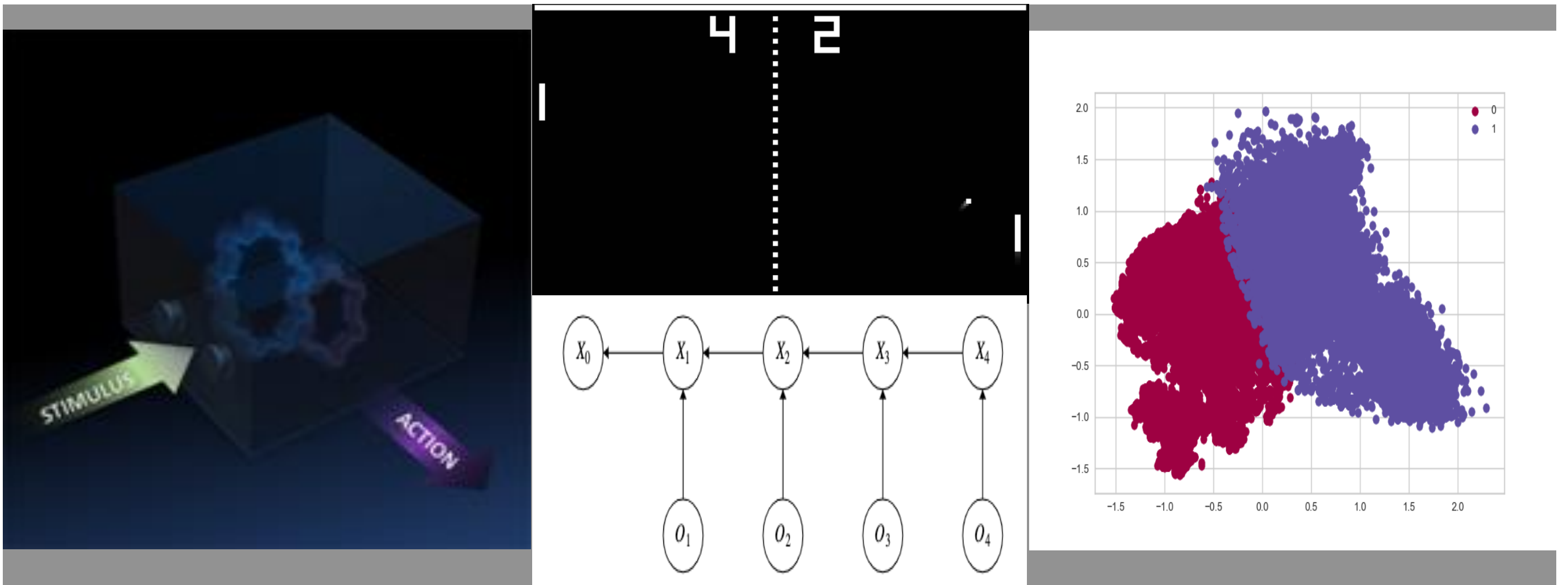


Quantum-Enhanced Agents

And Comparisons with Optimal Classical Agents

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Project Objectives:

This project aims to explore the discretization of Recurrent Neural Networks (RNNs) into Finite State Machines (FSMs) through two main methods, ternary neurons, and clustering. This is a prerequisite to being able to empirically determine if there exists a quantum advantage i.e. whether an agent with a quantum memory will beat the optimal agent with a classical memory under the condition that they have the same number of internal states.

This analysis is done through analysing the performance of the agents on one-way communication games and on POMDPs such as Atari games.

Results:

- Implemented ternary neurons and clustering for the discretization of RNNs
- Produced FSM for communication game is not the optimal FSM
- Clustering of RNNs gives us FSMs with the same number of states as the ternary neuron method

Produced FSM from RNN

