(# 18) Real world data analysis using Quantum Machine Learning algorithms

Kaushal Kishor Gagan
Computer Science Undergraduate, IIT Goa, India

Mitesh Adake
Computer Science Undergraduate, Pune Institute of Computer Technology, India

Balaji Seetharaman (Mentor)
Software Engineer, Extreme Networks, India

Manjula Gandhi S (Mentor)
Associate Professor, Coimbatore Institute of Technology, India

Qiskit

Real word data analysis using QML Algorithms/Quantum Optimization problems

Qiskit

Goal:

- To perform data analysis using **quantum machine learning** algorithms.
- To solve optimization problems using **Quantum Algorithms**.
- To contribute content as Journal paper/Hands-on Tutorial

Hand Picked Problems

1. Prediction of student learning outcomes in higher education
2. Prediction of customer online retail spending patterns
3. Numerical optimization problem
4. Graph coloring problem
5. Knapsack problem

Contribution #1

Prediction of student learning outcomes in higher education

- **Dataset :** Student Performance Dataset, Coimbatore Institute of Technology

- Prediction of student learning outcome based on the performance dataset

- **Classical approach:** Regression and Supervised ML models

- **Quantum approach:** Quantum Naive Bayes to classify student performance

Contribution #2

Prediction of customer online retail spending patterns

- **Dataset :** Online Retail Data-set from UCI Repository

- Prediction of customer spending patterns based on the retail dataset

- **Classical approach:** K-means and UnSupervised ML models

- **Quantum approach:** Quantum K-means Model to group the customer spending patterns

Contribution #3

Quantum optimization problems

- Solving optimization problem with the help of **quantum genetic algorithm/hybrid genetic algorithm.**

- Some of the optimization **problems planned** are **Numerical optimization problem, Knapsack problem, and graph coloring problem**(these optimization problems are just placeholders for now)

Future Work

1

Publish the work in Journal

2

Model Performance improvement

3

Deployment of Final QML model as Web App

Thank You