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# Quantum Generative Adversarial Network with Noise

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**Project Name:** Quantum Generative Adversarial Network with Noise

**Project member:**

*YmHuang*

*WhRen*

*ZlChen*

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WH REN

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# 1 Experiment

In this week,I want to use quantum image representation to encoding an image to a pure state.But if we use a coefficient of computational basis,there have two questions.

$$c_k = F_{i,j} / \left( \sum F_{i,j}^2 \right)^{1/2}$$

First,when we use pure state to representation a big image,every coefficient would be very small.If we use a 28x28 image,the coefficient is about  $c_k = 100 / \left( \sum 100^2 \right)^{1/2} = 1/28$ .This pure state just like zero state.

Second,if we want to use this representation to represent a full zero image,it will fail to represent.

So,next week,I want to change this representation by another representation or improve it so that it can be used in our program.

# 2 Results

# 3 Next Plan

P: 1 find some ideas

# 4 Reference

## References

- [1] BENEDETTI, M., GRANT, E., WOSSNIG, L., AND SEVERINI, S. Adversarial quantum circuit learning for pure state approximation. *New Journal of Physics* 21, 4 (2019), 043023.
- [2] SHENDE, V. V., MARKOV, I. L., AND BULLOCK, S. S. Minimal universal two-qubit controlled-not-based circuits. *Physical Review A* 69, 6 (2004), 062321.

## 5 Appendix

### A Source Code

just add core codes