Unit 7

Exercise 1:

The first exercise I completed was particularly engaging, as it introduced me to the concept of perceptrons. I found it fascinating to learn that a perceptron, a fundamental machine learning component, could be implemented using a simple Python function. This realisation helped me connect theoretical knowledge with practical application, greatly enhancing my understanding. By experimenting with different input values and weights, I was able to observe varying results, which further reinforced my comprehension of how perceptrons operate in practice.

Exercise 2:

Exercise 2 was equally insightful and eye-opening. This activity focused on breaking down the training process of a prediction model, demonstrating how a perceptron can be trained to minimise errors. The model iteratively adjusted its weights and biases by utilising a function combined with a loop until it achieved zero errors. This step-by-step process not only highlighted the logic behind the training algorithm but also underscored the importance of iteration and refinement in machine learning. Observing how the model improved with each pass through the data was both fascinating and rewarding, as it provided a clear understanding of how predictive accuracy is achieved in practice.

Exercise 3:

Working through the multi-layer perceptron (MLP) exercise has deepened my understanding of neural networks by linking theory with practice. I explored the structure and functionality of MLPs, including the role of activation functions such as the sigmoid in introducing non-linearity. The training process, involving forward propagation, backpropagation, and optimisation, clarified how networks learn from data, while experimenting with hyperparameters and demonstrated their impact on performance. Overcoming practical challenges, such as debugging and data preprocessing, reinforced the importance of persistence and attention to detail. This exercise has provided a solid foundation and inspired me to explore more advanced neural network architectures and applications.