

| | |
|-------------------------|--|
| 1. Record Nr. | UNINA9910254355303321 |
| Autore | Chaudhuri Arindam |
| Titolo | Optical Character Recognition Systems for Different Languages with Soft Computing / / by Arindam Chaudhuri, Krupa Mandaviya, Pratixa Badelia, Soumya K Ghosh |
| Pubbl/distr/stampa | Cham : , : Springer International Publishing : , : Imprint : Springer, , 2017 |
| ISBN | 3-319-50252-2 |
| Edizione | [1st ed. 2017.] |
| Descrizione fisica | 1 online resource (XIX, 248 p. 95 illus.) |
| Collana | Studies in Fuzziness and Soft Computing, , 1434-9922 ; ; 352 |
| Disciplina | 006.424 |
| Soggetti | Computational intelligence Pattern perception Computational linguistics Artificial intelligence Computational Intelligence Pattern Recognition Computational Linguistics Artificial Intelligence |
| Lingua di pubblicazione | Inglese |
| Formato | Materiale a stampa |
| Livello bibliografico | Monografia |
| Nota di bibliografia | Includes bibliographical references and index. |
| Nota di contenuto | Intro -- Contents -- List of Figures -- List of Tables -- 1 Introduction -- 1.1 Organization of the Monograph -- 1.2 Notation -- 1.3 State of Art -- 1.4 Research Issues and Challenges -- 1.5 Figures -- 1.6 MATLAB OCR Toolbox -- References -- 2 Optical Character Recognition Systems -- Abstract -- 2.1 Introduction -- 2.2 Optical Character Recognition Systems: Background and History -- 2.3 Techniques of Optical Character Recognition Systems -- 2.3.1 Optical Scanning -- 2.3.2 Location Segmentation -- 2.3.3 Pre-processing -- 2.3.4 Segmentation -- 2.3.5 Representation -- 2.3.6 Feature Extraction -- 2.3.7 Training and Recognition -- 2.3.8 Post-processing -- 2.4 Applications of Optical Character Recognition Systems -- 2.5 Status of Optical Character Recognition Systems -- 2.6 Future of Optical Character Recognition Systems -- References -- 3 Soft Computing Techniques for Optical Character Recognition Systems -- Abstract -- |

3.1 Introduction -- 3.2 Soft Computing Constituents -- 3.2.1 Fuzzy Sets -- 3.2.2 Artificial Neural Networks -- 3.2.3 Genetic Algorithms -- 3.2.4 Rough Sets -- 3.3 Hough Transform for Fuzzy Feature Extraction -- 3.4 Genetic Algorithms for Feature Selection -- 3.5 Rough Fuzzy Multilayer Perceptron -- 3.6 Fuzzy and Fuzzy Rough Support Vector Machines -- 3.7 Hierarchical Fuzzy Bidirectional Recurrent Neural Networks -- 3.8 Fuzzy Markov Random Fields -- 3.9 Other Soft Computing Techniques -- References -- 4 Optical Character Recognition Systems for English Language -- Abstract -- 4.1 Introduction -- 4.2 English Language Script and Experimental Dataset -- 4.3 Challenges of Optical Character Recognition Systems for English Language -- 4.4 Data Acquisition -- 4.5 Data Pre-processing -- 4.5.1 Binarization -- 4.5.2 Noise Removal -- 4.5.3 Skew Detection and Correction -- 4.5.4 Character Segmentation -- 4.5.5 Thinning -- 4.6 Feature Extraction.
4.7 Feature Based Classification: Sate of Art -- 4.7.1 Feature Based Classification Through Fuzzy Multilayer Perceptron -- 4.7.2 Feature Based Classification Through Rough Fuzzy Multilayer Perceptron -- 4.7.3 Feature Based Classification Through Fuzzy and Fuzzy Rough Support Vector Machines -- 4.8 Experimental Results -- 4.8.1 Fuzzy Multilayer Perceptron -- 4.8.2 Rough Fuzzy Multilayer Perceptron -- 4.8.3 Fuzzy and Fuzzy Rough Support Vector Machines -- 4.9 Further Discussions -- References -- 5 Optical Character Recognition Systems for French Language -- Abstract -- 5.1 Introduction -- 5.2 French Language Script and Experimental Dataset -- 5.3 Challenges of Optical Character Recognition Systems for French Language -- 5.4 Data Acquisition -- 5.5 Data Pre-processing -- 5.5.1 Text Region Extraction -- 5.5.2 Skew Detection and Correction -- 5.5.3 Binarization -- 5.5.4 Noise Removal -- 5.5.5 Character Segmentation -- 5.5.6 Thinning -- 5.6 Feature Extraction Through Fuzzy Hough Transform -- 5.7 Feature Based Classification: Sate of Art -- 5.7.1 Feature Based Classification Through Rough Fuzzy Multilayer Perceptron -- 5.7.2 Feature Based Classification Through Fuzzy and Fuzzy Rough Support Vector Machines -- 5.7.3 Feature Based Classification Through Hierarchical Fuzzy Bidirectional Recurrent Neural Networks -- 5.8 Experimental Results -- 5.8.1 Rough Fuzzy Multilayer Perceptron -- 5.8.2 Fuzzy and Fuzzy Rough Support Vector Machines -- 5.8.3 Hierarchical Fuzzy Bidirectional Recurrent Neural Networks -- 5.9 Further Discussions -- References -- 6 Optical Character Recognition Systems for German Language -- Abstract -- 6.1 Introduction -- 6.2 German Language Script and Experimental Dataset -- 6.3 Challenges of Optical Character Recognition Systems for German Language -- 6.4 Data Acquisition -- 6.5 Data Pre-processing -- 6.5.1 Text Region Extraction.
6.5.2 Skew Detection and Correction -- 6.5.3 Binarization -- 6.5.4 Noise Removal -- 6.5.5 Character Segmentation -- 6.5.6 Thinning -- 6.6 Feature Selection Through Genetic Algorithms -- 6.7 Feature Based Classification: Sate of Art -- 6.7.1 Feature Based Classification Through Rough Fuzzy Multilayer Perceptron -- 6.7.2 Feature Based Classification Through Fuzzy and Fuzzy Rough Support Vector Machines -- 6.7.3 Feature Based Classification Through Hierarchical Fuzzy Bidirectional Recurrent Neural Networks -- 6.8 Experimental Results -- 6.8.1 Rough Fuzzy Multilayer Perceptron -- 6.8.2 Fuzzy and Fuzzy Rough Support Vector Machines -- 6.8.3 Hierarchical Fuzzy Bidirectional Recurrent Neural Networks -- 6.9 Further Discussions -- References -- 7 Optical Character Recognition Systems for Latin Language -- Abstract -- 7.1 Introduction -- 7.2 Latin Language Script and Experimental Dataset -- 7.3 Challenges of Optical Character Recognition Systems for Latin Language -- 7.4 Data Acquisition -- 7.5

Data Pre-processing -- 7.5.1 Text Region Extraction -- 7.5.2 Skew Detection and Correction -- 7.5.3 Binarization -- 7.5.4 Noise Removal -- 7.5.5 Character Segmentation -- 7.5.6 Thinning -- 7.6 Feature Selection Through Genetic Algorithms -- 7.7 Feature Based Classification: State of Art -- 7.7.1 Feature Based Classification Through Rough Fuzzy Multilayer Perceptron -- 7.7.2 Feature Based Classification Through Fuzzy and Fuzzy Rough Support Vector Machines -- 7.7.3 Feature Based Classification Through Hierarchical Fuzzy Rough Bidirectional Recurrent Neural Networks -- 7.8 Experimental Results -- 7.8.1 Rough Fuzzy Multilayer Perceptron -- 7.8.2 Fuzzy and Fuzzy Rough Support Vector Machines -- 7.8.3 Hierarchical Fuzzy Rough Bidirectional Recurrent Neural Networks -- 7.9 Further Discussions -- References -- 8 Optical Character Recognition Systems for Hindi Language.

Abstract -- 8.1 Introduction -- 8.2 Hindi Language Script and Experimental Dataset -- 8.3 Challenges of Optical Character Recognition Systems for Hindi Language -- 8.4 Data Acquisition -- 8.5 Data Pre-processing -- 8.5.1 Binarization -- 8.5.2 Noise Removal -- 8.5.3 Skew Detection and Correction -- 8.5.4 Character Segmentation -- 8.5.5 Thinning -- 8.6 Feature Extraction Through Hough Transform -- 8.7 Feature Based Classification: State of Art -- 8.7.1 Feature Based Classification Through Rough Fuzzy Multilayer Perceptron -- 8.7.2 Feature Based Classification Through Fuzzy and Fuzzy Rough Support Vector Machines -- 8.7.3 Feature Based Classification Through Fuzzy Markov Random Fields -- 8.8 Experimental Results -- 8.8.1 Rough Fuzzy Multilayer Perceptron -- 8.8.2 Fuzzy and Fuzzy Rough Support Vector Machines -- 8.8.3 Fuzzy Markov Random Fields -- 8.9 Further Discussions -- References -- 9 Optical Character Recognition Systems for Gujarati Language -- Abstract -- 9.1 Introduction -- 9.2 Gujarati Language Script and Experimental Dataset -- 9.3 Challenges of Optical Character Recognition Systems for Gujarati Language -- 9.4 Data Acquisition -- 9.5 Data Pre-processing -- 9.5.1 Binarization -- 9.5.2 Noise Removal -- 9.5.3 Skew Detection and Correction -- 9.5.4 Character Segmentation -- 9.5.5 Thinning -- 9.6 Feature Selection Through Genetic Algorithms -- 9.7 Feature Based Classification: State of Art -- 9.7.1 Feature Based Classification Through Rough Fuzzy Multilayer Perceptron -- 9.7.2 Feature Based Classification Through Fuzzy and Fuzzy Rough Support Vector Machines -- 9.7.3 Feature Based Classification Through Fuzzy Markov Random Fields -- 9.8 Experimental Results -- 9.8.1 Rough Fuzzy Multilayer Perceptron -- 9.8.2 Fuzzy and Fuzzy Rough Support Vector Machines -- 9.8.3 Fuzzy Markov Random Fields -- 9.9 Further Discussions -- References.

10 Summary and Future Research -- 10.1 Summary -- 10.2 Future Research -- References -- Index.

Sommario/riassunto

The book offers a comprehensive survey of soft-computing models for optical character recognition systems. The various techniques, including fuzzy and rough sets, artificial neural networks and genetic algorithms, are tested using real texts written in different languages, such as English, French, German, Latin, Hindi and Gujarati, which have been extracted by publicly available datasets. The simulation studies, which are reported in details here, show that soft-computing based modeling of OCR systems performs consistently better than traditional models. Mainly intended as state-of-the-art survey for postgraduates and researchers in pattern recognition, optical character recognition and soft computing, this book will be useful for professionals in computer vision and image processing alike, dealing with different issues related to optical character recognition.

