

ADVOCATE MENTORSHIP PROGRAM

MID-TERM CHECKPOINT

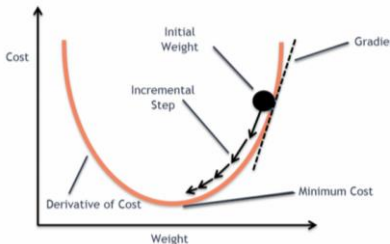
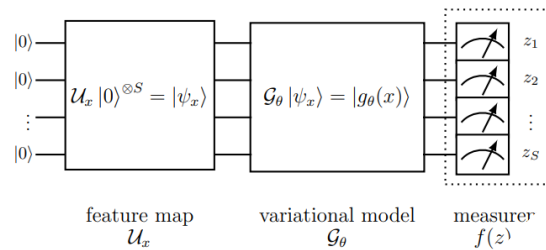
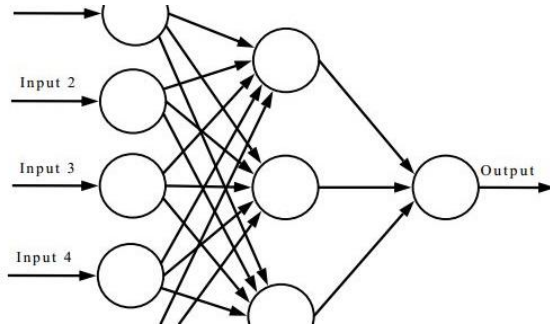
Quantum Neural Network section for
Qiskit Textbook Quantum Machine
Learning chapter (#41)

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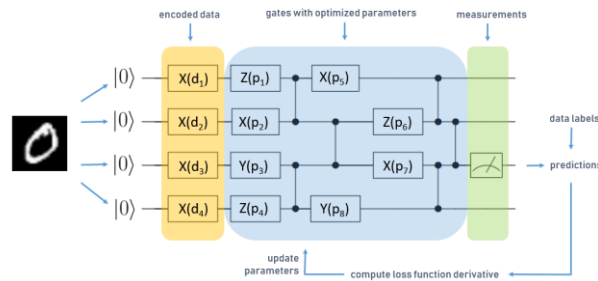
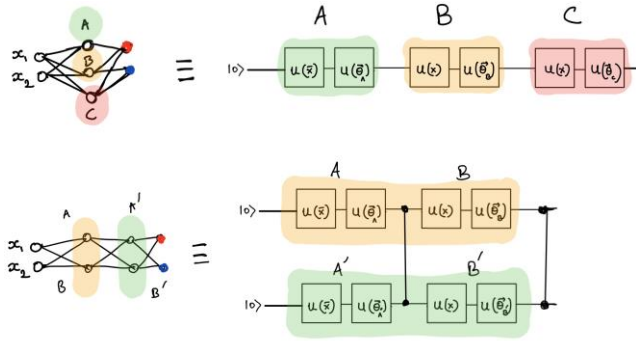
PROJECT

- ▶ Write the Quantum Neural Network section for the Qiskit Textbook - Quantum Machine Learning chapter
- ▶ Introduce quantum neural networks
- ▶ Build a QNN from scratch
- ▶ Discuss the issues in training them
- ▶ Discuss architectures and applications



- ▶ Introduction to classical NNs and Quantum NNs
- ▶ Classical NNs, Quantum NNs, Gradient-based optimisation
- ▶ Building a simple QNN:
- ▶ Build a simple QNN using Qiskit in a supervised scenario
- ▶ Examples of different QNN architectures and applications
- ▶ Quantum GAN, Quantum Variational Autoencoder, Etc.

PART I (WORK IN PROGRESS)



- ▶ Training QNNs
- ▶ Learn how to train and optimize models
- ▶ Different optimisation techniques
- ▶ Vanishing gradients and Barren Plateaus
- ▶ Possible ways to avoid barren plateaus
- ▶ Second order optimisation techniques

PART II