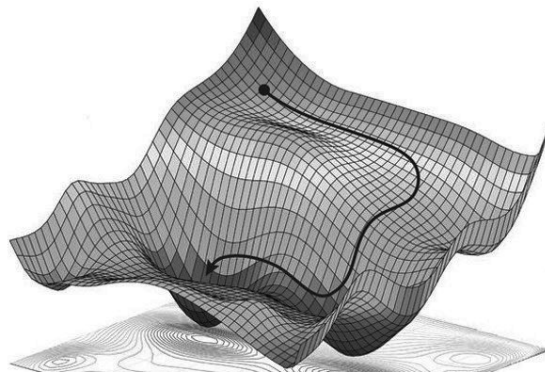


Quantum Machine Learning

Hamza, Ali; Hoda, Bilal

June 29, 2020



Contents

1	Abstract	3
2	Introduction	4
2.1	What is Machine Learning?	4
2.2	What is Quantum Machine Learning?	4
3	Classical Machine Learning Algorithms	5
3.1	Gradient Descent	5
3.2	Support Vector Machines	5
4	Quantum Machine Learning Algorithms	6
4.1	Quantum Gradient Descent	6
4.2	Support Vector Machines via Grover's Algorithm	6
5	Quantum Neural Networks	7
6	Reflection	8
6.1	Advantages of Quantum Machine Learning	8
6.2	Current Limitations	8
6.3	Future Prospects	8
7	Bibliography	9

1 Abstract

2 Introduction

2.1 What is Machine Learning?

2.2 What is Quantum Machine Learning?

3 Classical Machine Learning Algorithms

3.1 Gradient Descent

3.2 Support Vector Machines

4 Quantum Machine Learning Algorithms

4.1 Quantum Gradient Descent

4.2 Support Vector Machines via Grover's Algorithm

5 Quantum Neural Networks

6 Reflection

6.1 Advantages of Quantum Machine Learning

6.2 Current Limitations

6.3 Future Propects

7 Bibliography

1. <https://arxiv.org/pdf/1909.05074.pdf>
2. <https://arxiv.org/pdf/1909.02108.pdf>
3. <https://arxiv.org/pdf/0905.2794.pdf>
4. <https://iopscience.iop.org/article/10.1088/1367-2630/ab2a9e/pdf>
5. Peter Wittek - Quantum Machine Learning - What Quantum Computing Means to Data Mining-Elsevier AP, Academic Press (2014)