

Reflective Essay: My Machine Learning Journey

The Experience

Taking this machine learning module has been one of the most practical and rewarding learning experiences I've had. Over the last eleven units, I've gone from a beginner's understanding of ML to confidently applying models to real-world tasks. The content was clear and hands-on, and I could see the links between theory and application early on. Both the group and individual project gave me the chance to try what I'd learned in realistic settings—something I appreciated as someone looking to apply ML in the beauty industry.

In the team project, we focused on predicting Airbnb prices in New York City and segmenting listings. I contributed to the early cleaning, EDA, regression modelling, and K-means clustering analysis. In our smaller group within the team, we divided the tasks based on skills, and I also helped pull everything together for our final submission and presentation. Separately, in Unit 11, I completed an individual project where I built a CNN and compared it to a transfer learning model (MobileNetV2). This was my first time training and evaluating two image classifiers side by side, and it showed me the value of using pre-trained models in practice (Howard et al., 2017).

Reflection: What I've Learned

Looking back, the learning built up in layers. Each week connected to the last and gave me something new to apply.

Units 1–3 gave me the foundation I needed—especially in Exploratory Data Analysis. I learned how to clean, visualise, and interpret data, which turned out to be essential for everything that followed. Without understanding the structure of the data and spotting issues early, no model would perform well (Shmueli et al., 2017).

In **Units 4 and 5**, I explored correlation, regression, and clustering techniques. Regression taught me how to map relationships between independent and dependent variables, and clustering helped me see how ML can be used for customer segmentation. The Jaccard coefficient activity also helped me understand how to work with categorical data—something I could use in classifying beauty customer profiles (Tan, Steinbach and Kumar, 2019).

The shift into neural networks in **Units 7 and 8** was more technical but very useful. I used simple perceptrons to understand weight adjustments, learning rates, and how backpropagation works. Visualising how errors are minimised helped me better understand training in deep learning models (Goodfellow, Bengio and Courville, 2016). The gradient descent cost function task showed me how different learning rates and iteration counts impact convergence and training stability.

Units 9 and 10 took that learning into more specialised areas. In Unit 9, I looked at CNNs for image classification and began seeing potential for applications in beauty tech—such as skin tone matching or virtual makeup try-ons. In Unit 10, I explored NLP and how transformer models like

BERT and GPT are reshaping text generation and sentiment analysis (Vaswani et al., 2017). The weekly discussion based on Hutson's (2021) article was particularly engaging. It made me reflect on how useful AI writers can be, but also the risks of using them blindly—especially around bias, misinformation, and originality.

In **Unit 11**, everything came together. I trained a CNN on CIFAR-10, and then used MobileNetV2 for transfer learning. The MobileNetV2 model was faster and more accurate than the one I built from scratch, which showed me how powerful pre-trained models can be, especially when time and data are limited (Howard et al., 2017). This activity improved both my coding skills and my understanding of real-world ML deployment.

Action: Impact on My Development

From a team perspective, I gave consistent input and helped keep things on track. My peer review confirmed this—I was noted for being reliable and for contributing ideas throughout the team project. It wasn't always smooth sailing. Some team members dropped off or contributed very little, which made things harder for those of us who stayed committed. But the challenge helped me take on more responsibility and improve my ability to work under pressure.

On the individual side, I've gained a set of practical skills that I can already apply. For example, clustering and regression can be used to better understand customer behaviour and predict trends in the beauty industry. NLP could be useful in summarising product reviews or powering a chatbot for product recommendations. CNNs have clear applications in image-based product matching or skincare analysis. These are things I'm now confident exploring further.

More broadly, I've developed a more analytical mindset. I approach problems more systematically now, breaking them into steps, testing, evaluating, and adjusting. I'm also more comfortable using Python, libraries like Scikit-Learn and Keras, and visualisation tools like Seaborn and Matplotlib. This confidence has already made me more proactive in looking for new tools and ways to improve my business with data.

Ethical awareness has also grown. The Hutson (2021) article and our discussions around AI-generated content reminded me that technology always has consequences. As someone running a customer-facing brand, it's on me to ensure transparency, data privacy, and fairness—especially if I'm using ML tools that influence decisions or recommendations.

Going forward, I want to keep building on what I've learned. I plan to apply clustering to my existing customer data and explore NLP tools that can help automate content analysis. I also want to explore computer vision models more deeply, especially for beauty product trials and consultations.

Conclusion

This module has given me the tools and confidence to apply machine learning in a way that's relevant to my work and goals. I've built working models, learned from both individual and team-based activities, and developed a clearer understanding of how ML can be used ethically and effectively. Most importantly, I've built a solid foundation that I can keep growing from—as both a practitioner and a business owner.

References

Goodfellow, I., Bengio, Y. and Courville, A. (2016) *Deep Learning*. Cambridge, MA: MIT Press.

Howard, A.G. et al. (2017) 'MobileNets: Efficient Convolutional Neural Networks for Mobile Vision Applications', *arXiv preprint* arXiv:1704.04861.

Hutson, M. (2021) 'The language machines', *Nature*, 591(7848), pp. 22–25.

Shmueli, G., Bruce, P.C., Gedeck, P. and Patel, N.R. (2017) *Data Mining for Business Analytics: Concepts, Techniques, and Applications in Python*. Wiley.

Tan, P.N., Steinbach, M. and Kumar, V. (2019) *Introduction to Data Mining*. 2nd edn. Harlow: Pearson.

Vaswani, A. et al. (2017) 'Attention is all you need', *Advances in Neural Information Processing Systems*, 30, pp. 5998–6008.