know the procedure of putting a price to prevent accidents and set up mitigation for that. The Design Studio sessions helped, especially when we practiced with smaller examples.

What surprised me was how much our assumptions mattered. We guessed cameras might fail 11% of the time based on... which is not much actual data. It made me realize how much engineering relies on educated guesses.

Evaluation

Looking back, what worked well was the distribution of labor. Natalie and Lauren's civil engineering knowledge was perfect for the mounting type of camera and analyze the beams, while Zhicong and I could focus on the hardware of computer. Our weekly gantt chart check-ins kept everyone on track.

The improvement that we could do on next project by reflecting this one, we spent too long debating camera types early on. And I wish we'd found real Ontario traffic data instead of some of our guesses. The 3PX3 lectures on NPV calculations saved us though - without that, our 11% discount rate would've just been a random number.

Analysis

This project really brought the course concepts to life:

ILO 2 (Net Value): Learning to compare ARM's $11,324/year energy cost vs. GPU’s $226,481/year showed me do not just focus on the performance but also the energy consumption

ILO 5 (Teamwork): We played to our strengths—when Natalie and Lauren explained mount deflection using cantilever beams, it clicked for everyone.

ILO 6 (Communication): Presenting to non-engineers forced me to simplify—no one cares about "stochastic models," but they understand "planning for surprises."

The one I struggled with was ILO 3 (Ambiguity). The vibration of electricity price in Ontario is hard to calculate, it changes irregularly and that makes me struggle.

Conclusion

This project changed how I see engineering decisions by introducing the economy. It's not just about the "best" (highest performance) technical solution, but the one that balances cost, durability, energy efficiency and real-world messiness. The Choosing of hardware taught me that sometimes the "weaker" option is smarter long-term for the energy consumption point of view.

The Lesson I learnt from this project is: Every number tells a story - that $1,334 per accident statistic made the project feel real. Assumptions are landmines - next time, I'll question our guesses earlier. Most of all, I saw how good teamwork multiplies what we can achieve. Even when I got stuck on processor specs, Lauren's mount analysis or Natalie's diagrams would spark new ideas. That's the kind of engineer I want to be - one who solves problems with both numbers and teamwork.

To what extent have you achieved the Intended Learning Outcome of the course? (Mark an X)	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
I can utilize economic principles to make decisions in engineering projects.				x	
I can formulate Net Value functions to evaluate and compare the value and cost of alternative engineering decisions.					x
I can make reasonable assumptions or perform			x		

necessary research to cope with ambiguity and uncertainty in required tasks.					
I can apply the fundamentals of cost, price, present value, and other financial metrics.				x	
I can manage group projects and interpersonal relations, especially building project management skills, preparing agendas, and diagnosing team dynamics.					x
I can professionally				x	

communicate complex engineering decisions following an economic analysis					