

Reflective Piece – Module 3: Machine Learning

This reflection follows the structure proposed by Rolfe et al. (2001), moving through *What?* (description), *So What?* (analysis), and *Now What?* (future application) as a way to frame my experiences in this module, what I learned from them and how they will influence my future. I found this model particularly useful for its simplicity and how easily it applies to both technical learning and personal development.

What?

This module has been one of the most practical and demanding parts of my postgraduate journey so far. I went from exploring core machine learning algorithms through guided activities to applying theory in two assessed real-world projects.

In Unit 6, I worked collaboratively on an Airbnb price-prediction and market-segmentation problem using linear regression, random forest, and k-means clustering. I took responsibility for running the random forest model, assisting with clustering validation, writing the introduction and conclusion, and creating several of the key visualisations. As a team, we learned how to balance getting the most accurate results with making sure our models were understandable and meaningful in a business context.

In Unit 11, I worked independently on an image-recognition project using convolutional neural networks (CNNs). I designed and trained both a custom CNN and a VGG16 transfer-learning model on the CIFAR-10 dataset. This required managing the complete workflow: data preparation, model design, tuning, evaluation, and presentation. It was my first real experience of moving from manually building features to using models that could identify and learn them automatically.

So What?

Working on the team project initially made me feel both energised and anxious. I wanted to contribute at a high standard and ensure that we delivered a strong report, but this sometimes led me to take on too much. As we neared the deadline, I took on a coordinating role that was rewarding but stressful. Since we were a group of three rather than six, we couldn't assign all the roles we had planned, so each of us took on multiple responsibilities. I realised how easily my determination can turn into overcommitment, and that effective teamwork relies as much on delegation and trust as on technical skill. Reflecting afterwards, I recognised aspects of Kolb's (1984) experiential-learning cycle, particularly the *reflective observation* stage, where analysing what went well and what caused pressure, turned experience into learning. I also realised that good collaboration depends on everyone

staying connected and aware of each other's progress, something Salas et al. (2005) describe as a key feature of successful teams.

The project also deepened my understanding of regression and clustering models. Implementing Random Forest made me think critically about parameter tuning and overfitting, while collaborating with Amaka on clustering showed how unsupervised learning can complement predictive models. Our results weren't perfect, but they made sense. The project feedback helped me see that being able to explain a model clearly often matters more than small improvements in accuracy.

In contrast, the individual project felt both more challenging and more freeing. Without the safety net of a team, I had to rely on my own judgment, time management, and problem-solving skills. Training CNNs was technically demanding and initially frustrating, but as I experimented with learning rates, dropout, and data augmentation, I felt genuine satisfaction when the validation accuracy improved. These small breakthroughs built my confidence and reflected Schön's (1983) idea of *reflection-in-action*, learning through doing. Looking back, I can see how I moved from learning how to work collaboratively in Unit 6 to managing a project independently in Unit 11. That shift helped me grow in confidence and learn how to balance technical focus with decision-making.

This module also pushed me to think about the ethical side of machine learning in a more practical way. Talking about bias and fairness with my group made me realise how a pricing model could unintentionally reinforce inequalities, and later the CNN project drew my attention to the environmental cost of large models. Both experiences echoed Bender et al. (2021), who point out that AI development involves moral as well as technical responsibility.

The feedback from the Unit 6 project encouraged me to go beyond simply presenting graphs and add more interpretation to my analysis. In the Unit 11 project, I focused on explaining what the learning curves, confusion matrices, and F1-scores actually showed, which helped me improve and refine my evaluation process, an example of Kolb's (1984) cycle of learning in action.

Now What?

I am confident that what I have learned from this module will influence both my professional practice and future learning. In my current engineering role, I already work closely with data from deployment pipelines, and I recently applied ideas from this module during a work hackathon, where I built an AI-powered deployment risk predictor. The system used historical release and incident data to identify patterns linked to failed deployments. Additionally, I investigated how I could incorporate explainable AI features to allow engineers to query why a release was considered risky. Working on that prototype reinforced how techniques from this module, especially around supervised learning, feature selection, and model evaluation, can directly support real-world engineering problems.

I'm also keen to deepen my knowledge of MLOps, which we only touched on briefly in this module, but which feels like a natural extension of my current work. The idea of bringing together model development, deployment, and observability into a cohesive process really

resonates with how I already think about software and release engineering. It's an area I'd like to explore more as I continue to develop my AI skills.

On a personal level, I intend to apply the reflective habits I developed in this module more deliberately. Taking time to reflect after each milestone helped me process challenges and learn from them. Going forward, I plan to keep a lightweight reflective log for projects in my day job, noting what happened, what it meant, and what I would change next time, in the spirit of Rolfe et al. (2001).

References

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