QUANDELA

EPFL Hackathon 2026

OPTION PRICING USING QUANTUM COMPUTING

A Quandela x MILA x AMF Challenge

Background & Motivation

Option pricing is an important problem in finance. The goal of this prompt is to explore how quantum circuits can be used to price options using a quantum machine learning (QML) model. This prompt invites teams to explore one of these tracks and produce a working option pricing model.

Improving option pricing models has significant real-world impact, as even small predictive advantages can translate into substantial financial values!

Quantum Machine Learning

Description

Quantum Machine Learning provides a method by learning the distribution of future option prices from historical data. For example, quantum reservoir computing (QRC) is a type of hybrid model. In this model, a fixed quantum circuit extracts non-linear features from the data and feeds them to a trainable classical algorithm.

Objectives

Your task is to use quantum machine learning (QML) to produce an option pricing model. More specifically, your goal is to implement and train a QML model to predict the price of put and call options. A training dataset will be provided to the participants to train a QML model to price options. The test dataset will be provided at the end of the hackathon for fair and exciting evaluation.

Evaluation

The test dataset will be provided to the organizers for fair and exciting evaluation based on predefined metrics. The challengers will be evaluated on

Resources

Deep dive into this wonderful project and the complementary resources below.

- Folder incl. prompt and dataset resources: Quandela Cloud - CHALLENGER FOLDER
- Links to other resources:
  - AI & Quantum
    - PyTorch tutorial
    - Article: AI for financial forecasting

        - Paper: Quantum reservoir for financial forecasting
        - Paper: Study on the form of weighted networks
    - Quandela Resources
        - Quandela Training Center
        - Quandela MerLin tutorial & MerLin documentation
        - Implementation of quantum reservoir computing using QML
        - Quantum intuitions for ML practitioners
        - Paper: Baselines for photonic quantum machine learning

Questions for Deep Diving

How many qubits and depth of circuit are required to have a good approximation of the option price with your quantum or hybrid circuit? Does adding qubits or quantum gates improve the accuracy of your circuit? How long does it take to run your quantum or hybrid circuit? How many parameters are there in your quantum or hybrid circuit? Is your quantum or hybrid circuit tolerant to quantum noise?

Solution Hand-In

Please **upload** your **code**, **test results** and **presentation slides** here (best in a folder and make sure to double-check your submission):

Quandela Cloud - SOLUTION UPLOAD

Project Judging Criteria

1. Technical Aspects

How accurate is the model? How complex is the quantum algorithm? Is it well optimized? Can the architecture serve users at a reasonable scale? How accessible is the end user application? Is it easy to use and intuitive for end users? Could the quantum algorithm be implemented with realistic hardware constraints and noise? Did the team compare the quantum algorithm to a classical benchmark? Did the team consider creative use of quantum properties?

2. Originality & Uniqueness

How unique is this project compared to others? How interesting is it? Did the team attempt something new or difficult?

3. Usefulness & Complexity

How useful is the project and how well-designed is it? How functional is it at the time of judging? Can it be used in real-world business applications or serve as a valuable tool for individuals? Are there ways this project could be further built out and refined upon?

4. Presentation

How well did the team present their project? Were they able to explain their decision? Did the entire team have a chance to speak? Did they tell a cohesive story?

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