Learning Journey – Non Exhaustive List of Learning Materials

Research Project (100 pts): **Quantum Optimisation for the Vehicle Routing Problem**

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Fundamental Knowledge (Quantum Computing and VRP)

- **[chapter 4, 5, 6]** Noson S. Yanofsky, Mirco A. Mannucci - **Quantum Computing for Computer Scientists** (2008, Cambridge University Press)
- **[chapter 1]** Elias F. Combarro, Samuel Gonzalez-Castillo - **A Practical Guide to Quantum Machine Learning and Quantum Optimization**: Hands-on Approach to Modern Quantum Algorithms (2023, Packt Publishing)
- **[video 3-15] Understanding Quantum Information and Computation** with John Watrous (2022, Youtube)
- **[chapter 1, 2, 3]** Paolo Toth, Daniele Vigo (eds.) - **Vehicle Routing: Problems, Methods, and Applications**, Second Edition (2014, SIAM)

Specific Knowledge (Quantum Optimization and Solving VRP)

- **[chapter 3, 4, 5, 7]** Elias F. Combarro, Samuel Gonzalez-Castillo - **A Practical Guide to Quantum Machine Learning and Quantum Optimization**: Hands-on Approach to Modern Quantum Algorithms (2023, Packt Publishing)
- **[chapter 4, 8]** Paolo Toth, Daniele Vigo (eds.) - **Vehicle Routing: Problems, Methods, and Applications**, Second Edition (2014, SIAM)

Practical Knowledge

- **[chapter 2]** Elias F. Combarro, Samuel Gonzalez-Castillo - **A Practical Guide to Quantum Machine Learning and Quantum Optimization**: Hands-on Approach to Modern Quantum Algorithms (2023, Packt Publishing)
- **Qiskit Vehicle Routing** (https://qiskit-community.github.io/qiskit-optimization/tutorials/07_examples_vehicle_routing.html)
- **Pennylane Demos** (https://pennylane.ai/qml/demonstrations)
- **Qiskit Tutorials** (https://qiskit-community.github.io/qiskit-optimization/tutorials/index.html)
- **[network analysis]** Martin Tomko and Alan Thomas - **Spatial Data Management** (https://tomkom.pages.gitlab.unimelb.edu.au/spatialdatamanagement/)

Papers

1. Fitzek, D., Ghandriz, T., Laine, L., Granath, M., & Kockum, A. F. (2024). Applying quantum approximate optimization to the heterogeneous vehicle routing problem. *Scientific Reports*, *14*(1), 25415.
2. Mohanty, N., Behera, B. K., & Ferrie, C. (2024). Solving the vehicle routing problem via quantum support vector machines. *Quantum Machine Intelligence*, *6*(1), 34.
3. Tambunan, T. D., Suksmono, A. B., Edward, I. J. M., & Mulyawan, R. (2023, November). Quantum annealing for vehicle routing problem with weighted segment. In *AIP Conference Proceedings* (Vol. 2906, No. 1). AIP Publishing.

1. Bennett, T., Matwiejew, E., Marsh, S., & Wang, J. B. (2021). Quantum walk-based vehicle routing optimisation. *Frontiers in Physics*, *9*, 730856.
2. Leonidas, I. D., Dukakis, A., Tan, B., & Angelakis, D. G. (2023). Qubit efficient quantum algorithms for the vehicle routing problem on NISQ processors. *arXiv preprint arXiv:2306.08507*.
3. Marsh, S., & Wang, J. B. (2019). A quantum walk-assisted approximate algorithm for bounded NP optimisation problems. *Quantum Information Processing*, *18*(3), 61.
4. Marsh, S., & Wang, J. B. (2020). Combinatorial optimization via highly efficient quantum walks. *Physical Review Research*, *2*(2), 023302.

1. Farhi, E., Goldstone, J., & Gutmann, S. (2014). A quantum approximate optimization algorithm. *arXiv preprint arXiv:1411.4028*.
2. Alsaiyari, M., & Felemban, M. (2023, February). Variational quantum algorithms for solving vehicle routing problem. In *2023 International Conference on Smart Computing and Application (ICSCA)* (pp. 1-4). IEEE.
3. Irie, H., Wongpaisarnsin, G., Terabe, M., Miki, A., & Taguchi, S. (2019). Quantum annealing of vehicle routing problem with time, state and capacity. In *Quantum Technology and Optimization Problems: First International Workshop, QTOP 2019, Munich, Germany, March 18, 2019, Proceedings 1* (pp. 145-156). Springer International Publishing.