Name: Daniel Nguyen

Date: April 25, 2025

Assignment: Deep Learning – Week 12

Deep learning is a subfield of machine learning that utilizes specific patterns that are inspired by the human brain, or also known as artificial neural networks. The networks are made up of multiple layers of nodes or neurons, which activates a system to learn patterns and make complex decisions based on the amount of data it collects. It’s considered “deep” because it uses multiple hidden layers between the input and outputs, which makes the model extract complex features at every level of the layers. For example, an image recognition feature would detect edges at the first layer, then shapes, then objects like faces or cars.

Deep learning collects data through its network, determining an output, then compares the output to the stored result. The diff erence between predicting the result and the actual result mainly revolves around loss function. The loss is minimized by utilizing optimization algorithms called stochastic gradient descent, which updates the network’s weight using a process called backpropagation. During this process, the network becomes increasingly more accurate at making correct predictions, adjusting itself based on the feedback from its previous made errors.

Deep learning is used all over the world in many different instances, like natural language processing, self-driving cars, and image recognition. For example, facial recognition software is used by millions today. The system uses deep learning to collect facial features, from image captures and identifies or verifies the individual in real-time.