

Lecture Notes in Networks and Systems 100

Rajesh Kumar Shukla ·
Jitendra Agrawal · Sanjeev Sharma ·
Narendra S. Chaudhari ·
K. K. Shukla *Editors*

Social Networking and Computational Intelligence

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Editors

Rajesh Kumar Shukla
Department of Computer Science
and Engineering
Sagar Institute of Research and Technology
Bhopal, Madhya Pradesh, India

Sanjeev Sharma
School of Information Technology
Rajiv Gandhi Technical University
(State Technological University)
Bhopal, Madhya Pradesh, India

K. K. Shukla
Department of Computer Science
and Engineering
Indian Institute of Technology BHU
Varanasi, Uttar Pradesh, India

Jitendra Agrawal
Department of Computer Science
and Engineering, University Teaching
Department
Rajiv Gandhi Technical University
(State Technological University)
Bhopal, Madhya Pradesh, India

Narendra S. Chaudhari
Department of Computer Science
and Engineering
Indian Institute of Technology Indore
Indore, Madhya Pradesh, India

Visvesvaraya National Institute
of Technology
Nagpur, Maharashtra, India

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Contents

Cloud Computing

An Efficient Honey Bee Approach for Load Adjusting in Cloud Environment	3
Sangeeta Kumari and Shailendra Singh	
A Novel Approach of Task Scheduling in Cloud Computing Environment	13
Nidhi Rajak and Diwakar Shukla	
Development and Design Strategies of Evidence Collection Framework in Cloud Environment	27
Yunus Khan and Sunita Varma	
A Systematic Analysis of Task Scheduling Algorithms in Cloud Computing	39
Nidhi Rajak and Diwakar Shukla	
A Survey on Cloud Federation Architecture and Challenges	51
Lokesh Chouhan, Pavan Bansal, Bimalkant Lauhny and Yash Chaudhary	
Multi-tier Authentication for Cloud Security	67
Kapil Dev Raghuwanshi and Puneet Himthani	
Investigations of Microservices Architecture in Edge Computing Environment	77
Nitin Rathore, Anand Rajavat and Margi Patel	
Improving Reliability of Mobile Social Cloud Computing using Machine Learning in Content Addressable Network	85
Goldi Bajaj and Anand Motwani	
Data De-duplication Scheme for File Checksum in Cloud	105
Jayashree Agarkhed, Apurva Deshpande and Ankita Saraf	

A Survey on Cloud Computing Security Issues and Cryptographic Techniques	119
Vidushi Agarwal, Ashish K. Kaushal and Lokesh Chouhan	
Machine Learning	
Features Identification for Filtering Credible Content on Twitter Using Machine Learning Techniques	137
Faraz Ahmad and S. A. M. Rizvi	
Perspectives of Healthcare Sector with Artificial Intelligence	151
Mohammed Sameer Khan and Shadab Pasha Khan	
A Novel Approach for Stock Market Price Prediction Based on Polynomial Linear Regression	161
Jayesh Amrutphale, Pavan Rathore and Vijay Malviya	
Real-Time Classification of Twitter Data Using Decision Tree Technique.	173
Shivam Nilosey, Abhishek Pipliya and Vijay Malviya	
Dynamic Web Service Composition Using AI Planning Technique: Case Study on Blackbox Planner	183
Lalit Purohit, Satyendra Singh Chouhan and Aditi Jain	
A Study of Deep Learning in Text Analytics	197
Noopur Ballal and Sri Khetwat Saritha	
Image Segmentation of Breast Cancer Histopathology Images Using PSO-Based Clustering Technique	207
Vandana Kate and Pragya Shukla	
Survey of Methods Applying Deep Learning to Distinguish Between Computer Generated and Natural Images	217
Aiman Meenai and Vasima Khan	
SVM Hyper-Parameters Optimization using Multi-PSO for Intrusion Detection	227
Dhruba Jyoti Kalita, Vibhav Prakash Singh and Vinay Kumar	
A Survey on SVM Hyper-Parameters Optimization Techniques	243
Dhruba Jyoti Kalita, Vibhav Prakash Singh and Vinay Kumar	
Review of F0 Estimation in the Context of Indian Classical Music Expression Detection	257
Amit Rege and Ravi Sindal	

Classification and Detection of Breast Cancer Using Machine Learning	269
Rekh Ram Janghel, Lokesh Singh, Satya Prakash Sahu and Chandra Prakash Rathore	
Data and Web Mining	
Couplets Translation from English to Hindi Language	285
Anshuma Yadav, Rajesh Kumar Chakrawarti and Pratosh Bansal	
A Novel Approach for Predicting Customer Churn in Telecom Sector	295
Ankit Khede, Abhishek Pipliya and Vijay Malviya	
An Advance Approach for Spam Document Detection Using QAP Rabin-Karp Algorithm	305
Nidhi Ruthia and Abhigyan Tiwary	
A Review on Enhancement to Standard K-Means Clustering	313
Mohit Kushwaha, Himanshu Yadav and Chetan Agrawal	
A Review on Benchmarking: Comparing the Static Analysis Tools (SATs) in Web Security	327
Rekha Deshlahre and Namita Tiwari	
Farmer the Entrepreneur—An Android-Based Solution for Agriculture End Services	339
Jayashree Agarkhed, Lubna Tahreem, Summaiya Siddiqua and Tayyaba Nousheen	
Face Recognition Algorithm for Low-Resolution Images	349
Monika Rani Golla, Poonam Sharma and Jitendra Madarkar	
A Cognition Scanning on Popularity Prediction of Videos	363
Neeti Sangwan and Vishal Bhatnagar	
Review on High Utility Rare Itemset Mining	373
Shalini Zanzote Ninoria and S. S. Thakur	
A Study on Impact of Team Composition and Optimal Parameters Required to Predict Result of Cricket Match	389
Manoj S. Ishi and J. B. Patil	
Using Analytic Hierarchal Processing in 26/11 Mumbai Terrorist Attack for Key Player Selection and Ranking	401
Amit Kumar Mishra, Nisheeth Joshi and Iti Mathur	
A Comprehensive Study of Clustering Algorithms for Big Data Mining with MapReduce Capability	427
Kamlesh Kumar Pandey, Diwakar Shukla and Ram Milan	

Parametric and Nonparametric Classification for Minimizing Misclassification Errors	441
Sushma Nagdeote and Sujata Chiwande	
IoT	
A Review on IoT Security Architecture: Attacks, Protocols, Trust Management Issues, and Elliptic Curve Cryptography	457
Lalita Agrawal and Namita Tiwari	
A Comprehensive Review and Performance Evaluation of Recent Trends for Data Aggregation and Routing Techniques in IoT Networks	467
Neeraj Chandnani and Chandrakant N. Khairnar	
An Efficient Image Data Encryption Technique Based on RC4 and Blowfish Algorithm with Random Data Shuffling	485
Dharna Singhai and Chetan Gupta	
IoT Devices for Monitoring Natural Environment—A Survey	495
Subhra Shriti Mishra and Akhtar Rasool	
Suspicious Event Detection in Real-Time Video Surveillance System	509
Madhuri Agrawal and Shikha Agrawal	
Time Moments and Its Extension for Reduction of MIMO Discrete Interval Systems	517
A. P. Padhy and V. P. Singh	
Human Activity Recognition Using Smartphone Sensor Data	533
Sweta Jain, Sadare Alam and K. Shreesha Prabhu	
Novel Software Modeling Technique for Surveillance System	543
Rakesh Kumar, Priti Maheshwary and Timothy Malche	
An Investigation on Distributed Real-Time Embedded System	555
Manjima De Sarkar, Atrayee Dutta and Sahadev Roy	
Real-Time Robust and Cost-Efficient Hand Tracking in Colored Video Using Simple Camera	565
Richa Golash and Yogendra Kumar Jain	
Communication and Networks	
A State of the Art on Network Security	577
Vinay Kumar, Sairaj Nemmaniwar, Harshit Saini and Mohan Rao Mamidkar	

A Survey on Wireless Network	585
Vinay Kumar, Aditi Biswas Purba, Shailja Kumari, Amisha, Kanishka and Sanjay Kumar	
Jaya Algorithm Based Optimal Design of LQR Controller for Load Frequency Control of Single Area Power System	595
Nikhil Paliwal, Laxmi Srivastava and Manjaree Pandit	
A Review on Performance of Distributed Embedded System	605
Atrayee Dutta, Manjima De Sarkar and Sahadev Roy	
A Comparative Study of DoS Attack Detection and Mitigation Techniques in MANET	615
Divya Gautam and Vrinda Tokekar	
Prediction of Software Effort Using Design Metrics: An Empirical Investigation	627
Prerana Rai, Shishir Kumar and Dinesh Kumar Verma	
Recent Advancements in Chaos-Based Image Encryption Techniques: A Review	639
Snehlata Yadav and Namita Tiwari	
Image Fusion Survey: A Comprehensive and Detailed Analysis of Image Fusion Techniques	649
Monica Manviya and Jyoti Bharti	
Some New Methods for Ready Queue Processing Time Estimation Problem in Multiprocessing Environment	661
Sarla More and Diwakar Shukla	
Review of Various Two-Phase Authentication Mechanisms on Ease of Use and Security Enhancement Parameters	671
Himani Thakur and Anand Rajavat	
An Efficient Network Coded Routing Protocol for Delay Tolerant Network	679
Mukesh Sakle and Sonam Singh	
Hybrid Text Illusion CAPTCHA Dealing with Partial Vision Certainty	687
Arun Pratap Singh, Sanjay Sharma and Vaishali Singh	
“By Using Image Inpainting Technique Restoring Occluded Images for Face Recognition”	697
Usha D. Tikale and S. D. Zade	

Social Networking

Personality Prediction and Classification Using Twitter Data	707
Navanshu Agarwal, Lokesh Chouhan, Ishita Parmar, Sheirsh Saxena, Ridam Arora, Shikhin Gupta and Himanshu Dhiman	
A Novel Adaptive Approach for Sentiment Analysis on Social Media Data	717
Yashasvee Amrutphale, Nishant Vijayvargiya and Vijay Malviya	
Sentiment Analysis and Prediction of Election Results 2018	727
Urvashi Sharma, Rattan K. Datta and Kavita Pabreja	
Toward the Semantic Data Inter-processing: A Semantic Web Approach and Its Services	741
Anand Kumar and B. P. Singh	
A Big Data Parameter Estimation Approach to Develop Big Social Data Analytics Framework for Sentiment Analysis	755
Abdul Alim and Diwakar Shukla	
A Novel Approach of Vertex Coloring Algorithm to Solve the K-Colorability Problem	765
Shruti Mahajani, Pratyush Sharma and Vijay Malviya	
Predicting the Popularity of Rumors in Social Media Using Machine Learning	775
Pardeep Singh and Satish Chand	
Optimizing Memory Space by Removing Duplicate Files Using Similarity Digest Technique	791
Vedant Sharma, Priyamwada Sharma and Santosh Sahu	
Sentiment Analysis to Recognize Emotional Distress Through Facebook Status Updates	799
Swarnangini Sinha, Kanak Saxena and Nisheeth Joshi	

Jaya Algorithm Based Optimal Design of LQR Controller for Load Frequency Control of Single Area Power System



Nikhil Paliwal, Laxmi Srivastava and Manjaree Pandit

Abstract In this paper, Jaya algorithm has been proposed for optimizing the parameters of the linear quadratic regulator (LQR) for load frequency control (LFC). In feedback control system, LQR is an advanced and modern control technique. The LQR technique is based on minimizing the quadratic performance index. In the LQR controller, the main problem is to shape the weighting matrices Q and R . The problem to shape the weighting matrices Q and R in LQR controller can be solved using various evolutionary computing techniques. In this paper, the weighting matrices for load frequency control of the electrical power network are designed by using genetic algorithm and Jaya algorithm. It is shown that Jaya algorithm is the most powerful method, as it provides improved system performances by optimal design of the matrices Q and R to minimize settling time.

Keywords LFC · LQR · Single area power network · Genetic algorithm · Jaya algorithm

1 Introduction

These days, the demand of electrical power is rising and the main concern for the electrical power network operator is to provide better quality of electrical power at the end of consumers under various condition of changing load. The frequency of the electrical power network should be kept constant as far as possible for the satisfactory operation of the electrical power network. Many techniques have been proposed to overcome any deviations and to maintain constant value of frequency.

N. Paliwal · L. Srivastava (✉) · M. Pandit
Madhav Institute of Technology and Science, Gwalior, Madhya Pradesh 474005, India
e-mail: laxmigwl@gmail.com

N. Paliwal
e-mail: pnikhil02@gmail.com

M. Pandit
e-mail: drmanjareep@gmail.com