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IMPROVING CORPORATE FINANCIAL RISK PREDICTION THROUGH ARTIFICIAL INTELLIGENCE

Dagarov Jokhongir Hasan o'g'li
Tashkent State University of Economics

Abstract: Increasing financial complexity requires more accurate and timely risk prediction. Traditional methods may struggle to capture nonlinear relationships and early signs of financial deterioration. This study examines how artificial intelligence can improve enterprise financial risk prediction through financial indicators, data preprocessing, feature selection, and machine learning algorithms. The proposed approach has the potential to improve prediction accuracy and support effective risk management and decision-making.

Keywords: artificial intelligence, financial risk, enterprise, risk prediction, machine learning, financial stability, financial indicators.

Introduction.

Financial risk is a major challenge to enterprise sustainability and development. Changes in liquidity, profitability, leverage, cash flows, debt, and market conditions can weaken financial stability and, if detected too late, lead to insolvency or bankruptcy. Traditional risk assessment relies on financial ratios, statistical models, and expert evaluation. Although useful, these methods may not fully capture the complex and nonlinear relationships among financial indicators.

Artificial intelligence (AI) offers new opportunities to overcome these limitations. Machine learning (ML) can analyze large financial datasets, identify hidden patterns, and detect early signs of financial deterioration, thereby improving the accuracy and timeliness of enterprise financial risk prediction.

The President of the Republic of Uzbekistan, Shavkat Mirziyoyev, emphasized that “humanity is confidently entering the new era of civilization - the era of artificial intelligence” and highlighted the need to expand AI applications in the banking and financial system. He also stressed the importance of developing AI-based solutions across economic sectors to improve efficiency and competitiveness. These national priorities demonstrate the growing importance of applying AI to financial analysis and risk management and provide a strong practical basis for improving enterprise financial risk prediction through AI.¹

Literature Review.

Financial risk prediction has traditionally been based on financial ratios and statistical models. Altman developed the Z-score model for predicting corporate

¹ President of the Republic of Uzbekistan. (2025, October 21). The implementation of artificial intelligence technologies to be elevated to a new level. Official website of the President of the Republic of Uzbekistan.



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bankruptcy using multiple financial indicators², while Ohlson proposed a probabilistic approach based on logistic regression.³ These models established important foundations for enterprise risk assessment; however, their predictive capabilities may be limited when financial relationships are nonlinear or highly complex. Recent studies increasingly apply ML to financial risk prediction because these methods can capture complex patterns and nonlinear relationships. Therefore, further research is needed to develop effective AI-based approaches for accurate and timely enterprise financial risk prediction.

Methodology.

The study uses theoretical, analytical, and comparative methods to examine the application of artificial intelligence to enterprise financial risk prediction. It analyzes traditional risk assessment methods and modern ML approaches, focusing on their ability to identify complex financial risk patterns. Based on findings, an AI-based framework for improving enterprise financial risk prediction is proposed.

Analysis and Discussion.

Artificial intelligence can improve enterprise financial risk prediction by analyzing multiple financial indicators simultaneously and identifying complex and nonlinear relationships. Unlike traditional approaches, ML methods can process large datasets and detect patterns that may indicate financial deterioration at an early stage. Recent studies confirm the growing application of machine learning and AI in financial distress and bankruptcy prediction.⁴

An effective AI-based prediction framework consists of several stages: financial data collection, preprocessing, feature selection, model development, evaluation, and risk prediction. Relevant indicators may include liquidity, profitability, solvency, leverage, efficiency, and cash-flow measures. Data preprocessing is necessary to address missing values, outliers, and inconsistencies, while feature selection helps improve model efficiency and predictive reliability.⁵

² Altman, E. I. (1968). Financial ratios, discriminant analysis and the prediction of corporate bankruptcy. *The Journal of Finance*, 23(4), 589–609.

³ Ohlson, J. A. (1980). Financial ratios and the probabilistic prediction of bankruptcy. *Journal of Accounting Research*, 18(1), 109–131.

⁴ Zhao, J., Ouenniche, J., & De Smedt, J. (2024). Survey, classification and critical analysis of the literature on corporate bankruptcy and financial distress prediction. *Machine Learning with Applications*, 15, 100527.

⁵ El Madou, K., Marso, S., El Kharrim, M., & El Merouani, M. (2024). Evolutions in machine learning technology for financial distress prediction: A comprehensive review and comparative analysis. *Expert Systems*, 41(2), e13485.

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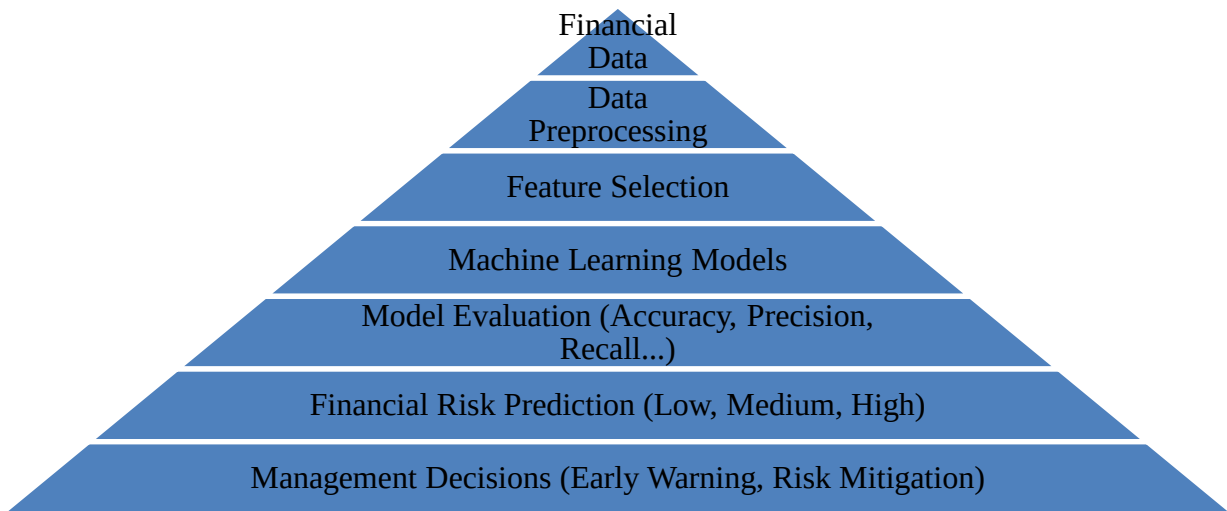


Figure 1. AI-based framework for enterprise financial risk prediction.

Source: Developed by the author.

Different models provide different advantages. Logistic regression offers greater interpretability, while ensemble methods and neural networks can capture more complex relationships.⁶ Therefore, model selection should consider both predictive performance and interpretability. Explainable AI techniques can further help managers understand the factors behind risk predictions.⁷

The practical value of the proposed framework is its ability to provide an early-warning mechanism for financial deterioration. AI-based predictions can support decisions related to liquidity, debt, capital structure, and cash-flow management. Thus, integrating AI with traditional financial analysis can improve the timeliness and effectiveness of enterprise financial risk management.

Conclusion

Artificial intelligence provides promising opportunities to improve enterprise financial risk prediction by identifying complex relationships and early signs of financial deterioration. The proposed framework integrates financial data, preprocessing, feature selection, ML, and model evaluation to support more accurate and timely risk assessment. The analysis also shows that combining AI techniques with traditional financial analysis can strengthen early-warning systems and support managerial decisions related to liquidity, debt, capital structure, and cash-flow management. Therefore, the application of AI represents an important direction for improving enterprise financial risk management and financial stability.

⁶ Lokanan, M. E., & Ramzan, S. (2024). Predicting financial distress in TSX-listed firms using machine learning algorithms. *Frontiers in Artificial Intelligence*, 7.

⁷ Deng, S., Luo, Q., Zhu, Y., Ning, H., & Shimada, T. (2024). Financial risk forewarning with an interpretable ensemble learning approach: An empirical analysis based on Chinese listed companies. *Pacific-Basin Finance Journal*, 85, 102393.

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