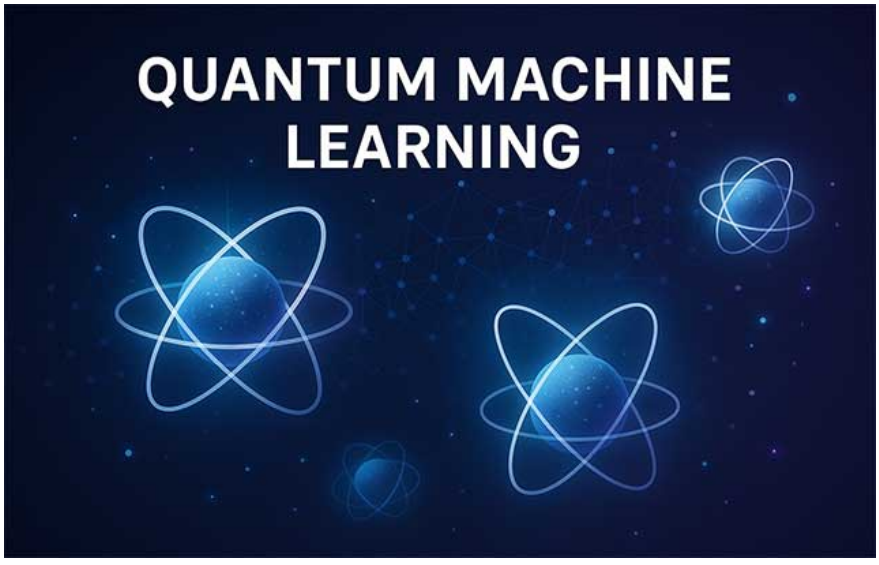
5 GitHub repositories to help you learn Quantum Machine Learning from basic to advanced levels.

Discover 5 GitHub repositories that will help you learn Quantum Machine Learning effectively, from theory and papers to practical exercises with Python and Qiskit.

Quantum Machine Learning (QML) is a field that combines quantum computing and machine learning. It's a rapidly growing area of ??research, as scientists seek to leverage the power of quantum computers to solve more complex machine learning problems.

To support learning and research, the community has built numerous open-source projects on GitHub, providing documentation, examples, and actual code. These repositories make knowledge more accessible to newcomers and also showcase the current development of the field.

Here are 5 noteworthy repositories, suitable for a variety of learning styles.



Start by 'mapping' the entire area.

The awesome-quantum-machine-learning repository (? 3.2k) can be seen as a 'master map' of QML.

It comprehensively covers important topics such as algorithms, learning materials, libraries, and research directions. If you're a beginner, this is the ideal place to get an overview and know where to start.

Concepts such as quantum kernels, variational circuits, and hardware limitations are clearly outlined, helping you visualize the field's structure systematically.

Deepen your knowledge through research papers.

If you already have a basic understanding, the awesome-quantum-ml repository (? 407) will be a better fit.

This list focuses on high-quality scientific papers, surveys, and academic literature related to the application of machine learning in quantum devices. It's an extremely valuable resource if you want to gain a deep understanding of algorithms, emerging trends, and how QML is being researched in practice.

In addition, the project is open to community contributions, so the content is constantly being updated.

Learn by doing with Python

If you're the type who learns by doing, the Hands-On Quantum Machine Learning With Python (Vol 1) repository (? 163) is a great choice.

This is the code included with the book of the same name, organized in a learning roadmap format. You can follow each chapter, run experiments, and adjust parameters to observe how the system works.

Using notebooks and Python scripts allows you to approach QML in a much more intuitive and understandable way compared to simply reading theory.

Work on a real-world project using current hardware.

The Repository Quantum Machine Learning on Near-Term Quantum Devices (? 25) is small but very practical.

It focuses on implementing QML on current quantum devices—which are limited and noisy. You will gain access to models such as quantum SVM, quantum CNN, and data classification models.

The key is that you'll understand the practical constraints of the hardware, rather than just working with ideal models.

Build a complete pipeline with Qiskit

If you want to go further and build a systematic system, the qinskit-machine-learning library (? 939) is an option you can't overlook.

This is part of the Qiskit ecosystem, co-developed by IBM and Hartree Centre. The library provides a full range of tools such as quantum kernels, neural networks, classifiers, and regressors.

In particular, it can integrate with PyTorch via TorchConnector, allowing you to build professional-standard QML pipelines, instead of just experimenting.

Which learning path should I follow?

An effective learning method is to start with 'awesome list' repositories to get an overview, then move on to reading papers to delve deeper into the knowledge.

Next, you should combine practicing with a notebook and working on real-world projects on your current hardware. Finally, use Qiskit as the primary tool to build complete systems.

This approach helps you progress from theory ? practice ? application, instead of learning each part separately.

Quantum Machine Learning is still a new and challenging field, but it also has great potential. Leveraging open-source repositories not only helps you learn faster but also keeps you closely aligned with what's happening in research and real-world applications.

If you start correctly and have a clear roadmap, you can absolutely keep up with this rapidly developing field.

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