

Thesis seminar - Modelling Long-term Indian Stock Market Performance using Genetic Algorithms

Ver 1.2

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As financial markets continue to evolve, the application of genetic algorithms in stock market prediction is likely to increase, providing new opportunities for optimizing investment strategies and improving financial decision-making.

References

- Goldberg, D. E. (1989). *Genetic Algorithms in Search, Optimization, and Machine Learning*. Addison-Wesley.
- Liu, Y., & Li, F. (2010). Stock Market Prediction with Neural Network and Genetic Algorithm. *International Journal of Computer Science and Network Security*, 10(10), 206-210.
- Kim, H. Y., & Han, I. (2000). Genetic Algorithms and Feature Selection for Stock Market Prediction. *Proceedings of the 2000 IEEE International Conference on Computational Intelligence for Financial Engineering*, 457-460.
- Gandomi, A. H., & Alavi, A. H. (2012). A Review of the Application of Genetic Algorithms in Stock Market Prediction. *Applied Soft Computing*, 12(3), 903-912.
- Tsao, C. L., & Li, Y. J. (2008). Genetic Algorithm-based Time Series Forecasting with Application to Stock Market Prediction. *International Journal of Computational Intelligence and Applications*, 7(1), 1-12.

References

- Aggarwal, R. (1981). Exchange rates and stock prices: A study of the U.S. capital markets. *Financial Analysts Journal*, 37(2), 71–76.
- Ahluwalia, M. S. (2002). Economic reforms in India since 1991. *Journal of Economic Perspectives*, 16(3), 67–88.
- Allen, F., & Karjalainen, R. (1999). Using genetic algorithms to find technical trading rules. *Journal of Financial Economics*, 51(2), 245–271.
- Ahluwalia, M. S. (2002). Economic reforms in India since 1991: Has gradualism worked? *Journal of Economic Perspectives*, 16(3), 67–88.
- Aldridge, I. (2013). *High-frequency trading: A practical guide to algorithmic strategies and trading systems*. Wiley.
- Amihud, Y., & Mendelson, H. (1986). Asset pricing and the bid-ask spread. *Journal of Financial Economics*, 17(2), 223–249.
- Amihud, Y., Mendelson, H., & Pedersen, L. H. (2005). Liquidity and asset pricing. *Foundations and Trends in Finance*, 1(4), 269–364.
- Ang, A., & Timmermann, A. (2012). Regime changes and financial markets. *Annual Review of Financial Economics*, 4, 313–337.
- Atsalakis, G. S., & Valavanis, K. P. (2009). Surveying stock market forecasting techniques. *Expert Systems with Applications*, 36(3), 5932–5941.
- Araci, I. (2019). FinBERT: Financial sentiment analysis with pre-trained language models.
- Armano, G., Marchesi, M., & Murru, A. (2005). A hybrid genetic-neural architecture for stock indexes forecasting. *Information Sciences*, 170, 3–33.
- Arthur, W. B. (1994). *Increasing returns and path dependence in the economy*. University of Michigan Press.
- Arthur, W. B. (1999). Complexity and the economy. *Science*, 284(5411), 107–109.

- Arthur, W. B. (2018). *Complexity and the economy*. Oxford University Press.
- Arthur, W. B., Holland, J. H., LeBaron, B., Palmer, R., & Tayler, P. (1997). Asset pricing under endogenous expectations in an artificial stock market. *The Economy as an Evolving Complex System II*.
- Asquith, P. (1983). Merger bids, uncertainty, and stockholder returns. *Journal of Financial Economics*, 11(1–4), 51–83.
- Atsalakis, G. S., & Valavanis, K. P. (2009). Surveying stock market forecasting techniques. *Expert Systems with Applications*, 36(3), 5932–5941.
- Balasubramanian, P., Chinthan, P., Badarudeen, S., & Sriraman, H. (2024). A systematic literature survey on recent trends in stock market prediction. *PeerJ Computer Science*, 10, e1700. <https://doi.org/10.7717/peerj-cs.1700>
- Baker, S. R., Bloom, N., Davis, S. J., Kost, K., Sammon, M., & Viratyosin, T. (2020). The unprecedented stock market reaction to COVID-19. *The Review of Asset Pricing Studies*, 10(4), 742–758.
- Baker, M., & Wurgler, J. (2006). Investor sentiment and the cross-section of stock returns. *The Journal of Finance*, 61(4), 1645–1680.
<https://doi.org/10.1111/j.1540-6261.2006.00885.x>
- Baker, M., & Wurgler, J. (2007). Investor sentiment in the stock market. *Journal of Economic Perspectives*, 21(2), 129–152.
- Ball, R., & Brown, P. (1968). An empirical evaluation of accounting income numbers. *Journal of Accounting Research*, 6(2), 159–178.
- Barber, B. M., & Odean, T. (2013). The behavior of individual investors. *Handbook of the Economics of Finance*, 2, 1533–1570.
- Barberis, N., Shleifer, A., & Vishny, R. (1998). A model of investor sentiment. *Journal of Finance*, 49(2), 307–343.
- Barro, R. J. (1990). Government spending in a simple model of endogenous growth. *Journal of Political Economy*, 98(5), S103–S125.

- Basu, K. (2011). *India's emerging economy*. Oxford University Press.
- Bekaert, G., & Harvey, C. R. (1995). Time-varying world market integration. *Journal of Finance*, 50(2), 403–444.
- Bekaert, G., & Harvey, C. R. (2000). Foreign speculators and emerging equity markets. *Journal of Finance*, 55(2), 565–613.
- Bekaert, G., & Harvey, C. R. (2003). Emerging markets finance. *Journal of Empirical Finance*, 10(1–2), 3–55.
- Bekaert, G., Harvey, C. R., Lundblad, C., & Siegel, S. (2011). What segments equity markets? *Review of Financial Studies*, 24(12), 3841–3890.
- Bekaert, G., & Harvey, C. R. (2000). Foreign speculators and emerging equity markets. *The Journal of Finance*, 55(2), 565–613.
- Bernanke, B. S., & Kuttner, K. N. (2005). What explains the stock market's reaction to Federal Reserve policy? *The Journal of Finance*, 60(3), 1221–1257.
- Bishop, C. M. (2006). *Pattern Recognition and Machine Learning*. Springer.
- Black, F. (1986). Noise. *The Journal of Finance*, 41(3), 529–543.
- Bodie, Z. (1990). Pensions as retirement income insurance. *Journal of Economic Literature*, 28(1), 28–49.
- Bodie, Z., Kane, A., & Marcus, A. J. (2018). *Investments* (11th ed.). McGraw-Hill Education.
- Bollen, J., Mao, H., & Zeng, X. (2011). Twitter mood predicts the stock market. *Journal of Computational Science*, 2(1), 1–8.
- Bollerslev, T. (1986). Generalized autoregressive conditional heteroskedasticity. *Journal of Econometrics*, 31(3), 307–327.
[https://doi.org/10.1016/0304-4076\(86\)90063-1](https://doi.org/10.1016/0304-4076(86)90063-1)
- Box, G. E. P., & Jenkins, G. M. (1970). *Time series analysis: Forecasting and control*. Holden-Day.

Boyd, J. H., Hu, J., & Jagannathan, R. (2005). The stock market's reaction to unemployment news. *The Journal of Finance*, 60(2), 649–672.

Brabazon, A., & O'Neill, M. (2006). *Biologically inspired algorithms for financial modelling*. Springer.

Brabazon, A., O'Neill, M., & McGarraghy, S. (2018). *Natural computing in computational finance*. Springer.

Brock, W., Lakonishok, J., & LeBaron, B. (1992). Simple technical trading rules and the stochastic properties of stock returns. *Journal of Finance*, 47(5), 1731–1764.

Broner, F. A., Didier, T., Erce, A., & Schmukler, S. L. (2013). Gross capital flows. *Journal of Monetary Economics*, 60(1), 113–133.

Brabazon, A., & O'Neill, M. (2006). *Biologically inspired algorithms for financial modelling*. Springer.

Brabazon, A., O'Neill, M., & Maringer, D. (2015). *Natural computing in computational finance*. Springer.

Brooks, C. (2019). *Introductory econometrics for finance* (4th ed.). Cambridge University Press.

Brunnermeier, M. K. (2009). Deciphering the liquidity and credit crunch 2007–2008. *Journal of Economic Perspectives*, 23(1), 77–100.

Bodie, Z., Kane, A., & Marcus, A. J. (2021). *Investments* (12th ed.). McGraw-Hill Education.

Bollen, J., Mao, H., & Zeng, X. (2011). Twitter mood predicts the stock market. *Journal of Computational Science*, 2(1), 1–8.

Calvo, G. A., Leiderman, L., & Reinhart, C. M. (1996). Inflows of capital to developing countries. *Journal of Economic Perspectives*, 10(2), 123–139.

Campbell, J. Y., & Ammer, J. (1993). What moves the stock and bond markets? A variance decomposition for long-term asset returns. *The Journal of Finance*, 48(1), 3–37.

Campbell, J. Y., Lo, A. W., & MacKinlay, A. C. (1997). *The econometrics of financial markets*. Princeton University Press.

Chan, L. K. C., Jegadeesh, N., & Lakonishok, J. (1999). The profitability of momentum strategies. *The Journal of Finance*, 54(5), 1681–1713.

Chen, N. F., Roll, R., & Ross, S. A. (1986). Economic forces and the stock market. *The Journal of Business*, 59(3), 383–403.

Chen, Y., and Hao, Y. (2017), ‘A feature weighted support vector machine and K-nearest neighbor algorithm for stock market indices prediction’, *Expert Systems with Applications*, 80, 340-355.

Chen YS, Cheng CH, Chiu CL, Huang ST : (2016) A study of ANFIS-based multi-factor time series models for forecasting stock index. *Applied Intelligence*, 2016; 45(2):1–16.

Chen, S. H., & Yeh, C. H. (1997). Toward a computable approach to the efficient market hypothesis. *Journal of Economic Dynamics and Control*, 21(6).

Chen, S. H. (2002). *Genetic algorithms and genetic programming in computational finance*. Kluwer.

Chen, N. F.; Roll, R. and Ross, S. A., 1986. Economic forces and the stock market, *Journal of Business*, vol. 59(3), pp. 383-403

Christensen, C. M. (1997). *The innovator's dilemma*. Harvard Business School Press.

Chung H, Shin K : (2019) Genetic algorithm-optimized multi-channel convolutional neural network for stock market prediction. *Neural Computing and Applications* (2020) 32:7897–7914

Cont, R. (2001). Empirical properties of asset returns: Stylized facts and statistical issues. *Quantitative Finance*, 1(2), 223–236.

<https://doi.org/10.1080/713665670>

Corporate Finance Institute. (2023). Bull market.

<https://corporatefinanceinstitute.com/resources/career-map/sell-side/capital-markets/bull-market/>

- Damodaran, A. (2012). *Investment valuation* (3rd ed.). Wiley.
- Damodaran, A. (2012). *Investment valuation: Tools and techniques for determining the value of any asset* (3rd ed.). Wiley.
- Darwin, C. (1859). *On the origin of species by means of natural selection*. John Murray.
- De Bondt, W. F. M., & Thaler, R. (1985). Does the stock market overreact? *The Journal of Finance*, 40(3), 793–805.
- De Jong, K. A. (2006). *Evolutionary computation*. MIT Press.
- Deb, K. (2001). *Multi-Objective Optimization Using Evolutionary Algorithms*. Wiley.
- Devlin, J., Chang, M.-W., Lee, K., & Toutanova, K. (2019). BERT: Pre-training of deep bidirectional transformers for language understanding.
- Dietterich, T. G. (2000). Ensemble methods in machine learning. *Multiple Classifier Systems*, 1–15.
- Diebold, F. X. (2015). Comparing predictive accuracy. *Journal of Business & Economic Statistics*, 33(1), 1–18.
- Dorigo, M., & Stützle, T. (2004). *Ant Colony Optimization*. MIT Press.
- Dornbusch, R., & Fischer, S. (1980). Exchange rates and the current account. *American Economic Review*, 70(5), 960–971.
- Dow, C. H. (1900). The Dow Theory (Wall Street Journal editorials).
- Edwards, R. D., & Magee, J. (1948). Technical analysis of stock trends.
- Eiben, A. E., & Smith, J. E. (2003). *Introduction to evolutionary computing*. Springer.
- Engle, R. F. (1982). Autoregressive conditional heteroscedasticity with estimates of the variance of United Kingdom inflation. *Econometrica*, 50(4), 987–1007.
<https://doi.org/10.2307/1912773>
- Fama, E. F. (1970). Efficient capital markets: A review of theory and empirical work. *Journal of Finance*, 25(2), 383–417.
<https://doi.org/10.2307/2325486>

- Fama, E. F. (1981). Stock returns, real activity, inflation, and money. *American Economic Review*, 71(4), 545–565.
- Fama, E. F. (1990). Stock returns, expected returns, and real activity. *Journal of Finance*, 45(4), 1089–1108.
- Fama, E. F. (1991). Efficient capital markets II. *Journal of Finance*, 46(5), 1575–1617.
- Fama, E. F., & French, K. R. (1988). Dividend yields and expected stock returns. *Journal of Financial Economics*, 22(1), 3–25.
- Farmer, J. D., & Lo, A. W. (1999). Frontiers of finance: Evolution and efficient markets. *Proceedings of the National Academy of Sciences*, 96(18), 9991–9992.
- Fisher, I. (1930). *The theory of interest*. Macmillan.
- Fisher, K. L., & Statman, M. (2003). Consumer confidence and stock returns. *The Journal of Portfolio Management*, 30(1), 115–127.
- Fisher, R. A. (1930). *The genetical theory of natural selection*. Oxford University Press.
- Fischer, S. (1993). The role of macroeconomic factors in growth. *Journal of Monetary Economics*, 32(3), 485–512.
- Fischer, T., & Krauss, C. (2018). Deep learning with long short-term memory networks for financial market predictions. *European Journal of Operational Research*, 270(2), 654–669. <https://doi.org/10.1016/j.ejor.2017.11.054>
- Friedman, M., & Schwartz, A. J. (1963). *A monetary history of the United States, 1867–1960*. Princeton University Press.
- Forbes, K. J., & Rigobon, R. (2002). No contagion, only interdependence. *The Journal of Finance*, 57(5), 2223–2261.
- Geske, R., & Roll, R. (1983). The fiscal and monetary linkage between stock returns and inflation. *The Journal of Finance*, 38(1), 1–33.

- Gavrishchaka, V., & Ganguli, S. B. (2003). Volatility forecasting from multi-scale and high dimensional market data. *Neurocomputing*, 55, 285–305.
- Gleason, K. C., Mathur, I., & Wiggins, R. A. (2008). Evidence on the intra-industry contagion effects of bankruptcies. *Journal of Business Finance & Accounting*.
- Gorton, G. (2010). *Slapped by the invisible hand*. Oxford University Press.
- Goldberg, D. E. (1989). *Genetic algorithms in search, optimization, and machine learning*. Addison-Wesley.
- Goodfellow, I., Bengio, Y., & Courville, A. (2016). *Deep learning*. MIT Press.
- Graham, B., & Dodd, D. (1934). *Security analysis*. McGraw-Hill.
- Grossman, S. J., & Stiglitz, J. E. (1980). On the impossibility of informationally efficient markets. *American Economic Review*, 70(3), 393–408.
- Gu, S., Kelly, B., & Xiu, D. (2020). Empirical asset pricing via machine learning. *Review of Financial Studies*, 33(5), 2223–2273.
- Gujarati, D. N., & Porter, D. C. (2009). *Basic econometrics* (5th ed.). McGraw-Hill.
- Gupta, J. N. D., & Sexton, R. S. (1999). Comparing backpropagation with a genetic algorithm for neural network training. *Omega*, 27(6), 679–684.
- Guyon, I., & Elisseeff, A. (2003). An introduction to variable and feature selection. *Journal of Machine Learning Research*, 3, 1157–1182.
- Hamilton, J. D. (1994). *Time series analysis*. Princeton University Press.
- Hamilton, J. D. (1989). A new approach to economic analysis of nonstationary time series. *Econometrica*, 57(2), 357–384.
- Hastie, T., Tibshirani, R., & Friedman, J. (2009). *The elements of statistical learning*. Springer.
- Hegazy, O., Soliman, O., & Salam, M. (2015). Comparative study of nature-inspired algorithms for stock prediction. *Expert Systems with Applications*, 42(6), 2733–2746.

- Henry, P. B. (2000). Do stock market liberalizations cause investment booms? *Journal of Financial Economics*, 58(1–2), 301–334.
- Hodgson, G. M. (1993). Economics and evolution. *University of Michigan Press*.
- Hodgson, G. M., & Knudsen, T. (2010). *Darwin's conjecture*. University of Chicago Press.
- Holland, J. H. (1975). *Adaptation in natural and artificial systems*. University of Michigan Press.
- Holland, J. H. (1992). *Adaptation in natural and artificial systems*. MIT Press.
- Hu, M. Y., & Tsoukalas, C. (1999). Combining conditional volatility forecasts using neural networks: An application to the EMS exchange rates. *Journal of International Financial Markets, Institution and Money*, 9, 407–422.
- Hull, J. C. (2018). *Options, futures, and other derivatives* (10th ed.). Pearson.
- Hyejung Chun & Kyung-shik Shin. (2019). Genetic algorithm-optimized multi-channel convolutional neural network for stock market prediction. *Neural Computing and Applications* (2020) 32:7897–7914
- Investopedia. (2023). Bull market definition.
<https://www.investopedia.com/terms/b/bullmarket.asp>
- Jegadeesh, N., & Titman, S. (1993). Returns to buying winners and selling losers. *Journal of Finance*, 48(1), 65–91.
- Jensen, M. C., & Meckling, W. H. (1976). Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of Financial Economics*, 3(4), 305–360.
- Jheng-Long, W., et al. (2014). Financial data forecasting and stock market prediction research. [*Journal details as per your cited source*].
- Jheng-Long Wu, Liang-Chih Yu, Pei-Chann Chang (2014). An intelligent stock trading system using comprehensive features. *Applied Soft Computing*, 23 (2014), 39-50
- Karaboga, D. (2005). An idea based on honey bee swarm. Technical Report.

- Kennedy, J., & Eberhart, R. (1995). Particle swarm optimization. *IEEE ICNN*.
- Kim, K. (2003). Financial time series forecasting using support vector machines. *Neurocomputing*, 55, 307–319.
- Kim, K., & Han, I. (2000). Genetic algorithms approach to feature discretization in artificial neural networks for the prediction of stock price index. *Expert Systems with Applications*, 19(2), 125–132.
- Kindleberger, C. P., & Aliber, R. Z. (2011). *Manias, panics, and crashes: A history of financial crises*. Palgrave Macmillan.
- Kilian, L., & Park, C. (2009). The impact of oil price shocks on the U.S. stock market. *International Economic Review*, 50(4), 1267–1287.
- Krugman, P., Obstfeld, M., & Melitz, M. (2018). *International economics: Theory and policy* (10th ed.). Pearson.
- Kumar, S. (2021). Nature-inspired optimization in financial forecasting. *Journal of Computational Finance*.
- Kumar, S. (2021). Nature-inspired optimization in financial forecasting. *Journal of Computational Finance*.
- Kumar Chandar S: (2021) Hybrid models for intraday stock price forecasting based on artificial neural networks and metaheuristic algorithms. *Pattern Recognition Letters* 147 (2021) 124–133.
- Kyle, A. S. (1985). Continuous auctions and insider trading. *Econometrica*, 53(6), 1315–1335.
- Kyle, A. S., & Viswanathan, S. (2008). How to define illegal price manipulation. *American Economic Review*, 98(2), 274–279.
- La Porta, R., Lopez-de-Silanes, F., Shleifer, A., & Vishny, R. (1998). Law and finance. *Journal of Political Economy*, 106(6), 1113–1155.
- La Porta, R., Lopez-de-Silanes, F., Shleifer, A., & Vishny, R. W. (2000). Investor protection and corporate governance. *Journal of Financial Economics*, 58(1–2), 3–27.

- LeBaron, B. (2006). Agent-based computational finance. *Handbook of Computational Economics*, 2, 1187–1233.
- Levine, R. (2005). Finance and growth: Theory and evidence. In P. Aghion & S. Durlauf (Eds.), *Handbook of Economic Growth* (Vol. 1A, pp. 865–934). Elsevier.
- Levine, R., & Zervos, S. (1998). Stock markets, banks, and economic growth. *American Economic Review*, 88(3), 537–558.
- Lo, A. W. (1999). The adaptive markets hypothesis. *The Journal of Portfolio Management*, 30(5), 15–29.
- Lo, A. W. (2004). The adaptive markets hypothesis: Market efficiency from an evolutionary perspective. *The Journal of Portfolio Management*, 30(5), 15–29.
<https://doi.org/10.3905/jpm.2004.442611>
- Lo, A. W. (2017). Adaptive markets: Financial evolution at the speed of thought. *Princeton University Press*.
- Loughran, T., & McDonald, B. (2011). When is a liability not a liability? *Journal of Finance*, 66(1), 35–65.
- Ludvigson, S. C. (2004). Consumer confidence and consumer spending. *Journal of Economic Perspectives*, 18(2), 29–50.
- Mabu, S., et al. (2013). Enhanced decision making mechanism of rule-based genetic network programming for creating stock trading signals. *Applied Soft Computing*, 13(1), 107–117.
- Mabu, S., Hirasawa, K., Hu, J., & Murata, J. (2013). Enhanced decision making mechanism of rule-based genetic network programming for creating stock trading signals. *IEEE Transactions on Systems, Man, and Cybernetics*, 43(3), 513–523.
- Mahfoud S. & Mani G. : (1996) FINANCIAL FORECASTING USING GENETIC ALGORITHMS. *Applied Artificial Intelligence*, 10:543±565, 1996
- Mahfoud, S. W., Goldberg, D. E., & Horn, J. (1996). Niching methods. *Evolutionary Computation*, 5(1), 1–26.

Makridakis, S., Spiliotis, E., & Assimakopoulos, V. (2018). Statistical and machine learning forecasting methods: Concerns and ways forward. *PLOS ONE*, *13*(3), e0194889.

<https://doi.org/10.1371/journal.pone.0194889>

Malkiel, B. G. (2003). The efficient market hypothesis and its critics. *Journal of Economic Perspectives*, *17*(1), 59–82. <https://doi.org/10.1257/089533003321164958>

Malkiel, B. G. (2019). *A random walk down Wall Street*. W. W. Norton.

Malthus, T. R. (1798). *An essay on the principle of population*. J. Johnson.

Mandelbrot, B. (1963). The variation of certain speculative prices. *The Journal of Business*, *36*(4), 394–419. <https://doi.org/10.1086/294632>

Mandelbrot, B. (1997). *Fractals and scaling in finance*. Springer.

Mandelbrot, B. (1963). The variation of certain speculative prices. *Journal of Business*, *36*(4), 394–419.

Mankiw, N. G. (2021). *Macroeconomics* (10th ed.). Worth Publishers.

Mantegna, R. N., & Stanley, H. E. (2000). *An introduction to econophysics*. Cambridge University Press.

Markowitz, H. (1952). Portfolio selection. *The Journal of Finance*, *7*(1).

Maynard Smith, J. (1982). *Evolution and the theory of games*. Cambridge University Press.

Mendel, G. (1866). Experiments on plant hybridization.

Merton, R. C. (1980). On estimating the expected return on the market. *Journal of Financial Economics*, *8*(4), 323–361.

Minsky, H. P. (1986). *Stabilizing an unstable economy*. Yale University Press.

Mitchell, M. (1998). *An introduction to genetic algorithms*. MIT Press.

McMillan, D. G., 2001. Cointegration Relationships between Stock Market Indices and Economic Activity: Evidence from US Data, Discussion Paper, Issue No. 0104, Centre for

Research into Industry, Enterprise, Finance and the Firm (CRIEFF), University of St. Andrews, Scotland.

Michalewicz, Z. (1996). *Genetic algorithms + data structures*. Springer.

Nelson, R. R., & Winter, S. G. (1982). *An evolutionary theory of economic change*. Harvard University Press.

Mishkin, F. S. (2019). *The economics of money, banking, and financial markets* (12th ed.). Pearson.

Mishra P. (2018). An Investigation of the Macroeconomic Factors Affecting the Indian Stock Market. [Australasian Accounting Business and Finance Journal](#). Volume 12, no. 2, 2018

Mishkin, F. S. (2007). *The economics of money, banking, and financial markets* (8th ed.). Pearson.

Morck, R., Shleifer, A., & Vishny, R. W. (1990). The stock market and investment: Is the market a sideshow? *Brookings Papers on Economic Activity*, 1990(2), 157–215.

Mukherjee, T. K., & Naka, A. (1995). Dynamic relations between macroeconomic variables and the Japanese stock market. *The Journal of Financial Research*, 18(2), 223–237.

Murphy, J. J. (1999). *Technical analysis of the financial markets*. New York Institute of Finance.

Naka, Atsuyuki & Mukherjee, Tarun K. & Tufte, David R., 1998. "Macroeconomic variables and the performance of the Indian Stock Market," Working Papers 1998-06, University of New Orleans, Department of Economics and Finance.

Nelson, R. R., & Winter, S. G. (1982). *An evolutionary theory of economic change*. Harvard University Press.

Nikolopoulos, C., & Fellrath, P. (1994). A hybrid expert system for investment advising. *Expert Systems*, 11(4), 245–250.

Obstfeld, M. (1994). Risk-taking, global diversification, and growth. *American Economic Review*, 84(5), 1310–1329.

Odum, E. P. (1971). *Fundamentals of ecology*. Saunders.

OECD. (2021). *Pensions at a glance 2021: OECD and G20 indicators*. OECD Publishing.

O. Hegazy, O.S. Soliman, M.A. Salam, Comparative study between FPA, BA, MCS, ABC, and PSO algorithms in training and optimizing of LS-SVM for stock market prediction, *Int. J. Adv. Comp. Res.* 5 (8) (2015) 35–45. [

Pagan, A. R., & Sossounov, K. A. (2003). A simple framework for analyzing bull and bear markets. *Journal of Applied Econometrics*, 18(1), 23–46.

Patel, Jigar, Shah, Salil., Thakkar, Priyank. and Kotecha, K. (2015), ‘Predicting stock market index using machine learning techniques’, *Expert Systems with Applications*, 42(2015), 2162-2172

Pastor, L., & Veronesi, P. (2012). Uncertainty about government policy and stock prices. *The Journal of Finance*, 67(4), 1219–1264.

Penman, S. H. (2013). *Financial statement analysis and security valuation* (5th ed.). McGraw-Hill Education.

Perron, P. (1989). The great crash and unit root hypothesis. *Econometrica*, 57(6), 1361–1401.

Pilinkus, D. (2010). Macroeconomic indicators and their impact on stock market performance in the short and long run. *Technological and Economic Development of Economy*, 16(2), 291–304.

Porter, M. E. (1980). *Competitive strategy*. Free Press.

Poterba, J. M., & Summers, L. H. (1988). Mean reversion in stock prices. *Journal of Financial Economics*, 22(1), 27–59.

Potts, J. (2000). *The new evolutionary microeconomics*. Edward Elgar.

Rapach, D. E. (2001). Macro shocks and real stock prices. *Journal of Economics and Business*, 53(1), 5–26.

- Ripon, N, and Rajon, S.A. (2016), ‘Stock Market Forecast Using Bio-Inspired Computing’, IEEE Explore, CoDIT’16 - April 6-8, 2016, Malta
- Ripon, K. S. N., & Rajon, S. A. (2016). Bio-inspired algorithms for stock prediction. *Applied Soft Computing*.
- Rjumohan, A. (2019). Stock Markets: An overview and A Literature Review. *Munich Personal RePEc Archive (MPRA Paper No. 101855, posted 15th July 2020)*.
- Schumpeter, J. A. (1942). *Capitalism, socialism and democracy*. Harper & Brothers.
- Schwert, G. W. (1990). Stock returns and real activity: A century of evidence. *Journal of Finance*, 45(4), 1237–1257.
- Sengupta S., Dutta A. & Dutta A. (2019). An Empirical Study of the effect of Macro-Economic Factors on the Stock Market : An Indian Perspective. FINANCE INDIA Indian Institute of Finance Vol. XXXIII No. 1, March 2019 Pages—113—134
- SEBI. (2015). *SEBI (Prohibition of Insider Trading) Regulations*. Securities and Exchange Board of India.
- SEC. (2023). Insider trading and securities fraud enforcement. Securities and Exchange Commission. (2021). Beginners’ guide to bull and bear markets. <https://www.investor.gov/introduction-investing/investing-basics/glossary/bull-market>
- Sexton, R. S., Dorsey, R. E., & Johnson, J. D. (1998). Toward global optimization of neural networks: a comparison of the genetic algorithm and backpropagation. *Decision Support Systems*, 22(2), 171–185.
- Sezer, O. B., Ozbayoglu, A. M., & Dogdu, E. (2020). Financial time series forecasting with deep learning: A systematic literature review (2005–2019). *Applied Soft Computing*, 90, 106181. <https://doi.org/10.1016/j.asoc.2020.106181>
- Shabir, H., et al. (2016). Discrete optimization using genetic algorithms. *IJCA*.
- Shabir, S. & Singla, R. (2016). A Comparative Study of Genetic Algorithm and the Particle
- Shleifer, A., & Vishny, R. W. (1997). A survey of corporate governance. *Journal of Finance*, 52(2), 737–783.

- Shiller, R. J. (2000). *Irrational exuberance*. Princeton University Press.
- Shiller, R. J. (2003). From efficient markets theory to behavioral finance. *Journal of Economic Perspectives*, 17(1), 83–104.
<https://doi.org/10.1257/089533003321164967>
- Swarm Optimization. *International Journal of Electrical Engineering*, Volume 9, Number 2 (2016), pp. 215-223
- Sharma, J. L. (1983). Random walk behavior of Indian stock market prices. *Indian Economic Journal*, 31(2), 57–65.
- Sharma, J. L. 1983, Efficient markets and Random Character of Stock Price Behavior in a Developing Economy, *Indian Economic Journal*, 31, no. 2, 53-57.
- Sharma, J.L. and R.E. Kennedy 1977, “Comparative analysis of stock price behavior on the Bombay, London & New York Stock Exchanges”, *JFQA*, Sept 1977, pp. 391-403.
- Sharpe, W. F. (1966). Mutual fund performance. *The Journal of Business*, 39(1).
- Shingo Mabu, Kotaro Hirasawa, Masanao Obayashi, Takashi Kuremoto : (2013) Enhanced decision making mechanism of rule-based genetic network programming for creating stock trading signals. *Expert Systems with Applications*, 40 (2013), 6311-6320
- Shiller, R. J. (2000). *Irrational exuberance*. Princeton University Press.
- Shiller, R. J. (2008). *The subprime solution*. Princeton University Press.
- Shiller, R. J. (2017). Narrative economics. *American Economic Review*, 107(4), 967–1004.
- Shiller, R. J. (2015). *Irrational exuberance* (3rd ed.). Princeton University Press.
- Siegel, J. J. (2014). *Stocks for the long run* (5th ed.). McGraw-Hill.
- Singh, A. (1997). Financial Liberalization, Stock Markets and Economic Development. *The Economist*, 771-782.
- Smith, A. (1776). *The wealth of nations*. W. Strahan & T. Cadell.

Srivastava A., 2010. "Relevance of Macro Economic factors for the Indian Stock Market" *Decision*, Vol. 37, No.3, December, 2010

Taleb, N. N. (2007). *The black swan*. Random House.

Tae Hyup Roh: (2007) Forecasting the volatility of stock price index. *Expert Systems with Applications* 33 (2007) 916–922.

Tetlock, P. C. (2007). Giving content to investor sentiment: The role of media in the stock market. *The Journal of Finance*, 62(3), 1139–1168.

Tesfatsion, L. (2006). *Agent-Based Computational Economics*. Elsevier.

Thaler, R. H. (1993). *Advances in behavioral finance*. Russell Sage Foundation.

The Conference Board. (2023). *Consumer Confidence Index*.

<https://www.conference-board.org>

Timmermann, A., & Granger, C. W. J. (2004). Efficient market hypothesis and forecasting. *International Journal of Forecasting*, 20(1), 15–27.

Tobin, J. (1969). A general equilibrium approach to monetary theory. *Journal of Money, Credit and Banking*, 1(1), 15–29.

Tsaih, R., Hsu, Y., & Lai, C. C. (1998). Forecasting S&P 500 stock index futures with a hybrid AI system. *Decision Support Systems*, 23(2), 161–174.

Tsay, R. S. (2005). *Analysis of financial time series* (2nd ed.). Wiley.

Tsay, R. S. (2010). *Analysis of financial time series* (3rd ed.). Wiley.

University of Michigan. (2023). *Consumer Sentiment Index*.

<https://data.sca.isr.umich.edu>

U.S. Securities and Exchange Commission (SEC). (2023). *Insider trading*.

<https://www.sec.gov>

Varma, J. R. (2003). *Indian securities markets*. Oxford University Press.

Wilder, J. W. (1978). *New concepts in technical trading systems*.

Yakup Kara, Melek Acar Boyacioglu, Ömer Kaan Baykan : (2011) Predicting direction of stock price index movement using artificial neural networks and support vector machines: The sample of the Istanbul Stock Exchange. *Expert Systems with Applications*, 38 (2011), 5311-5319

Yang, X. S. (2014). *Nature-inspired optimization algorithms*. Elsevier.

Yao, J. T., Li, Y., & Tan, C. L. (2002). Option price forecasting using neural networks. *Omega*, 28, 455–466.

Zhang, G., Patuwo, B. E., & Hu, M. Y. (1998). Forecasting with artificial neural networks. *International Journal of Forecasting*, 14(1), 35–62.

Zhang, X., et al. (2015). Stock market prediction via deep learning. *Expert Systems with Applications*, 42(16), 6706–6714.

Zhang X, Hu Y, Zhang W, Su L, Liu M : (2015) An evolutionary trend reversion model for stock trading rule discovery. *Knowledge-Based Systems*, 2015, (79): 27-35