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Present Address: : Qtr No . 41 7 , C T ype Qt r , IIM Shillong, Umsawli, Shillong,
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Permanent Address: C/O Mr. Benulal Bhattacharjee,Road No. 13, Near Chaipara Bus Stop, P.O. Arundhutinagar, Agartala , Tripura

Professional summary: A researcher, academician and entrepreneur with 7 years of diverse experience in information systems, data sciences, business analytics, financial analytics, research & academics and consulting, having a research output of 25 publications (in peer- reviewed journals). A passionate teacher and an interdisciplinary researcher especially in the areas of data sciences, system sciences, business information systems and network sciences. Currently working as Assistant Professor Grade I (on contract) in the Information Systems and Analytics Area in IIM Shillong.

Education

PhD (2014-2018)	School of Management Studies, National Institute of Technology Calicut, ***Specialization***-Systems and Business Analytics **Supervisors:** Dr Animesh Acharjee, University of Cambridge, UK Dr Muhammad Shafi, SOMS, NIT Calicut ***Thesis:*** Cross-market and Cross-security Interdependencies in Capital Markets: Complex Network Based Elucidation and Influence Relationships Analysis in Financial Time Series
M.Sc. Engineering by Research (2011-2014)	PESIT, Bangalore under Visvesvaraya Technological University, Specialization- Bioinformatics, Grade B
B.E. (2002-2006)	KLE College of Engineering and Technology, Belgaum under Visvesvaraya Technological University, Specialization- Biotechnology, 76.24%
Higher Secondary	Hindi Higher Secondary School, Agartala, Tripura (CBSE Board), 71.6%
Matriculation	Holy Cross School , Agartala, Tripura (ICSE Board),84%

PROFESSIONAL CAREER

February 2020 till date	Assistant Professor Grade I, Information Systems and Analytics Area, IIM Shillong
January 2019 – December 2019	Assistant Professor, Department of Management, Amrita Viswa Vidyapeetham, Amritapuri, Kerala
August 2018-January 2019	Adhoc Faculty-Systems and Business Analytics, School of Management Studies, National Institute of Technology Calicut
January 2015-July 2018	PhD Research Scholar, SOMS, NIT Calicut
May 2014 - December 2014	Lecturer, Noble School of Business, Bangalore
Feb 2014-May 2014	Data Analyst, Predictive Research Ltd., Bangalore
December 2013-January 2014	Guest Faculty for Biostatistics and SAS programming, BT Finishing School (Govt of Karnataka),PESIT, Bangalore
September 2011-November 2013	Research Assistant, CDAC Project(Govt of India), PESIT, Bangaore
September 2011- February 2011	Guest Faculty for Biostatistics and SAS programming, BT Finishing School (Govt of Karnataka), Maharani Lakshmi Ammani College for Women, Bangalore
June 2007-June 2011	Entrepreneur, Co-Founder & Manager Operations, Institute of Computational Biology (IOCB), Bangalore

AWARDS & ACHIEVEMENTS:

- **Received Certificate of Honour** from Ministry of Culture, Government of India (75 Azadi ka Amrit Mahotsav)
- **Best Paper Award** in 4th International Conference on Fuzzy Systems and Data Mining (FSDM 2018) held at Bangkok, Thailand
- **Best Research Paper Award** by Operation Research Society of India in 4th International Conference on Business Analytics and Intelligence 2016 [ICBAI-2016) organized by IISc, Bangalore and IIM Bangalore
- **Top 30 finalist** for the innovative research projects in Grand Challenge in TB Control by *Bill and Melinda Gates Foundation*, USA. Invited to Hyderabad to present to ICICI Knowledge Park , Hyderabad to investors for $ 30,000 prize money
- **First Prize** in Biomodeling Content in HELIX 2004 in RVCE ,Bangalore for developing a Stainless Steel Bioreactor with all utilities
- **First Prize** in State Level Project Competition SHRISTI 2006 at Davangere held between 18-21st May 2006 for project work on "Use of D Limonene as an antimicrobial and anti-cancerous agent –An invitro and invivo approach"
- **First prize** in International Conference in Computational Biology, Bhubaneshwar ,2007 for the research on "Sequence Analysis of H1N1 and H5N1 and ascertaining test systems"
- **Schrödinger Award** for the Best Research Work in Bioinformatics in International Conference in Bioinformatics, Hyderabad 2008 for the research work on "Use of natural inhibitors for the treatment of Uterine Cancer-An insilico approach"
- **First Prize** in Oral Presentation of Bioinformatics research paper on **"**Mapping natural compounds on potential drug target Colon Cancer network" in **12th Annual BTISNet Coordinators Meeting ,** Pondicherry University, Feb 3-4, 2011.
- **Ranked First in 4th Semester** in BE Biotechnology
- **First Prize in Industrial Tour Seminar** in Manthana -2005 held by Association of Chemical Engineering Students**,** KLECET, Belgaum

SELECTED PUBLICATIONS:

1. Kavya Unni, Biplab Bhattacharjee, and Maheshwar Pratap. Bayesian optimized extreme gradient boosting models for classification problems: An experimental analysis with product return case, Journal of Systems and Information Technology **[ABDC B Rank]** (Provisionally accepted)
2. Vishnu Manohar G, Biplab Bhattacharjee, and Maheshwar Pratap. (2021). Preventing misuse of discount promotions in ecommerce websites: An application of rule-based systems, International Journal of Services Operations and Informatics, 11 (1), 54-74 (**SCOPUS Indexed)**
3. Kalyan Nagaraj, Biplab Bhattacharjee, Amulyashree Sridhar, and Sharvani GS. (2018). Detection of phishing websites using a novel twofold ensemble model, Journal of Systems and Information Technology**,** 20 (3), 321-357. **[SCOPUS Indexed] [ABDC B Rank]**
4. Biplab Bhattacharjee, T Radha Ramanan**,** Muhammad Shafi, and Animesh Acharjee. (2018). Elucidation of the Backbone Structure of Cross-market dependency network of world market indices: A global threshold filtering approach, Frontiers in Artificial Intelligence and Application, 309, 189-195. **[SCOPUS Indexed]**
5. Biplab Bhattacharjee, Muhammad Shafi, and Animesh Acharjee. (2016). Investigating the Influence Relationship Models for Stocks in Indian Equity Market: A Weighted Network Modelling Study. PLoS ONE 11(11): e0166087. https://doi.org/10.1371/journal.pone.0166087 [**Science Citation and SCOPUS Indexed, SCI Impact Factor 3.4]**
6. Biplab Bhattacharjee, Amulyashree Sridhar, and Anirban Dutta. (2017). Identifying the causal relationship between social media content of a Bollywood movie and its Box-office success - A text mining approach, International Journal of Business Information Systems, 24 (3), 344-368 **[**

SCOPUS Indexed, ABDC C Rank]

7. Biplab Bhattacharjee, Amulyashree Sridhar, and Muhammad Shafi. (2017). An Artificial Neural Network based Ensemble model for credit risk assessment and deployment as a Graphical User Interface, International Journal of Data Mining, Modelling and Management, 9(2), 122-141 **[SCOPUS and Emerging Science Citation Indexed]**
8. Biplab Bhattacharjee, Muhammad Shafi, and Animesh Acharjee. (2017). investigating the evolution of linkage dynamics among equity markets using network models and measures: A case of Asian equity market segmentation and integration. Data. 2(4), 41, 1-28. [**EmergingScience Citation Index, SCOPUS indexed]**
9. Biplab Bhattacharjee, Muhammad Shafi, and Animesh Acharjee. (2019). Network mining based elucidation of the dynamics of cross-market clustering and connectedness in Asian region: An MST and Hierarchical Clustering Approach. The Journal of King Saud University: Computer and Information Sciences, 31 (2), 218-228. **(Science Citation Index Expanded, SCOPUS Indexed)**
10. Vijayakumari Malipatil, Shivkumar Madagi, and Biplab Bhattacharjee. (2013). STD Putative Drug Target Database: A comprehensive database of putative drug targets of STD Pathogens identified by comparative genomics. Indian Journal of Pharmacology, 45(5), 434-438 [**SCOPUS and Science Citation Indexed**, **SCI Impact Factor 0.902]**
11. Biplab Bhattacharjee and Jhinuk Chatterjee. (2013). Identification of proapoptopic, anti-inflammatory, anti-proliferative, anti-invasive and anti-angiogenic targets of bioactive principles of Cardamom by Insilico Reverse screening approach & Binding Pose Analysis, Asian Pacific Journal of Cancer Prevention. 14 (6), 6281-6288 [**SCOPUS and Science Citation Indexed**, **SCI Impact Factor 1.271]**
12. Biplab Bhattacharjee, Rose Mary Simon, Chaithra Gangadharaiah, and Prashantha Karunakar. (2013). Chemogenomics profiling of drug targets of peptidoglycan biosynthesis pathway in Leptospira interrogans by virtual screening approaches, Journal of Microbiology and Biotechnology, The Korean Society for Microbiology and Biotechnology, 23(6), 779–784 [**SCOPUS and Science Citation Indexed**, **SCI Impact Factor 1.650]**
13. Subhojyoti Chatterjee and Biplab Bhattacharjee. (2012). Use of natural molecules as anti-angiogenic inhibitors for vascular endothelial growth factor receptor. Bioinformation, 8(25), 1249–1254. **[PubMed Indexed]**
14. Biplab Bhattacharjee, Sandhya MP, Prashantha Karunakar, and Jhinuk Chatterjee. (2012). A Comparative Reverse Screening Approach to Identify Potential Anti-neoplastic Targets of Saffron Functional Components and Binding Mode. Asian Pacific Journal of Cancer Prevention, 13 (11), 5605-11. [**SCOPUS and Science Citation Indexed**, **SCI Impact Factor 1.271]**
15. S.K. Middha, Biplab Bhattacharjee, D Saini, MS Baliga, M.B. Nagaveni, and T Usha. (2011). Protective role of Trigonella foenum graceum extract against oxidative stress in hyperglycemic rats. European Review for Medical and Pharmacological Sciences, 15(4):427-35. [**SCOPUS and Science Citation Indexed**, **SCI Impact Factor 2.387]**
16. Biplab Bhattacharjee, Jayadeepa R.M, et al. (2011). Complex Network and Gene Ontology in Pharmacology Approaches: Mapping Natural Compounds on Potential Drug Target Colon Cancer Network. Current Bioinformatics, 6 (1), 44-52. [**SCOPUS and Science Citation Indexed**, **SCI Impact Factor 0.54]**

Papers in Pipeline

1. Opinion mining of user-generated online reviews for homestay accommodations in selected tourist destinations of Kerala: A text mining approach, Journal of Business Analytics (C category) (Under Review)
2. Can North East India board the Startup bandwagon? An internal stakeholder perspective of business incubation ecosystem, Cogent Economics & Finance (B category) (Under Review)
3. A Systematic Literature Review towards a Conceptual Framework for Enablers and Barriers of an Enterprise Data Science Strategy, Information Systems and e-Business Management, Springer

(Impact Factor: 5.073), (Under Review)

4. Link strength prediction in global financial networks using optimized BiLSTM models: A case of dynamic cross-market equity networks, Cogent Economics & Finance (B category) (Under Review)
5. Unidirectional and bidirectional LSTM models for edge weight predictions in dynamic cross-market equity networks, Technology Forecasting and Social Change (A Category) (Under Review)

Subjects Handled for MBA/PGP/ PGP Executive

Management Information Systems (NIT Calicut)
Designing and Managing Information System (IIMS PGP)
Data and Business Modeling (IIMS PGP)
Social Media and Web Analytics (IIMS PGP Elective/ PGPEx Elective)
Data Science Strategy for Enterprises (IIMS PGP Elective/ PGPEx Elective)
Digital Transformation Strategy (IIMS PGP Elective offered)
Business Intelligence (MBA Systems Elective)-NITC
Business Analytics (MBA Core)-Amrita Vishwa Vidyapeetham
Enterprise Resource Planning (MBA Systems Elective-(NITC)
Advanced Tools for Decision Support (MBA Systems Elective
(NITC)

Consultancy work

1. Development of data driven products for the social media and e-commerce, Storilabs Systems Technologies LLP, Calicut (Done in 2019)
2. Training, mentoring and working on joint collaborative projects on healthcare and iOT data analytics, Software Associates IT Pvt Ltd., Calicut (Done in 2017)

Administrative Responsibilities performed

1. Co-Coordinator, BPO Sector, Dr APJ Abdul Kalam Centre for Policy Research and Analysis, IIM Shillong (Working on the policy research activities in the centre, mentoring the research assistant)
2. Member, Centre for Development of North Eastern Region (CeDNER), IIM Shillong
3. Member, Incubation and Enterprise Support Centre (IESC), IIM Shillong
4. Member, Library Committee, IIM Shillong
5. PGP Admissions/ PhD Admissions, IIM Shillong

Workshops/ Conferences Organized

1. Coordinator, 3rd National Workshop on Applied Data Science using Python and R, 21st -25th November 2018, SOMS, NIT Calicut
2. Programme Coordinator for “Online Master Class on Healthcare Management, organized by CEDNER with CAHO, IIM Shillong (Oct 3-7, 2020)
3. Sectoral Co-coordinator for e-Symposium on "Emergent North-East India: Strategic and Developmental Imperatives in BPO" (31st July 2020)
4. Convener for “Online Training Program on Digital Transformation for Small Businesses” Jointly organized by Dr. APJ Abdul Kalam Centre for Policy Research and Analysis and Centre for Development of North Eastern Region (CeDNER) (9-10th July 2021)
5. Convener for “Virtual Workshop and Roundtable Discussion for Business Incubators in North Eastern India” Jointly organized by Dr. APJ Abdul Kalam Centre for Policy Research and Analysis and Incubation and Enterprise Support Centre" (16-17th July 2021)
6. Convener for “Virtual Workshop on Emerging Digital Technologies for Agriculture, Food Processing, and

Horticulture Businesses" Jointly organized by Dr. APJ Abdul Kalam Centre for Policy Research and Analysis and Centre for Development of North Eastern Region (CeDNER) (26th-27th August 2021)

Invited Talks/MDPs

1. Delivered a session on "Digital Transformation for Agriculture, Food Processing, and Horticulture Businesses -An overview" in the "Virtual Workshop on Emerging Digital Technologies for Agriculture, Food Processing, and Horticulture Businesses", for APJ Centre for Policy Analysis and Research, IIM Shillong (26th August 2021)
2. Delivered a session on "Digital Transformation for Artisants and Art Products" to artists of Tripura as part of Azadi Ka Amrit Mahotsav, under Ministry of Culture, Government of India (22nd July 2021)
3. Delivered a session on "Digital Transformation for Small Businesses -An overview" in the "Online Training Program on Digital Transformation for Small Businesses", for APJ Centre for Policy Analysis and Research, IIM Shillong (9th July 2021)
4. Delivered a session on "Status of Business Incubators in North East: A research study" in the "Virtual Workshop and Roundtable Discussion for Business Incubators in North Eastern India", for APJ Centre for Policy Analysis and Research, IIM Shillong (16th July 2021)
5. Delivered MDP Session in IIM Shillong on "Leveraging Technology Leadership & Digital Transformation" for "General Management Program with special emphasis on Leadership Competencies", for Indian Oil Corporation Ltd Officers (03 June 2021 and 9th September 2021)
6. Delivered a full day session on "Basic data analytics using R" in the 3rd National Workshop on Applied Data Science using Python and R, 21st -25th November 2018, SOMS, NIT Calicut

Editorial Board Member

Editorial Advisory Board Member, IMI Journal of Innovation and Management, Sage Publications

Membership of Scientific / Engineering Bodies

1. Life Member of Indian Science Congress

References

1. Dr Muhammad Shafi, Associate Prof & Head, School of Management Studies, NIT Calicut
2. Dr Animesh Acharjee, Senior Scientist, University of Birmigham, UK
3. Dr T Radha Ramanan, Associate Professor, School of Management Studies, NIT Calicut

Personal

Date of Birth: June 19, 1984
Place of Birth: Agartala, Tripura, India
Father's Name: Late Benulal Bhattacharjee
Age : 37 years
Martial Status :Married

Preventing misuse of discount promotions in e-commerce websites: an application of rule-based systems

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Abstract: E-commerce websites continue to get affected by fraudulent online activities in spite of the substantial efforts made by different stakeholders such as card issuers, banking intermediaries, merchants, and law enforcement agencies. First-time promotional discounts are offered by e-commerce websites for gaining and retaining new and existing customers. However, in several instances, such discounts are abused by fraudsters. Surprisingly, little attempt has been put in the past to detect such abuses. This study is the first attempt in this direction and uses transaction data of an e-commerce company to develop a rule-based detection system. The rules-based system is developed in two-stage processes, generation of facts and rules, respectively; and it is further validated by experts. An architecture of a rule-based fraud detection system is also proposed. Using rule-based detection system, the company can flag-off the probable abusers, and can subsequently monitor their behaviour and take decisive actions.

Keywords: e-commerce fraud; promotional abuse; fraud detection; preventing misuse; discount promotions; e-commerce website; rules-based systems; online fraud; fraud prevention.

Reference to this paper should be made as follows: Manohar, G.V., Bhattacharjee, B. and Pratap, M. (xxxx) 'Preventing misuse of discount promotions in e-commerce websites: an application of rule-based systems', *Int. J. Services Operations and Informatics*, Vol. x, No. x, pp.xxx–xxx.

Detection of phishing websites using a novel twofold ensemble model

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School of Management Studies, National Institute of Technology, Calicut, India, and

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16 May 2018
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Abstract

Purpose – Phishing is one of the major threats affecting businesses worldwide in current times. Organizations and customers face the hazards arising out of phishing attacks because of anonymous access to vulnerable details. Such attacks often result in substantial financial losses. Thus, there is a need for effective intrusion detection techniques to identify and possibly nullify the effects of phishing. Classifying phishing and non-phishing web content is a critical task in information security protocols, and full-proof mechanisms have yet to be implemented in practice. The purpose of the current study is to present an ensemble machine learning model for classifying phishing websites.

Design/methodology/approach – A publicly available data set comprising 10,068 instances of phishing and legitimate websites was used to build the classifier model. Feature extraction was performed by deploying a group of methods, and relevant features extracted were used for building the model. A twofold ensemble learner was developed by integrating results from random forest (RF) classifier, fed into a feedforward neural network (NN). Performance of the ensemble classifier was validated using k-fold cross-validation. The twofold ensemble learner was implemented as a user-friendly, interactive decision support system for classifying websites as phishing or legitimate ones.

Findings – Experimental simulations were performed to access and compare the performance of the ensemble classifiers. The statistical tests estimated that RF_NN model gave superior performance with an accuracy of 93.41 per cent and minimal mean squared error of 0.000026.

Research limitations/implications – The research data set used in this study is publically available and easy to analyze. Comparative analysis with other real-time data sets of recent origin must be performed to ensure generalization of the model against various security breaches. Different variants of phishing threats must be detected rather than focusing particularly toward phishing website detection.

Originality/value – The twofold ensemble model is not applied for classification of phishing websites in any previous studies as per the knowledge of authors.

Keywords Machine learning, Ensemble learner, Intelligent systems, Phishing website

Paper type Research paper

1. Introduction

Exponential expansion of data in digital media over the years has resulted in corresponding growth of e-commerce transaction volumes. Internet has provided a digital platform to

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Identifying the causal relationship between social media content of a Bollywood movie and its box-office success – a text mining approach

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Abstract: Movie marketing strategies have undergone a rapid metamorphosis over the years with the progress in technological innovations and advent of social media. Social media gives a two way interacting platform and such interactions generate voluminous textual content which can be a source for deriving new insights into the customer behavioural dynamics and can also act as a handy tool for revenue enhancement. This study is designed to understand whether the polarity of the social media content of Bollywood movies can essentially reveal any insights about the potential box office revenues. The initial steps involved data collection from social media, followed by text mining to identify the sentiments about a movie. Furthermore, the relationship between the sentiments captured from social media and total revenue generated was explored in both pre-release and post-release scenarios and linear regression models were built. The model can be further improved by incorporating additional metrics.

Keywords: social media; sentimental analysis; Bollywood; box-office; text analytics.

Reference to this paper should be made as follows: Bhattacharjee, B., Sridhar, A. and Dutta, A. (2017) 'Identifying the causal relationship between social media content of a Bollywood movie and its box-office success – a text mining approach', *Int. J. Business Information Systems*, Vol. 24, No. 3, pp.344–368.

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Network mining based elucidation of the dynamics of cross-market clustering and connectedness in Asian region: An MST and hierarchical clustering approach

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ABSTRACT

We investigate the dynamics of cross-market clustering and connectedness of the Asian capital markets in this study. We perform the cross-correlation structure analysis of the daily return data of 14 global indices belonging to the major Asian capital markets by using the sub-dominant ultrametric distance based MST and Hierarchical Clustering techniques. The study dataset is for fourteen years duration (2002–2016). A rolling window approach is used to generate 151 temporally synchronous observations. We generate MSTs and Hierarchical Clustering plots (based on average linkage distance) for these temporally synchronous observations, and visually comprehend them to decipher the cross-market cluster formation, hub node formation, and connectivity structure with hub nodes. To identify those set of Asian markets having close connectivity with India, we employed a weighted hop count method and based on its scorings the Asian indices are subsequently ranked. We also investigate the influence of the 2008 financial crisis on the connectivity and clustering patterns in the Asian indices network. We also compute the key network topological parameters to decipher the dynamically varying topological properties, and with a particular reference during financial crisis periods.

1. Introduction

In modern day theories of portfolio management, an essential element is the feature of risk diversification, be it in domestic or regional or global scales (Gao et al., 2015). Understanding this risk diversification in these three scales encompasses the interpretation of the behaviour of cluster formation & the ingredients of risk contagion in investable asset classes. The customarily utilized cross-correlation analysis is a key quantitative measure of interactive relationships among pairs of securities (Gao et al., 2015) and also for the cross-market linkages, and an investigation into this will facilitate the enhanced understanding of the dynamic mechanisms with which an integrated complex economic system operate.

As an outcome of the steady rise in the globalization and the expansion of cross-country economic activities, there has been a noticeable incline in the correlation of global financial markets. In spite of the fact that this cross-market interaction has promoted allocation of financial and economic resources in an optimal manner, it also has subsequently caused the rapid spread of financial crisis to markets possessing no significant attachment to the real cause of the crisis but rather than because of that market's linkage (in direct or indirect manner) to the source of the contagion.

For instance in the year 2007, the US subprime mortgage crisis originated because of the defaults in US mortgage lending and investment banking space (a purely domestic reason) & had swiftly transmitted its contagion to savings institutions, insurance companies, and commercial banks located all across the world in different geographies, which has subsequently resulted in a crisis of global nature. Having the capacity to depict and comprehend correlation

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PLOS ONE

RESEARCH ARTICLE

Investigating the Influence Relationship Models for Stocks in Indian Equity Market: A Weighted Network Modelling Study

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Abstract

The socio-economic systems today possess high levels of both interconnectedness and interdependencies, and such system-level relationships behave very dynamically. In such situations, it is all around perceived that influence is a perplexing power that has an overseeing part in affecting the dynamics and behaviours of involved ones. As a result of the force & direction of influence, the transformative change of one entity has a cogent aftereffect on the other entities in the system. The current study employs directed weighted networks for investigating the influential relationship patterns existent in a typical equity market as an outcome of inter-stock interactions happening at the market level, the sectorial level and the industrial level. The study dataset is derived from 335 constituent stocks of 'Standard & Poor Bombay Stock Exchange 500 index' and study period is 1st June 2005 to 30th June 2015. The study identifies the set of most dynamically influential stocks & their respective temporal pattern at three hierarchical levels: the complete equity market, different sectors, and constituting industry segments of those sectors. A detailed influence relationship analysis is performed for the sectorial level network of the construction sector, and it was found that stocks belonging to the cement industry possessed high influence within this sector. Also, the detailed network analysis of construction sector revealed that it follows scale-free characteristics and power law distribution. In the industry specific influence relationship analysis for cement industry, methods based on threshold filtering and minimum spanning tree were employed to derive a set of sub-graphs having temporally stable high-correlation structure over this ten years period.

Introduction

In the past decades, there have been substantial empirical contributions focusing on investigating the socio-economic systems in the framework of complex network analysis [1–9]. Even though the concept of complex network analysis is not recent, studies in past [10] have emphasized the capability of this method to understand the principal attributes of interacting systems