B. Uma Shankar · Kuntal Ghosh Deba Prasad Mandal · Shubhra Sankar Ray David Zhang · Sankar K. Pal (Eds.)

Pattern Recognition and Machine Intelligence

7th International Conference, PReMI 2017 Kolkata, India, December 5–8, 2017 Proceedings



Contents

Invited Talks

An Incremental Fast Policy Search Using a Single Sample Path Ajin George Joseph and Shalabh Bhatnagar	3
Biometric Counter-Spoofing for Mobile Devices Using Gaze Information Asad Ali, Nawal Alsufyani, Sanaul Hoque, and Farzin Deravi	11
Pattern Recognition and Machine Learning	
kNN Classification with an Outlier Informative Distance Measure Gautam Bhattacharya, Koushik Ghosh, and Ananda S. Chowdhury	21
Tree-Based Structural Twin Support Tensor Clustering with Square Loss Function Reshma Rastogi and Sweta Sharma	28
Kernel Entropy Discriminant Analysis for Dimension Reduction Aditya Mehta and C. Chandra Sekhar	35
A New Method to Address Singularity Problem in Multimodal Data Analysis Ankita Mandal and Pradipta Maji	43
Label Correlation Propagation for Semi-supervised Multi-label Learning Aritra Ghosh and C. Chandra Sekhar	52
Formulation of Two Stage Multiple Kernel Learning Using Regression Framework	61
A Two-Stage Conditional Random Field Model Based Framework for Multi-Label Classification	69
A Matrix Factorization & Clustering Based Approach for Transfer Learning V. Sowmini Devi, Vineet Padmanabhan, and Arun K. Pujari	77

Signal and Image Processing

Feature Selection and Fuzzy Rule Mining for Epileptic Patients from Clinical EEG Data Abhijit Dasgupta, Losiana Nayak, Ritankar Das, Debasis Basu, Preetam Chandra, and Rajat K. De	87
Selection of Relevant Electrodes Based on Temporal Similarity for Classification of Motor Imagery Tasks Jyoti Singh Kirar, Ayesha Choudhary, and R.K. Agrawal	96
Automated Measurement of Translational Margins and Rotational Shifts in Pelvic Structures Using CBCT Images of Rectal Cancer Patients Sai Phani Kumar Malladi, Bijju Kranthi Veduruparthi, Jayanta Mukherjee, Partha Pratim Das, Saswat Chakrabarti, and Indranil Mallick	103
Exploring the Scope of HSV Color Channels Towards Simple Shadow Contour Detection Jayeeta Saha and Arpitam Chatterjee	110
Linear Curve Fitting-Based Headline Estimation in Handwritten Words for Indian Scripts Rahul Pramanik and Soumen Bag	116
Object Segmentation in Texture Images Using Texture GradientBased Active ContoursPriyambada Subudhi and Susanta Mukhopadhyay	124
A Variance Based Image Binarization Scheme and Its Application in Text Segmentation	132
Computer Vision and Video Processing	
Variants of Locality Preserving Projection for Modular Face and Facial Expression Recognition <i>Gitam Shikkenawis and Suman K. Mitra</i>	141
A Robust Color Video Watermarking Technique Using DWT, SVD and Frame Difference	148
Aggregated Channel Features with Optimum Parameters for Pedestrian Detection Blossom Treesa Bastian and C. Victor Jiji	155

Contents	XXIII

Object Tracking with Classification Score Weighted Histogram of Sparse Codes Mathew Francis and Prithwijit Guha	162
A Machine Learning Inspired Approach for Detection, Recognition and Tracking of Moving Objects from Real-Time Video Anit Chakrabory and Sayandip Dutta	170
Does Rotation Influence the Estimated Contour Length of a Digital Object? Sabyasachi Mukherjee, Oishila Bandyopadhyay, Arindam Biswas, and Bhargab B. Bhattacharya	179
Abnormal Crowd Behavior Detection Based on Combined Approach of Energy Model and Threshold Madhura Halbe, Vibha Vyas, and Yogita M. Vaidya	187
Unsupervised Feature Descriptors Based Facial Tracking over Distributed Geospatial Subspaces Shubham Dokania, Ayush Chopra, Feroz Ahmad, S. Indu, and Santanu Chaudhury	196
Face Detection Based on Frequency Domain Features B.H. Shekar and D.S. Rajesh	203
A Study on the Properties of 3D Digital Straight Line Segments	212
Unlocking the Mechanism of Devanagari Letter Identification Using Eye Tracking Chetan Ralekar, Tapan K. Gandhi, and Santanu Chaudhury	219
Video Stabilization Using Sliding Frame Window Keerthan S. Shagrithaya, Eeshwar Gurushankar, Deepak Srikanth, Pravin Bhaskar Ramteke, and Shashidhar G. Koolagudi	227
Palmprint and Finger Knuckle Based Person Authentication with Random Forest via Kernel-2DPCA Gaurav Jaswal, Amit Kaul, and Ravinder Nath	233
Soft and Natural Computing	
A Fuzzy-LP Approach in Time Series Forecasting Pritpal Singh and Gaurav Dhiman	243
Third Order Backward Elimination Approach for Fuzzy-Rough Set Based Feature Selection	254

A Novel OCR System Based on Rough Set Semi-reduct Ushasi Chaudhuri, Partha Bhowmick, and Jayanta Mukherjee	263
Rough Set Rules Determine Disease Progressions in Different Groups of Parkinson's Patients	270
Adversarial Optimization of Indoor Positioning System Using Differential Evolution Feroz Ahmad and Sreedevi Indu	276
Fast Convergence to Near Optimal Solution for Job Shop Scheduling Using Cat Swarm Optimization	282
Music-Induced Emotion Classification from the Prefrontal Hemodynamics Pallabi Samanta, Diptendu Bhattacharya, Amiyangshu De, Lidia Ghosh, and Amit Konar	289
Speech and Natural Language Processing	
Analysis of Features and Metrics for Alignment in Text-Dependent Voice Conversion	299
Effectiveness of Mel Scale-Based ESA-IFCC Features for Classification of Natural vs. Spoofed Speech	308
Novel Phase Encoded Mel Filterbank Energies for Environmental Sound Classification Rishabh N. Tak, Dharmesh M. Agrawal, and Hemant A. Patil	317
An Adaptive i-Vector Extraction for Speaker Verification with Short Utterance Arnab Poddar, Md Sahidullah, and Goutam Saha	326
Spoken Keyword Retrieval Using Source and System Features Maulik C. Madhavi, Hemant A. Patil, and Nikhil Bhendawade	333
Novel Gammatone Filterbank Based Spectro-Temporal Features for Robust Phoneme Recognition Ankit Nagpal and Hemant A. Patil	342

Neural Networks Compression for Language Modeling 351 Artem M. Grachev, Dmitry I. Ignatov, and Andrey V. Savchenko A Metaphor Detection Approach Using Cosine Similarity 358 Malay Pramanick and Pabitra Mitra Named Entity Identification Based Translation Disambiguation Model..... 365 Vijay Kumar Sharma and Namita Mittal LEXER: LEXicon Based Emotion AnalyzeR 373 Shikhar Sharma, Piyush Kumar, and Krishan Kumar Lexical TF-IDF: An n-gram Feature Space for Cross-Domain Classification of Sentiment Reviews 380 Atanu Dey, Mamata Jenamani, and Jitesh J. Thakkar A Method for Semantic Relatedness Based Query Focused Text Summarization 387 Nazreena Rahman and Bhogeswar Borah

Contents

XXV

Bioinformatics and Computational Biology

Efficient and Effective Multiple Protein Sequence Alignment Model Using Dynamic Progressive Approach with Novel Look Back Ahead Scoring System	397
Classification of Vector-Borne Virus Through Totally Ordered Set of Dinucleotide Interval Patterns Uddalak Mitra and Balaram Bhattacharyya	405
A Quasi-Clique Mining Algorithm for Analysis of the Human Protein-Protein Interaction Network Brijesh Kumar Sriwastava, Subhadip Basu, and Ujjwal Maulik	411
Prediction of Thyroid Cancer Genes Using an Ensemble of Post Translational Modification, Semantic and Structural Similarity Based Clustering Results Anup Kumar Halder, Pritha Dutta, Mahantapas Kundu, Mita Nasipuri, and Subhadip Basu	418
mRMR+: An Effective Feature Selection Algorithm for Classification Hussain A. Chowdhury and Dhruba K. Bhattacharyya	424
Topological Inquisition into the PPI Networks Associated with Human Diseases Through Graphlet Frequency Distribution Debjani Bhattacharjee, Sk Md Mosaddek Hossain, Raziya Sultana, and Sumanta Ray	431

AAVI COMEMS	XXVI	Contents
-------------	------	----------

Machine Learning Approach for Identification of miRNA-mRNA	
Regulatory Modules in Ovarian Cancer	438
Sushmita Paul and Shubham Talbar	

Data Mining and Big Data Analytics

K-Means Algorithm to Identify k ₁ -Most Demanding Products Ritesh Kumar, Partha Sarathi Bishnu, and Vandana Bhattacherjee	451
Detection of Atypical Elements by Transforming Task to Supervised Form Piotr Kulczycki and Damian Kruszewski	458
Mining Rare Patterns Using Hyper-Linked Data Structure Anindita Borah and Bhabesh Nath	467
Random Binary Search Trees for Approximate Nearest Neighbour Search in Binary Space	473
A Graphical Model for Football Story Snippet Synthesis from Large Scale Commentary Anirudh Vyas, Sangram Gaikwad, and Chiranjoy Chattopadhyay	480
An Efficient Approach for Mining Frequent Subgraphs Tahira Alam, Sabit Anwar Zahin, Md. Samiullah, and Chowdhury Farhan Ahmed	486
Image Annotation Using Latent Components and Transmedia Association Anurag Tripathi, Abhinav Gupta, Santanu Chaudhary, and Brejesh Lall	493
Incremental Learning of Non-stationary Temporal Causal Networks for Telecommunication Domain Ram Mohan, Santanu Chaudhury, and Brejesh Lall	501
Effectiveness of Representation and Length Variation of Shortest Paths in Graph Classification	509
An Efficient Encoding Scheme for Dynamic Multidimensional Datasets Mehnuma Tabassum Omar and K.M. Azharul Hasan	517
Deep Learning	

Stacked Features Based CNN for Rotation Invariant Digit Classification 527 Ayushi Jain, Gorthi R.K. Sai Subrahmanyam, and Deepak Mishra

Improving the Performance of Deep Learning Based Speech EnhancementSystem Using Fuzzy Restricted Boltzmann Machine5Suman Samui, Indrajit Chakrabarti, and Soumya K. Ghosh	534
A Study on Deep Convolutional Neural Network Based Approaches for Person Re-identification	543
Two-Stream Convolutional Network with Multi-level Feature Fusion for Categorization of Human Action from Videos Prateep Bhattacharjee and Sukhendu Das	549
Learning Deep Representation for Place Recognition in SLAM	557
Performance of Deep Learning Algorithms vs. Shallow Models, in Extreme Conditions - Some Empirical Studies. Samik Banerjee, Prateep Bhattacharjee, and Sukhendu Das	565
Deep Learning in the Domain of Multi-Document Text Summarization 5 Rajendra Kumar Roul, Jajati Keshari Sahoo, and Rohan Goel	575
Space-Time Super-Resolution Using Deep Learning Based Framework 5 Manoj Sharma, Santanu Chaudhury, and Brejesh Lall	582
A Spatio-temporal Feature Learning Approach for Dynamic Scene Recognition	591
Spatial Data Science and Engineering	
Spatial Distribution Based Provisional Disease Diagnosisin Remote HealthcareIndrani Bhattacharya and Jaya Sil	501
 Extraction of Phenotypic Traits for Drought Stress Study Using Hyperspectral Images	508
Spatio-Temporal Prediction of Meteorological Time Series Data:An Approach Based on Spatial Bayesian Network (SpaBN)	515
Adaptive TerraSAR-X Image Registration (AIR) Using Spatial Fisher Kernel Framework 61 B. Sirisha, Chandra Sekhar Paidimarry, A.S. Chandrasekhara Sastry, and B. Sandhya	523

Contents

XXVII

Applications of Pattern Recognition and Machine Intelligence

Hierarchical Ranking of Cricket Teams Incorporating Player Composition Abhinav Agarwalla, Madhav Mantri, and Vishal Singh	633
Smart Water Management: An Ontology-Driven Context-Aware IoT Application Deepti Goel, Santanu Chaudhury, and Hiranmay Ghosh	639
Structured Prediction of Music Mood with Twin Gaussian Processes Santosh Chapaneri and Deepak Jayaswal	647
Differentiating Pen Inks in Handwritten Bank Cheques Using Multi-layer Perceptron Prabhat Dansena, Soumen Bag, and Rajarshi Pal	655
Analysis of Causal Interactions and Predictive Modelling of Financial Markets Using Econometric Methods, Maximal Overlap Discrete Wavelet Transformation and Machine Learning: A Study in Asian Context Indranil Ghosh, Manas K. Sanyal, and R.K. Jana	664
Opinion Mining Using Support Vector Machine with Web Based Diverse Data	673
Harnessing Online News for Sarcasm Detection in Hindi Tweets Santosh Kumar Bharti, Korra Sathya Babu, and Sanjay Kumar Jena	679
Concept-Based Approach for Research Paper Recommendation Ritu Sharma, Dinesh Gopalani, and Yogesh Meena	687
Author Index	693