R2P
CAPSTONE PROJECT

Quantum Neural Networks

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TEAM MEMBERS

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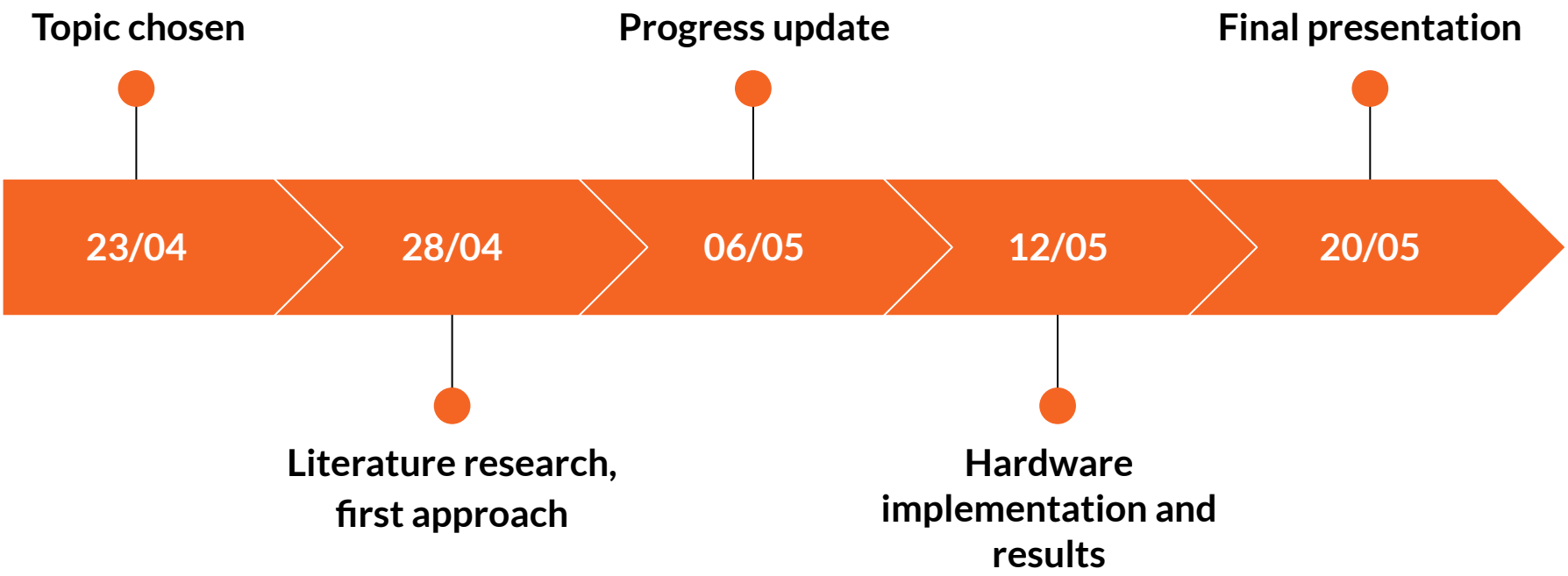
Topic chosen
Progress update
Final presentation
23/04
28/04
06/05
12/05
20/05
Literature research, first approach
Hardware implementation and results

Objectives

Image classification with QNN

- **Concept and architecture:** convert each image into a low-dimensional feature vector (e.g., via PCA or a lightweight CNN) and encode it into a parameterized quantum circuit; stack variational layers to build a Quantum Neural Network (QNN) that outputs class probabilities for the two image categories.
- **Data Pipeline:** pre-process images, batch-encode each sample into amplitude or angle-encoded qubit states, and auto-generate circuits at runtime to keep depth manageable.

Current state of the project

Literature reading:

- **A review of Quantum Neural Networks: Methods, Models, Dilemma** ***arXiv:2109.01840v1***
- **Training Quantum Embedding Kernels on Near-Term Quantum Computers** ***arXiv:2105.02276***
- **Variational Quantum Classifier, Elies M. Gil Fuster & J.I. Latorre**

Database creation:

- **Program to convert hand-drawn drawings into vectors**