DOCBIB: A Document Understanding Bibliography

Version 1.2

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Contents

1 Introduction

This document contains information about **DOCBIB**, a Document Understanding Bibliography which will be available on-line from the University of Maryland beginning in the Fall of 1993, and a recent copy of the citations.

The bibliography contains selected references from before 1980, major references for the 1980's and a more complete set of references for 1990 and beyond. References are included for topics such as preprocessing, represenation, on- and off-line recognition, graphics interpretation, page analysis, and signature verification, among others.

The bibliography is not intended to be comprehensive of all document understanding literature, but rather is a resource which can be used to obtain entry points into the document literature. The current bibliography is skewed toward document image understanding, with some on-line recognition references. The bibliography is updated periodically as new sources emerge or as additional topics are added by interested parties.

2 Sources

References have been gathered from a wide variety of sources, but are primarily from the computer vision and pattern recognition literature. The next two sections contain lists of primarily conference and journal sources, respectively.

2.1 Conference and Workshop Proceedings

Abbreviation	*Conference*[1]	*Years*
CVIP	Computer Vision and Image Processing	1992
CVPR	IEEE Computer Society Conference on Computer Vision and Pattern Recognition	1985-1992
ICPR	International Conference on Pattern Recognition	1984-1992
ICDAR	International Conference on Document Analysis and Recognition	1991, 1993
IWFHR	International Workshop on Frontiers in Handwriting Recognition	1990, 1991, 1993
SSPR	Syntactic and Structural Pattern Recognition	
VF	Visual Form	

2.2 Journals

Abbreviation	*Journal*	*Years*
AI	Artificial Intelligence	1987
BC	Biological Cybernetics	1990-
CGIP	Computer Graphics and Image Processing	
CVGIP	Computer Vision, Graphics and Image Processing	1984-1992
GMIP	Graphical Models and Image Processing (CVGIP)	1992-
IBMJRD	IBM Journal of Research and Development	
IJCV	International Journal of Computer Vision	
IJPRAI	International Journal of Pattern Recognition and Artificial Intelligence	
IPL	Information Processing Letters	
IU	Image Understanding (CVGIP)	1992-
IVC	Image and Vision Computing	
MVA	Machine Vision and Applications	
PIEEE	Proceedings of the IEEE	
PR	Pattern Recognition	1983-
PRL	Pattern Recognition Letters	1983-
SP	Signal Processing	
TCOMP	IEEE Transactions on Computers	
TPAMI	IEEE Transactions on Pattern Analysis and Machine Intelligence	
TSMC	IEEE Transactions on Systems, Man, and Cybernetics	
TSE	IEEE Transactions on Software Engineering	
VC	The Visual Computer	

2.3 Pending Entry

3 Organization of Bibliography

The bibliography is in BIBTEX format, with all of the standard fields and an additional "CATEGORY" field which contains a broad categorization of the article into the hierarchy presented below.

Not all references fit cleanly into a single category. The hardcopy version of the bibliography places each reference into the *most appropriate* primary category[2]. Secondary keywords are appended to provide a more specific categorization of the topic described or the approach taken in the work.

Please Note:

- As a general rule, a topic or category area will be given its own section when it contains 10 references which do not fit cleanly into another category.
- No hyphans will be introduced in any of the keywords.
- The category "GENERAL" is used as a way of extracting references other then the ones in the other subsections.

3.1 Hierarchy

			CATEGORY
I	Books	1	[BOOK, *]
II	Meetings	2	[MEETING, *]
	– Indexed		
	– Not Indexed		
III	Special Issues	3	[SPECIAL ISSUE, *]
IV	Pre-processing Tasks		
	– Survey		
	– Character Segmentation	4	[PREPROCESSING, CHARACTER SEGMENTATION]
	– Feature Extraction	5	[PREPROCESSING, FEATURE EXTRACTION]
	– Skew Detection	6	[PREPROCESSING, SKEW]
	– Text-Graphics Discrimination	7	[PREPROCESSING, TEXT GRAPHICS]
	– Thinning	8	[PREPROCESSING, THINNING]
	– Thresholding	9	[PREPROCESSING, THRESHOLDING]
	– Vectorization	10	[PREPROCESSING, VECTORIZATION]
	– General References	11	[PREPROCESSING, GENERAL, *]
V	Models, Analysis and Representations		
	– Models of Documents	12	[DOCUMENT MODELS]
	– Handwriting Models	13	[HANDWRITING MODELS]
	– Handwriting Analysis	14	[HANDWRITING ANALYSIS]
	– Representations	15	[REPRESENTATION]
VI	Text Processing		
	– On-line Recognition		
	– – Surveys	16	[TEXT PROCESSING, ONLINE, SURVEY]
	– – Foreign	17	[TEXT PROCESSING, ONLINE, FOREIGN LANGUAGE]
	– – Gestures and Sketches	18	[TEXT PROCESSING, ONLINE, SKETCHES]
	– – Script	19	[TEXT PROCESSING, ONLINE, HANDWRITTEN]
	– – Word Recognition	20	[TEXT PROCESSING, ONLINE, WORD]
	– – General References	21	[TEXT PROCESSING, ONLINE, GENERAL]
	– Optical Character Recognition - Latin		
	– – Surveys	22	[TEXT PROCESSING, OCR, SURVEY]
	– – Hand-Printed	23	[TEXT PROCESSING, OCR, HAND PRINTED]
	– – Script	24	[TEXT PROCESSING, OCR, HANDWRITTEN]
	– – Machine-Printed	25	[TEXT PROCESSING, OCR, MACHINE PRINTED]
	– – Digit Recognition	26	[TEXT PROCESSING, OCR, DIGIT]
	– – Word Recognition	27	[TEXT PROCESSING, OCR, WORD]
	– – General References	28	[TEXT PROCESSING, OCR, GENERAL]
	– Optical Character Recognition - Foreign		
	– – Chinese	29	[TEXT PROCESSING, OCR, FOREIGN LANGUAGE, CHINESE]

[2] On-line access to DOCBIB is described in Section 5.2

3.2 Primary Category Descriptors

BOOK	Book
MEETING	Meeting
SPECIAL ISSUE	Special Issue
APPLICATIONS	
CHARACTER SEGMENTATION	
CHARACTER SET RECOGNITION	Alphabet Identification
CHECKS	Check Processing
CONTEXT	Use of Context or Priors
DATABASES	for Training, Testing or Storage
DOCUMENT MODELS	Page Level Modeling
DOCUMENT PROCESSING	
ENGINEERING DRAWING	Engineering Drawing Interpreation
EVALUATION	Error Analysis and Evaluation
FAX	Fax Processing
FEATURE EXTRACTION	Feature Extraction
FOREIGN LANGUAGE	Foreign Language Processing
FORMS	Forms Processing
FORMULAS	Mathematics and Scientific Notation
GENERAL	General References of a Category
GRAPHICS	Graphics Understanding
HAND PRINTED	Hand Produced Documents
HANDWRITING ANALYSIS	Handwriting Analysis
HANDWRITING MODELS	
HANDWRITTEN	Handwritten (script) Recognition
INFORMATION RETRIEVAL	
LANGUAGE RECOGNITION	
LINE DRAWING	
LOGICAL ANALYSIS	Logical Layout Analysis
MACHINE PRINTED	Machine Produced Documents
MACHINE TRANSLATION	
MAPS	Map Understanding
MUSIC	Music Processing
NATURE	Documents in 3D Scenes
NATURE LANGUAGE	Documents in 3D Scenes
OCR	Optical Character Recognition
ONLINE	On-line Recognition
PAGE SEGMENTATION	
POSTAL	Mail Piece Processing
POSTPROCESSING	
PREPROCESSING	
REPRESENTATION	
SHORTHAND	Shorthand Processing
SIGNATURE	Signature Verification
SKETCHES	Hand Produced Graphics
SKEW	Skew Detection and Correction
SPECIAL APPLICATIONS	
SURVEY	Survey Papers
TABLES	Table Processing, Flowcharts
TEXT PROCESSING	
TEXT GRAPHICS	Text/Graphics Discrimination
THINNING	Thinning Algorithms
THRESHOLDING	Thresholding Algorithms
WORD	Whole Word Recognition
WRITER IDENTIFICATION	

3.3 Additional Category Descriptors

3.3.1 General Descriptors

ADDRESS	Address Block Location
COMPRESSION	Compression and Vectorization
DIGIT	Numeric Digits
FONT	Font Processing
GRAYSCALE	
HARDWARE	Hardware
HOUGH	Hough Transform
LOGO	Logo and Seal Processing
MARKOV	Markov Models
MORPHOLOGY	
NGRAM	N-Gram Probabilities
OFFLINE	
PARALLEL	Parallel Algorithms
SYSTEM	Systems
VECTORIZATION	
ZIP CODE	Zip Code Processing

3.3.2 Classifier/Pattern Recognition Descriptors

CLASSIFIER	Classification
CLUSTERING	Clustering Approach
FUZZY LOGIC	
KNOWLEDGE BASED	Expert Systems
LEARNING	Learning Based Approaches
NEURAL NET	Neural Nets
RELAXATION	Relaxation
STATISTICAL	Statistical PR Approaches
STRUCTURAL	Structural Approaches
SYNTACTIC	Syntactic PR Approaches
TEMPLATE MATCHING	

3.3.3 Language Descriptors

ARABIC	
BRAHAMI	
CHINESE	KANJI
CHITRA	
CYRILLIC	
DEVNAGARI	
FARSI	
GREEK	
HEBREW	
ITALIAN	
JAPANESE	KANJI
JAPANESE	HIRAGANA
JAPANESE	KATAKANA
KOREAN	
MANDERIN	
PINYIN	
TAMIL	
TELUGU	
THIA	

4 BIBTEX Conventions

- The bibtex-key is constructed by using the first three letters of the first author's last name and the last two digits of the year. For multiple references by the same author or authors with the same first three letters of the last name, the letters 'a', 'b', ... are appended.

```
@inproceedings{kas88,
    AUTHOR = {R. Kasturi},
    BOOKTITLE =  ICPR,
    PAGES = {255-259 },
    TITLE = {A System for Recognition and Description of Graphics },
    YEAR =  1988,
    CATEGORY =  {DOCUMENT PROCESSING,  TEXT GRAPHICS}
}

@article{kas88a,
    AUTHOR = {R. Kasturi and J. Alemany },
    JOURNAL =  TSE,
    PAGES = {671-675},
    TITLE = {Information Extraction from Images of Paper-Based Maps },
    VOLUME =  14,
    YEAR =  1988,
    CATEGORY =  {GRAPHICS, MAPS}
}
```

- All `@STRING` commands are kept in one file (docstrings.bib). This file should be the first file in `bibliography` command.

5 Accessing DOCBIB

5.1 Off-Line

A copy of this document is available by sending a request to the Document Processing Group, Center for Automation Research, University of Maryland, College Park, MD 20742.

5.2 On-Line from The DIMUND Document Information Server

5.2.1 Via Gopher

A postscript copy of this document as well as the DOCBIB files are available on-line through the DIMUND Document Information Gopher server at the University of Maryland or via anonymous FTP.

The Gopher information server is located on `dimund.cfar.umd.edu`, port 70. Using a gopher client, connect to `dimund.cfar.umd.edu`. If you do not have a client, telnet to dimund and gain access to a Unix client by entering "gopher" at the login prompt and providing your full internet address as the password.

5.2.2 Via anonymous FTP access

To access files in DOCBIB, internet users can use FTP (file-transfer-protocol) to copy files and programs to their machines. The bibliographies can be downloaded and searched using the *bibindex* and *biblook* utilities provided in the utilities directory from dimund.cfar.umd.edu. See the file named README for more information about the contents of files.

In the following example, where much of the output from ftp is left out, the following conventions are used.

```
"$" is your system's prompt
"ftp>" is the prompt from the file transfer program
```

```
$ ftp dimund.cfar.umd.edu       to reach our archive; obscure text will follow
Name (...): anonymous           user logs in with standard anon ftp name
Password: yourname@yoursite     use your name and your site for identification
ftp> cd pub/DOCBIB              go to DOC Bibliography directory
ftp> dir                        to get a listing of what's there
ftp> get README                 to retrieve a file
ftp> cd databases               go to DOC Bibliography Database directory
ftp> mget DocumentBib.bib       to retrieve the complete files
ftp> cd ../utilities            go to utilities directory
ftp> mget *                     interactively retrieve all files
ftp> quit                       to leave ftp when done
```

5.2.3 Via email

A ListServer and Document Understanding Mailing List (DOCUMENTS) is available as part of the document server. This list server can be used to request searches of the database. To use the capabilities, you must first subscribe to the ListServer.

Send a mail message to Document-Server@dimund.cfar.umd.edu containing the following single line message

SUBSCRIBE DOCUMENTS [first name] [last name]

A ListServer program has been set up to process requests for bibliography information.

Send Server Requests to	:	Document-Server@dimund.cfar.umd.edu
Send Comments to	:	Document-Request@dimund.cfar.umd.edu

For searches send a mail message to Document-Server@dimund.cfar.umd.edu containing the following message:

RUN DOCUMENTS DOCBIB BIBSEARCH <search string>

where <search string> is presented in *biblook* format as:

```
        ? or h[elp]
             Display this help message.

    f[ind] [not] <field> <words>
             Find the entries containing the given words in any
             field with a prefix matching the <field> argument.  For
              example, 'a' matches both 'author' and 'address', and
             'au' matches 'author' only.  If the <field> argument is
             '-' (or any string with no letters or numbers), match
             any field.

             If 'not' appears before the <field>, the sense of the
             search is reversed.  The symbols '~' and '!' can be
             used in place of 'not'.

             Each word is a contiguous sequence of letters and
             digits.  Case is ignored; accents should be omitted;
             apostrophes are not required.  Single characters and a
             few common words are also ignored.  Any word ending
             with an asterisk is treated as a prefix.  Thus,
             'point*' matches 'point', 'points', 'pointer', etc.

        and [not] <field> <words>
```

```
or [not] <field> <words>
     Intersect (resp. union) the results of the given search
     with the previous search.  Several of these commands
     may be combined on a single line.  Commands are handled
     in the order in which they appear; there is no pre-
     cedence.  Unlike other commands, and like 'not', these
     must be spelled out completely.  '&' can be used in
     place of 'and', and '|' can be used in place of 'or'.


-----------------------------------------------------------------
  Valid fields to search include all BIBTEX defined
     fields as well as the CATEGORY field defined to hold keywords

  Of primary interest will be:
              author, booktitle, category, journal, and year

  -----------------------------------------------------------------
  Several commands can be combined on a single line by
  separating them with semicolons.


  Example:  All OCR papers with Pavlidis as an author.
        f cat ocr & a pav*
```

6 Acknowledgements

We thank Professor Azriel Rosenfeld for the hunderds of vision references he has compiled over the years, of which document understanding is a small part. He has graciously allowed us to use the data and convert it for inclusion in our system.

7 Books

[1] H.S. Baird, H. Bunke, and K. Yamamoto. *Structured Document Image Analysis*. Springer, 1992.
KEY: baird92
CATEGORIES: BOOK, DOCUMENT PROCESSING, STRUCTURAL, PAGE SEGMENTATION, LOGICAL ANALYSIS

[2] D. Ellen. *The Scientific Examination of Documents: Methods and Techniques*. John Wiley and Sons, 1989. chapters 1-5.
KEY: ellen89
CATEGORIES: BOOK, DOCUMENT PROCESSING

[3] S. Impedovo and J.C. Simon. *From Pixels to Features III – Frontiers in Handwriting Recognition*. North Holland, 1992.
KEY: impedovo92
CATEGORIES: BOOK, TEXT PROCESSING, OCR, HAND PRINTED

[4] M.C. Mozer. *The Perception of Multiple Objects – A Connectionist Approach*. MIT Press, 1991.
KEY: mozer91
CATEGORIES: BOOK

[5] R. Plamondon, C.Y. Suen, and M.L. Simner. *Computer Recognition and Human Production of Handwriting*. World Scientific, 1988.
KEY: plamondon88
CATEGORIES: BOOK, TEXT PROCESSING, OCR, HAND PRINTED, DOCUMENT MODELS

[6] R. Plamondon and G. Leedham. *Computer Processing of Handwriting*. World Scientific, 1990.
KEY: plamondon90b
CATEGORIES: BOOK, ONLINE

[7] G. Rickheit and H. Strohner. *Inferences in Text Processing*. North Holland, 1985.
KEY: rickheit85
CATEGORIES: BOOK, TEXT PROCESSING, OCR, GENERAL

[8] S.N. Srihari. *Computer Text Recognition and Error Correction*. IEEE EH022-4, 1984.
KEY: srihari84
CATEGORIES: BOOK, TEXT PROCESSING, OCR, GENERAL, EVALUATION

[9] R. Suchenwirth, J. Guo, I. Hartmann, G. Hincha, M. Krause, and Z. Zhang. *Optical Recognition of Chinese Characters*. Vieweg, 1989.
KEY: suchenwirth89
CATEGORIES: BOOK, TEXT PROCESSING, OCR, FOREIGN LANGUAGE

[10] A.J.W.M. Thomassen, P.J.G. Keuss, and G.P. Van Galen. *Motor Aspects of Handwriting – Approaches to Movement in Graphic Behavior*. North Holland (Acta Psychologica 54), 1984.
KEY: thomassen84
CATEGORIES: BOOK, DOCUMENT MODELS

8 Meetings

8.1 Indexed

[11] *IEEE Conferences on Computer Vision and Pattern Recognition*. IEEE Computer Society Press, 1983 - 1993. Annual.
KEY: CVPR
CATEGORIES: MEETING

[12] *International Conferences on Document Analysis and Recognition, St. Malo, France*. IEEE Computer Society Press, 1991.
KEY: ICDAR91
CATEGORIES: MEETING

[13] *International Conferences on Document Analysis and Recognition, Tskuba Science City, Japan.* IEEE Computer Society Press, 1993.
KEY: ICDAR93
CATEGORIES: MEETING

[14] *International Conferences on Pattern Recognition.* IEEE Computer Society Press, 1980 -. Biannual.
KEY: ICPR
CATEGORIES: MEETING

[15] *IAPR International Workshops on Frontiers in Handwriting Recognition*, 1990 - 1993. Biannual.
KEY: IWFHR
CATEGORIES: MEETING

[16] *Scandinavian Conferences on Image Analysis*, 1980 - 1992.
KEY: SCIA
CATEGORIES: MEETING

[17] *Symposiums on Document Analysis and Retrieval, University of Nevada, Las Vegas*, 1992 - 1993. Annual.
KEY: SDAR
CATEGORIES: MEETING

8.2 Non-Indexed

[18] *SPIE Conferences on Visual Communications and Image Processing.* SPIE - The International Society for Optical Engineers, 1986 - 1990.
KEY: VCIP
CATEGORIES: MEETING

9 Special Issues

[19] L. O'Gorman and R. Kasturi, editors. Special Issue on Document Image Analysis Systems. *IEEE Computer*, 25(7), July 1992.
KEY: COMPUTERSI92
CATEGORIES: SPECIAL ISSUE, DOCUMENT PROCESSING

[20] P.S.P. Wang, editor. Special Issue on Character & Handwriting Recognition: Expanding Frontiers. *International Journal of Pattern Recognition and Artificial Intelligence*, 5(1-2):1–382, 1991.
KEY: IJPRAISI91
CATEGORIES: SPECIAL ISSUE, TEXT PROCESSING, OCR

[21] G. Herring and V. Uzilevsky, editors. Special Issue on Postal Applications. *International Journal of Research & Engineering*, 1989.
KEY: IJRESI89
CATEGORIES: SPECIAL ISSUE, POSTAL

[22] R. Kasturi and L.O'Gorman, editors. Special Issue on Document Image Analysis Techniques. *Machine Vision and Applications*, 5(3), 1992.
KEY: MVASI92
CATEGORIES: SPECIAL ISSUE

[23] R. Kasturi and L.O'Gorman, editors. Special Issue on Document Image Analysis Techniques. *Machine Vision and Applications*, 6(2 - 3), 1993.
KEY: MVASI93
CATEGORIES: SPECIAL ISSUE

[24] T. Pavlidis and S. Mori, editors. Special Issue on Optical Character Recognition. *Proceedings of the IEEE*, 80(7), July 1992.
KEY: PIEEESI92
CATEGORIES: SPECIAL ISSUE, TEXT PROCESSING, OCR

[25] H. Tominaga, editor. Special Issue on Postal Processing and Character Recognition. *Pattern Recognition Letters*, 14(4), 1993.
KEY: PRLSI93
CATEGORIES: SPECIAL ISSUE

[26] R. Plamondon, editor. Special Issue on Handwriting Processing and Recognition. *Pattern Recognition*, 26(3), 1993.
KEY: PRSI93
CATEGORIES: SPECIAL ISSUE

10 Pre-processing Tasks

10.1 Character Segmentation

[27] A. Amin and H.B. Al-Sadoun. A new segmentation technique of Arabic text. In *Proceedings of the International Conference on Pattern Recognition*, pages 441–445, 1992.
KEY: amin92
CATEGORIES: PREPROCESSING, CHARACTER SEGMENTATION, FOREIGN LANGUAGE, ARABIC

[28] S. Ariyoshi. A character segmentation method for Japanese printed documents coping with touching character problems. In *Proceedings of the International Conference on Pattern Recognition*, pages 313–316, 1992.
KEY: ariyoshi92
CATEGORIES: PREPROCESSING, CHARACTER SEGMENTATION, FOREIGN LANGUAGE, JAPANESE

[29] N. Babaguchi, M. Tsukamoto, and T. Aibara. Knowledge aided character segmentation from handwritten document image. In *Proceedings of the International Conference on Pattern Recognition*, pages 573–575, 1986.
KEY: babaguchi86
CATEGORIES: PREPROCESSING, CHARACTER SEGMENTATION, HANDWRITTEN

[30] T. Bayer, U. Kressel, and M. Hammelsbeck. Segmenting merged characters. In *Proceedings of the International Conference on Pattern Recognition*, pages 346–349, 1992.
KEY: bayer92
CATEGORIES: PREPROCESSING, CHARACTER SEGMENTATION

[31] T.A. Bayer and U.H.G. Kressel. Cut classification for segmentation. In *Proceedings of the International Conference on Document Analysis and Recognition*, pages 565 – 568, 1993.
KEY: bayer93
CATEGORIES: PREPROCESSING, CHARACTER SEGMENTATION

[32] N.P. Carter. Segmentation and preliminary recognition of madrigals notated in white mensural notation. *Machine Vision and Applications*, 5:223–230, 1992.
KEY: carter92
CATEGORIES: PREPROCESSING, CHARACTER SEGMENTATION, FOREIGN LANGUAGE

[33] M. Cesar and R. Shinghal. An algorithm for segmenting handwritten postal codes. *IJMMS*, ar33:63–80, 1990.
KEY: cesar90
CATEGORIES: PREPROCESSING, CHARACTER SEGMENTATION, POSTAL, ADDRESS, ZIP CODE

[34] M. Cheriet, Y.S. Huang, and C.Y. Suen. Background region-based algorithm for the segmentation of connected digits. In *Proceedings of the International Conference on Pattern Recognition*, pages 619–622, 1992.
KEY: cheriet92d
CATEGORIES: PREPROCESSING, CHARACTER SEGMENTATION, DIGIT

[35] R. Fenrich. Segmentation of automatically located handwritten numeric strings recognition. In *From Pixels to Features III*, pages 47–60. North Holland, 1992.
KEY: fenrich92
CATEGORIES: PREPROCESSING, CHARACTER SEGMENTATION, DIGIT

[36] V. Govindaraju and S.N. Srihari. Separating handwritten text from interfering strokes. In *From Pixels to Features III*, pages 17–28. North Holland, 1992.
KEY: govindaraju92
CATEGORIES: PREPROCESSING, CHARACTER SEGMENTATION

[37] M.J.J. Holt, M. Beglou, and S. Datta. Slant-independent letter segmentation for off-line cursive script recognition. In *From Pixels to Features III*, pages 41–46. North Holland, 1992.
KEY: holt92
CATEGORIES: PREPROCESSING, CHARACTER SEGMENTATION, TEXT PROCESSING, OCR, HANDWRITTEN

[38] E. Lecolinet and J.P. Crettez. A grapheme-based segmentation technique for cursive script recognition. In *Proceedings of the International Conference on Document Analysis and Recognition*, pages 740–748, 1991.
KEY: lecolinet91
CATEGORIES: PREPROCESSING, CHARACTER SEGMENTATION, TEXT PROCESSING, OCR, HANDWRITTEN

[39] S. Liang, M. Ahmadi, and M. Shridhar. Segmentation of touching characters in printed document recognition. In *Proceedings of the International Conference on Document Analysis and Recognition*, pages 569 – 572, 1993.
KEY: liang93
CATEGORIES: PREPROCESSING, CHARACTER SEGMENTATION

[40] C.W. Liao and J.S. Huang. Stroke segmentation by Bernstein-Bezier curve fitting. *Pattern Recognition*, 23:475–484, 1990.
KEY: liao90
CATEGORIES: PREPROCESSING, CHARACTER SEGMENTATION

[41] Y. Lu. On the segmentation of touching characters. In *Proceedings of the International Conference on Document Analysis and Recognition*, pages 440 – 443, 1993.
KEY: lu93
CATEGORIES: PREPROCESSING, CHARACTER SEGMENTATION

[42] M. Maier. Separating characters in scripted documents. In *Proceedings of the International Conference on Pattern Recognition*, pages 1056–1058, 1986.
KEY: maier86
CATEGORIES: PREPROCESSING, CHARACTER SEGMENTATION, HANDWRITTEN

[43] A. Naiman and A. Fournier. Rectangular convolution for fast filtering of characters. In *ACM SIGGRAPH*, pages 233–242, 1987.
KEY: naiman87
CATEGORIES: PREPROCESSING, CHARACTER SEGMENTATION

[44] H. Ozawa and T. Nakagawa. A character image enhancement method from characters with various background images. In *Proceedings of the International Conference on Document Analysis and Recognition*, pages 58 – 61, 1993.
KEY: ozawa93
CATEGORIES: PREPROCESSING, CHARACTER SEGMENTATION

[45] J. Rocha and T. Pavlidis. A solution to the problem of touching and broken characters. In *Proceedings of the International Conference on Document Analysis and Recognition*, pages 602 – 605, 1993.
KEY: rocha93
CATEGORIES: PREPROCESSING, CHARACTER SEGMENTATION

[46] M. Shridhar and A. Badreldin. Context-directed segmentation algorithm for handwritten numeral strings. *Image and Vision Computing*, 5:3–9, 1987.

KEY: shridhar87
CATEGORIES: PREPROCESSING, CHARACTER SEGMENTATION, DIGIT, CONTEXT

[47] N.W. Strathy, C.Y. Suen, and A. Krzyzak. Segmentation of handwritten digits using contour features. In *Proceedings of the International Conference on Document Analysis and Recognition*, pages 577 – 580, 1993.
KEY: strathy93
CATEGORIES: PREPROCESSING, CHARACTER SEGMENTATION, DIGIT

[48] S.W. Sun and S.Y. Kung. Flexible segmentation and matching for Optical Character Recognition. In *SPIE on Visual Communications and Image Processing IV*, pages 1314 – 1323, 1989.
KEY: sun89
CATEGORIES: PREPROCESSING, CHARACTER SEGMENTATION, TEXT PROCESSING, OCR, GENERAL

[49] K. Takizawa, D. Arita, M. Minoh, and K. Ikeda. Extraction of character strings from unformed document images. In *Proceedings of the International Conference on Document Analysis and Recognition*, pages 660 – 663, 1993.
KEY: takizawa93
CATEGORIES: PREPROCESSING, CHARACTER SEGMENTATION, PAGE SEGMENTATION

[50] G. Tambouratzis and T.J. Stonham. Evaluating the topology-preservation capabilities of a self-organizing local Neural Network. *Pattern Recognition Letters*, 14(11):927 – 934, November 1993.
KEY: tambouratzis93
CATEGORIES: PREPROCESSING, CHARACTER SEGMENTATION, TEXT PROCESSING, OCR, GENERAL, NEURAL NET

[51] K.R. Tampi and S.S. Chetlur. Segmentation of handwritten characters. In *Proceedings of the International Conference on Pattern Recognition*, pages 684–686, 1986.
KEY: tampi86
CATEGORIES: PREPROCESSING, CHARACTER SEGMENTATION

[52] S. Tsujimoto and H. Asada. Resolving ambiguity in segmenting touching characters. pages 203–218. Springer-Verlag, 1992.
KEY: tsujimoto92
CATEGORIES: PREPROCESSING, CHARACTER SEGMENTATION

[53] K. Weisteen and T. Taxt. Font segmentation of non-rotated, printed symbols in the vector representation. In *Proceedings of the International Conference on Pattern Recognition*, pages 669–672, 1992.
KEY: weisteen92
CATEGORIES: PREPROCESSING, CHARACTER SEGMENTATION

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