

INDEX

- Action-based manipulation, 21–22
- Advanced detection system (ADS), 30
- Amsterdam stock markets, 1
- Analytical techniques, 30
- χ^2 approximation test, 62–63
- Artificial neural network-genetic algorithm based composite mode (ANN-GA based composite model). *See also* Support Vector Machines model (SVM model), 35–37, 39–40, 53, 83–85
 - applying weights to neural network, 71
 - artificial neural network based model, 47–49
 - comparison of results, 53–54
 - convergence, 70–71
 - for detecting stock price manipulation, 46–51
 - determining weights using genetic algorithm, 68–71
 - development of model, 67–71
 - fitness function, 70
 - generating chromosome, 68
 - reproduction, 70
 - results, 72–73
 - weight extraction, 69–70
- Artificial neural networks (ANN), 31, 46, 66, 72
 - ANN based model, 47–49
 - computing weights using genetic algorithm, 49–51
 - hidden layer nodes, 47–49
 - input layer nodes, 47
 - output layer nodes, 49
- Autoregressive integrated moving average (ARIMA), 17
- Behavioural finance, 3
- Bombay stock exchange (BSE), 4, 39
 - index, 4
- Box's *M*-test, 44, 62
- C#.NET 2.0, 53, 83
- Capital market, 4, 10–11
 - in India, 3–4
 - trading behaviour in, 10
- Capital Markets Cooperative Research Centre (CMCRC), 2
- Chromosome, 68
- Classification, 30
- Classifier equation, 37
- Closing price manipulation, 25
- Co-location facility, 4–5
- Composite model, 34, 67
- Confusion matrix, 39–40, 72, 81–82
- Continuous auction framework, 20
- Convergence, 70–71
- Corporate practices, 21
- Crossover operation, 47, 49
- Currency
 - derivatives segments, 4
 - futures and options, 4
- Day trading, 8
- Department of Company Affairs (DCA), 5

- Department of Economics Affairs (DEA), 5
- Depositories, 11–12
- Derivatives Market, 4
- Dhaka Stock Exchange (DSE), 17
- Direct Market Access (DMA), 4–5
- Discriminant analysis, 31, 35, 37, 39–40, 55
- Discrimination, 30
- DTREG, 53, 83
- Dual Decision function, 80
- Econometrics and network, 31
- Effective Market Surveillance, 10
- Efficient market, 16–17
- Efficient stock market, 3
- Efficient-Market Hypothesis (EMH), 3, 16–17
- Equal variance-covariance, 62–63
 - test of equal variance-covariance matrices, 43–44
- Equities based derivatives, 4
- Equity based ETFs, 4
- F-approximation
 - method, 63
 - test, 45
- Fitness function, 70
- FIX capabilities, 4–5
- Flash Orders, 15
- Futures & Options segments (F&O segments), 37–38
- Game theory, 23
- Generalized Squared Distance Function, 64
- Genetic Algorithm (GA), 47, 50–51, 66
 - determining weights using, 68–71
- Global Capital Markets, 6–7
- Gold ETF, 4
- Graph clustering algorithm, 31
- Guinness Four Business Scandal, The, 6
- Hedge Funds, 27
- Helsinki Stock Exchange, 27
- Hyperplane, 51, 75
 - maximum margin, 77
- Illegal price manipulation, 21
- Indian Capital Market, 85
- Indian Equity Exchanges, 71, 81
- Indian Equity Market, 37, 39
- Indian Stock Exchange, 1, 38
- Indian Stock Market, 3, 5, 33
 - BSE, 4
 - identifying research gap, 33–34
 - key developments in, 4–5
 - limitations of scope, 35
 - NSE, 4
 - research objectives, 35–36
 - scope of research, 34–35
- Information
 - dissemination, 16
 - false, 23–24
 - flow, 17
 - information-based
 - manipulation, 21–22, 24
 - insider, 23
 - material, 3
 - private, 25
- Information flow dynamics, 17
- Informed trader, 25
- Instruments, 2
- Integrated Market Surveillance System (IMSS), 11–12
- Integrated Surveillance Department of SEBI, 11
- Intermediaries, 2
- IPOs, 4–5, 19
- Istanbul Stock Exchange, 31
- Karush–Kuhn–Tucker conditions (KKT conditions), 79
- Kernel function, 79–80
- ‘Lead-lag’ linkages, 17
- Linear Classification Function, 41–42, 56, 59

- Linear classifier, 85
- Linear discriminant analysis. *See also* Quadratic Discriminant analysis, 83–84
- Linear discriminant function (LDF). *See also* Quadratic Discriminant Function (QDF), 35, 39–40, 53, 55, 59, 85
 - comparison of results, 53–54
 - for detecting stock price manipulation, 41–42
 - development of model, 55–56
 - F-approximation test, 45, 63
 - limitation of model, 58
 - linear classification function, 41–42, 56
 - results, 56–58
 - test for multivariate normality, 42–43
 - test of equal variance-covariance matrices, 43–44
 - test to check data, 60
 - test to check for equal variance-covariance, 62–63
 - testing assumptions governing, 42, 45, 59, 63
 - χ^2 approximation test, 62–63
- Linear kernel function, 79
- Linear Soft Margin Classifier, 52, 75
- Linearly Separable Classifier, 52, 75–76, 79
- Liquid market, 16
- Livedoor Scandal, The, 6
- Logistics regression, 31
- Logit, Genetic Algorithm, 34
- Long Dated Options, 4
- Manipulate/manipulation, 19, 24, 33
 - in stock market, 1
 - of stock prices, 1
 - techniques to detect, 1, 30–31
- Manipulators, 1
- Market
 - data dissemination, 3
 - integrity, 17–18
 - regulation, 7
 - surveillance system, 7, 11, 13, 15, 18, 29–30, 83
 - transparency, 18
- Market manipulation, 5, 9, 13, 19, 29
 - action-based manipulation, 22
 - empirical studies in, 26–29
 - information-based manipulation, 22–24
 - theoretical foundation to, 20–26
 - trade-based manipulation, 24–26
- Market Quality Forum, 34–35
- Market structure, 2–3
 - instruments, 2
 - market data dissemination, 3
 - market participants and intermediaries, 2
 - models adopted in present work, 13
 - regulator and regulations, 2
 - technology, 2
- MATLAB, 53, 83
- Microsoft. Net framework, 83
- Mini Nifty, 4
- Misclassification tables, 37, 40
- Mobile trading, 4–5
- Multi discriminant analysis (MDA), 34
- Multivariate normality, test for, 42–43
- Mutual Fund Service System, 4
- NASDAQ Stock Market, 30
- Nasdaq-Liffe (futures) stock markets, 30
- National Stock Exchange (NSE), 4, 6, 37–39
- Neural network model, 34, 46, 49–50, 68
 - applying weights to, 71

- Neurons, 46–47
- New York Stock Exchange (NYSE), 18
- Non-linear classifier, 52, 75, 79, 81
- Online message board database, 24
- Opportunistic individuals, 23
- Over the counter (OTC), 30
- Penny stocks, 8
- Polynomial kernel function, 79
- Price of stock, 1, 3
- Profit maximization, 24
- Pump-and-dump strategy, 28
- Q-Q plot, 42, 60–61
- Quadratic Classification function, 64
- Quadratic discriminant analysis, 63–64, 83–84
 - results, 64–66
 - testing assumptions governing Linear Discriminant Function, 59–63
- Quadratic discriminant function (QDF). *See also* Linear discriminant function, 35–36, 39–40, 45–46, 53, 63–65, 84–85
 - comparison of results, 53–54
 - QDF based model, 85
 - Quadratic Discriminant analysis for detecting stock price manipulation, 45–46
- Radial basis function (RBF), 79
 - kernel function, 52, 81
- Random walk behaviour, 16
- Redistribution method, 40
- Regulations, 2
- Regulator, 2
- Reproduction, 70
- Reserve Bank of India (RBI), 5–7
- Retail equity investor, 4–5
- Retail Government Securities, 4
- Saddle point, 78
- Securities Exchange Board of India (SEBI), 5–7, 10, 12, 19–20, 38–39
 - IMSS, 11–12
- Securities Exchange Commission, 23
- Securities Observation, News Analysis, and Regulation system (SONAR system), 30
- Securities regulation, 18
- Self-regulating organizations (SROs), 6, 83
- SENSEX, 4
- Sequential trade framework, 20
- Share prices, 20
- Sigmoid kernel function, 79
- Sigmoidal activation function, 71
- Small cap stocks, 8
- Smart Order Routing (SOR), 4–5
- SQL Server 2005, 83
- Stock, 75–76
- Stock market
 - efficient, 3
 - Indian Stock Market, 3–5
 - motivation for research, 12–13
 - SEBI, 10–12
 - stock price manipulation, 5–9
 - surveillance, 9–12
 - surveillance systems, 31
- Stock price manipulation, 5, 9, 55
 - ANN-GA based composite model for detecting stock price manipulation, 46–51
 - issues in identifying manipulation, 7–9
 - Linear Discriminant Function for detecting, 41–42
 - Quadratic Discriminant analysis for detecting, 45–46
 - SVM model for detecting, 51–53
 - types of manipulation, 9
- Structure-based methods, 31

- Substantiation, 21
- Support vector machine model (SVM model). *See also* Artificial neural network-genetic algorithm based composite mode (ANN-GA based composite model), 31, 34–37, 39–40, 53, 75–77, 81, 84–86
 - comparison of results, 53–54
 - confusion matrix, 82
 - development of model, 75–81
 - error count estimates for stock, 82
 - linearly separable classifier, 76–79
 - model for detecting stock price manipulation, 51–53
 - non-linear classifier, 79–81
 - results, 81–82
- Surveillance system, 7, 9
 - stock market, 9, 12
- Technology, 2
- Tehran Stock Exchange (TSE), 31
- Theory of Efficient Market, 16
- Trade data, 37–39
- Trade-based manipulation, 21–22, 24, 26
- Trade-based market
 - efficient market, 16–17
 - literature review of, 15
 - market integrity, 17–18
 - market manipulation, 19–29
 - market surveillance, 29–30
 - techniques to detect manipulation, 30–31
- Trade-based price manipulation, 20
- Trading regulations, 29
- Trading strategy, 21
- Tunisian Stock Market (TSE), 17
- Variance-covariance matrix, 34, 59, 83–84
- Volatility, 3, 26
- Weight extraction, 69–70