

# Intelligent Finance:

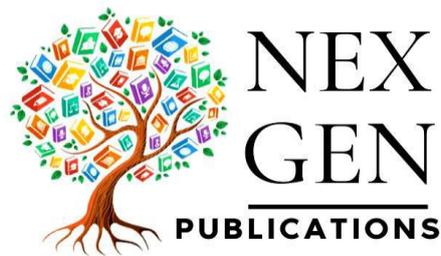
AI and ML Approaches to Decision-Making

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Dr. K.L. Sumathy  
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# Intelligent Finance: AI and ML Approaches to Decision-Making



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# Intelligent Finance: AI and ML Approaches to Decision-Making

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First Impression: February 2026

**Intelligent Finance: AI and ML Approaches to Decision-Making**

**ISBN: 978-81-19477-53-1**

**Rs. 1000/- (\$80)**

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Nex Gen Publications

*Dedicated to*  
*Mrs. Savariammal and*  
*Mr. Lourdunathan*  
*(My Parents)*

## Preface

Finance is no longer driven solely by balance sheets, historical ratios, and human intuition. The rapid evolution of computational power, data availability, and algorithmic innovation has fundamentally transformed how financial decisions are made. *Intelligent Finance: AI and ML Approaches to Decision-Making* emerges from this transformation, addressing the urgent need to understand how Artificial Intelligence (AI) and Machine Learning (ML) are reshaping modern financial systems.

Traditional financial models were built on assumptions of rational markets, limited datasets, and linear relationships. Today, financial ecosystems generate massive streams of structured and unstructured data—from high-frequency trading signals and credit histories to social media sentiment and macroeconomic indicators. AI and ML techniques enable institutions to process this complexity at scale, detect hidden patterns, and adapt in real time. However, technological capability alone does not guarantee sound judgment. Intelligent finance requires not only powerful algorithms but also critical evaluation, governance, interpretability, and ethical responsibility.

This book bridges theory and application. It introduces foundational concepts in AI and ML before moving into practical financial domains such as risk assessment, portfolio optimization, fraud detection, algorithmic trading, credit scoring, and financial forecasting. Emphasis is placed on both strengths and limitations—highlighting where machine-driven insights outperform conventional approaches and where human oversight remains indispensable.

Readers will find a balanced integration of mathematical rigor, conceptual clarity, and real-world case perspectives. The aim is not to glorify automation, but to examine how intelligent systems can augment strategic financial decision-making while addressing issues of bias, transparency, and systemic risk.

This work is designed for students, researchers, financial analysts, policymakers, and professionals seeking to understand the structural shift underway in global finance. The future of finance will not be purely human nor purely machine—it will be intelligently integrated.

## Acknowledgement

The completion of *Intelligent Finance: AI and ML Approaches to Decision-Making* reflects a collective journey of inquiry, discipline, and intellectual engagement. As we navigated the rapidly evolving intersection of finance, artificial intelligence, and machine learning, we recognized both the transformative potential and the analytical rigor required to meaningfully integrate these domains.

We extend our sincere gratitude to the mentors, scholars, and industry experts whose insights into financial analytics, algorithmic modeling, risk management, and intelligent systems significantly shaped the foundation of this book. Their critical observations and constructive feedback challenged our assumptions and strengthened the analytical depth of this work.

We are deeply thankful to our colleagues and research collaborators who engaged in thoughtful discussions on predictive modeling, data-driven strategies, and the ethical dimensions of AI in financial decision-making. These exchanges refined our perspectives and ensured that the content presented here balances theoretical clarity with practical applicability.

Our appreciation also goes to the broader community of researchers, data scientists, and financial technologists whose pioneering contributions continue to redefine modern finance. Their advancements in machine learning algorithms, big data infrastructure, and computational finance provided essential reference points that informed the structure and direction of this manuscript.

We acknowledge the encouragement and patience of our families and well-wishers, whose support made it possible to dedicate the time and focus necessary for this project.

Finally, we are grateful to our readers—students, academics, practitioners, and policymakers—who are committed to advancing intelligent, ethical, and evidence-based financial decision-making. We hope this book serves as a rigorous and practical resource in understanding and applying AI and ML approaches within the dynamic world of finance.

**Dr. K.L. Sumathy**  
**Mrs.Jona Jesudass**  
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## About the Authors



**Dr. K.L. Sumathy**, MCA.,M.Phil.,Ph.D has 26 years of teaching experience in the University of Madras affiliated colleges. She has completed Master of computer applications during the year 1999. She was awarded Ph.D on July 2018. Currently working as NAAC Coordinator in St.Anne’s Arts and Science College. She has published many research papers in National/International Journals. Her area of interest are Algorithms research in Distributed Cloud and Grid Computing, Distributed Databases, Cellular Networks, Wireless Networks and Data Mining.



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## ABOUT THE BOOK :

***Intelligent Finance: AI and ML Approaches to Decision-Making*** explores the transformative role of artificial intelligence (AI) and machine learning (ML) in modern financial systems. The book examines how data-driven models, predictive analytics, algorithmic trading strategies, risk assessment frameworks, and intelligent automation are reshaping financial decision-making across banking, investment management, insurance, and fintech ecosystems. It provides a structured understanding of core AI and ML techniques—such as supervised and unsupervised learning, neural networks, natural language processing, and reinforcement learning—and demonstrates their practical applications in credit scoring, fraud detection, portfolio optimization, market forecasting, and behavioral finance analysis. Beyond technical implementation, the book critically addresses model interpretability, data governance, regulatory compliance, cybersecurity risks, and ethical considerations associated with automated financial systems. Designed for students, researchers, finance professionals, and technology practitioners, this work bridges theoretical foundations with real-world applications, offering a comprehensive framework for integrating intelligent systems into strategic and operational financial decision-making in an increasingly complex and competitive global environment.

