

Regularization Technique for Neural Network Training Using Variational Quantum Circuits

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Overfitting is a common issue in neural network training, particularly when the size of the dataset and the distribution of the data are taken into account. This study addresses this issue by first designing a variable quantum variational circuit that generates noise under different layers and numbers of qubits. This circuit is then used to add noise to the activation values of the neurons during each training step, thereby regularizing the training process. In comparison to existing regularization techniques, the flexibility of combining different numbers of layers and qubits allows for more convenient and flexible adjustments and experiments to achieve optimal regularization effects. In this research, we also tested the effects of different combinations of layers and qubits for specific problems and compared them with existing regularization techniques.