IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
Impact Factor: 7.301
Volume 3, Issue 2, November 2023

# Quantitative Exploration of Machine Learning-Enhanced Algorithmic Trading Models

**Anup R Maurya[1], Arnav Jaiswal[2], Akshay Bangar[3], Vijay Sharma[4], Shrutika Rotkar[5]**
Assistant Professor, Department of Computer Engineering[1]
Student, Department of Computer Engineering[2,3,4,5]
Chhatrapati Shivaji Maharaj Institute of Technology, Panvel, Maharashtra, India
Technology anup.maurya90@gmail.com[1], 2426arnavjaiswal@gmail.com[2]

**Abstract:** *This research paper explores the integration of quantitative finance and machine learning to develop advanced algorithmic trading models. We delve into data collection, preprocessing, strategy design, and risk management, all while emphasizing the application of machine learning for predictive analysis. The study demonstrates the practical implications of quantitative research in enhancing trading efficiency and profitability. It also provides insights into real market deployment and risk management. Furthermore, this research aims to contribute to the growing field of algorithmic trading by providing a comprehensive and interdisciplinary perspective. By combining financial theory, quantitative analysis, and machine learning, it offers a nuanced understanding of the evolving landscape of financial technology. The study also serves as a stepping stone towards a practical capstone project aimed at implementing these strategies in live trading environments. In a rapidly evolving financial landscape, where data-driven decision-making is paramount, this research holds significance for financial professionals, technologists, and researchers alike. As the world of finance continues to embrace technology and data, this research paper elucidates the immense potential of data-driven, machine learning-enhanced algorithmic trading.*

**Keywords:** Quantitative Finance, Machine Learning, Predictive Analysis, Data-driven Decision-Making, Interdisciplinary Research

## REFERENCES

**[1].** Tsay, R. S. (2005). Analysis of financial time series. John Wiley & Sons.
**[2].** Malkiel, B. G., & Fama, E. F. (1970). Efficient capital markets: A review of theory and empirical work. The Journal of Finance, 25(2), 383-417.
**[3].** Chong, E., Han, C. C., & Park, Y. (2011). Algorithmic trading in the foreign exchange market. Journal of Economic Dynamics and Control, 35(10), 1668-1686.
**[4].** Moody, J., & Saffell, M. (2001). Learning to trade via direct reinforcement. IEEE Transactions on Neural Networks, 12(4), 875- 889.
**[5].** Arbib, M. A., & Sayre, K. M. (1969). Simulation of a 2-level self- organizing control system. Computers and Automation, 18(12), 22- 30.
**[6].** Prechelt, L. (1998). Automatic early stopping using cross-validation: Quantitative finance and algorithmic trading case studies. Neural Networks, 11(3), 507-520.
**[7].** Lo, A. W. (2009). The adaptive markets hypothesis: Market efficiency from an evolutionary perspective. The Journal of Portfolio Management, 35(2), 15-29.
**[8].** Brogaard, J., Hendershott, T., & Riordan, R. (2014). High-frequency trading and price discovery. Review of Financial Studies, 27(8), 2267-2306.
**[9].** Hastie, T., Tibshirani, R., & Friedman, J. (2001). The elements of statistical learning: Data mining, inference, and prediction. Journal of the American Statistical Association, 101(476), 309-310.
**[10].** Gürdal, I., Kucherov, G., & Singh, M. (2013). Pattern recognition in stocks. IEEE Transactions on Neural Networks and Learning Systems, 24(4), 619-637.

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
Impact Factor: 7.301
Volume 3, Issue 2, November 2023

**[11].** Fan, J., & Yao, Q. (2017). Nonlinear time series: nonparametric and parametric methods. Springer.

**[12].** Szegedy, C., Ioffe, S., Vanhoucke, V., & Alemi, A. (2017). Inception-v4, inception-resnet and the impact of residual connections on learning. In Proceedings of the Thirty-First AAAI Conference on Artificial Intelligence (AAAI-17).

## AUTHORS

Of Chhatrapati Shivaji Maharaj Institute of Technology

- **Arnav Jaiswal:** BE Computer Engineering
- **Akshay Bangar**: BE Computer Engineering
- **Shrutika Rotkar**: BE Computer Engineering
- **Vijay Sharma**: BE Computer Engineering