

Enhancing the Efficiency of Credit Risk Classification Modeling using Quantum Machine Learning for sturdy decision making in Finance

Author 1

Parvathy Gopakumar
Department of Computer Science and Engineering
Indian Institute of Information Technology
Kottayam
Pala, Kottayam, Kerala, India
parvathymmlm.22phd11009@iiitkottayam.ac.in

Author 2

Rubell Marion Lincy G
Department of Computer Science and Engineering
Indian Institute of Information Technology
Kottayam
Pala, Kottayam, Kerala, India
lincy@iiitkottayam.ac.in

Abstract—The 2008 financial crisis underscored the critical importance of effective credit risk modelling, revealing the repercussions of inadequate risk management by financial institutions. The crisis, triggered by widespread defaults on subprime mortgages, highlighted the need for improved credit decisions and risk management practices around the world. Credit risk modelling is indispensable for financial institutions, offering statistical techniques to assess default likelihood based on past data, enabling better-informed lending decisions. Quantum systems can be used to represent and manipulate probability distributions efficiently which has applications in machine learning and optimization problems. Numerous aspects of quantum computing, such as the ability to represent quantum states and develop quantum algorithms based on the probabilistic nature of quantum mechanics, could give an advantage in the field of credit risk analysis to address the uncertainty in finance. The first significant study in the field of credit risk analysis using quantum computation was published on 2019. Because of the limited power of computation due to hardware restrictions, there is a dearth of research published in this field. The focus of this study is to review the literature in order to comprehend the state-of-the-art methods currently employed in classical structures, to pinpoint the ways in which these methods fall short of meeting modern hurdles and to investigate ways these problems can be solved in the quantum domain. The research will also look at techniques and algorithms that follow the most recent developments in quantum machine learning and how they can apply in effect compilation of credit risk analysis.