ISMB Tutorial #4
Quantum-enabled multi-omics analysis

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FRIDAY, JULY 12, 2024

9 AM – 6 PM EDT

HTTPS://WWW.ISCB.ORG/ISMB2024/PROGRAMME-SCHEDULE/TUTORIALS#IP4

PALAIS DES CONGRÈS DE MONTRÉAL

Session Plan

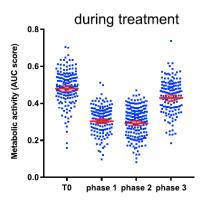| Time	Session	Title
0900 - 1000	I	Quantum Information & Fundamentals
1000-1045	I	IBM Quantum setup & Introduction to Qiskit
1045-1100	-	Coffee Break
1100-1200	II	Introduction to Quantum circuits
1200-1300	II	Variational Quantum Algorithms & Machine Learning
1300-1400	-	Lunch
1400-1430	III	Single-cell RNAseq Data & Classical Machine Learning
1430-1600	III	Quantum Machine Learning concepts and applications in single-cell RNAseq data.
1600-1615	-	Coffee Break
1615-1700	IV	Design and Implementation of Quantum Machine Learning in single-cell RNAseq data.
1700-1800	V	Interactive Q&A

Cell

Toward Minimal Residual Disease-Directed Therapy in Melanoma
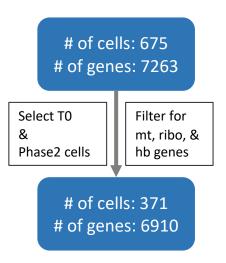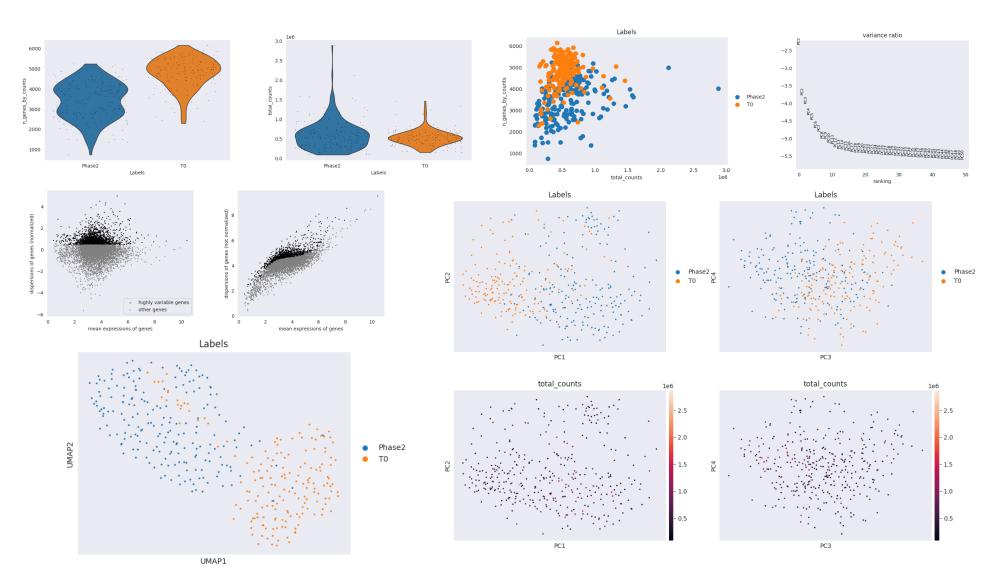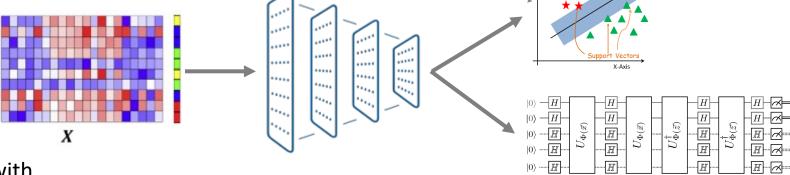
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Toward Minimal Residual Disease-Directed Therapy in Melanoma

Experiments

- Split the data into Train/validation/test with 0.6/0.2/0.2 proportions.

- Trained a neural network on the data with 5 embedding layers and 1 classification layer.

- Performed five-fold cross validation with early stopping criterion.

- Obtained 8-dimensional embeddings and performed SVC and QSVC on the test data.

- Ran QSVC on *statevector simulator* with two reps in the circuit.

- Similar performance between SVC and QSVC.