



Digital Library and Document Server

Abdel Belaïd

► **To cite this version:**

Abdel Belaïd. Digital Library and Document Server. International Workshop on Technology Development in Indian Language, ISI, Calcutta, 2001, Calcutta, India, 39 p. inria-00107519

HAL Id: inria-00107519

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Submitted on 19 Oct 2006

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Digital Library and Document Server



Calliope, Muse of eloquence and poe

The Calliope Project A. Belaïd

The Framework

R&D Collaboration

- ▶ IMAG + INRIA + RXRC (Xerox)
- ▶ First collaboration success : **Callimaque**
 - 3000 thesis & technical reports : 1950 - 1993
 - RXRC : multilingual interrogation for anglophone readers
 - IMAG : 320 journals, annual budget 150 000 \$

The problem

- ▶ INRIA Displacement, deprived researchers of doc access

The Solution

- ▶ Not duplicate the center
- ▶ Automatic system : access to IMAG document center

Constraints

Infrastructure :

- ▶ **Investment** : to minimize the cost in material
 - Use : Net infrastructure (connection flow 128 K bits/s)
 - Permit : heterogeneous client station (Macintosh, PC, Unix)
- ▶ **Quality** : to deliver articles with a quality similar to the photocopy
 - Postscript level 2

Research : to take advantage of this opportunity

- ▶ To go beyond the paper model
 - To better apprehend the mass of scientific information
 - To integrate sources of heterogeneous documents
 - To open the research on data indexing, data mining, ...

The Calliope service

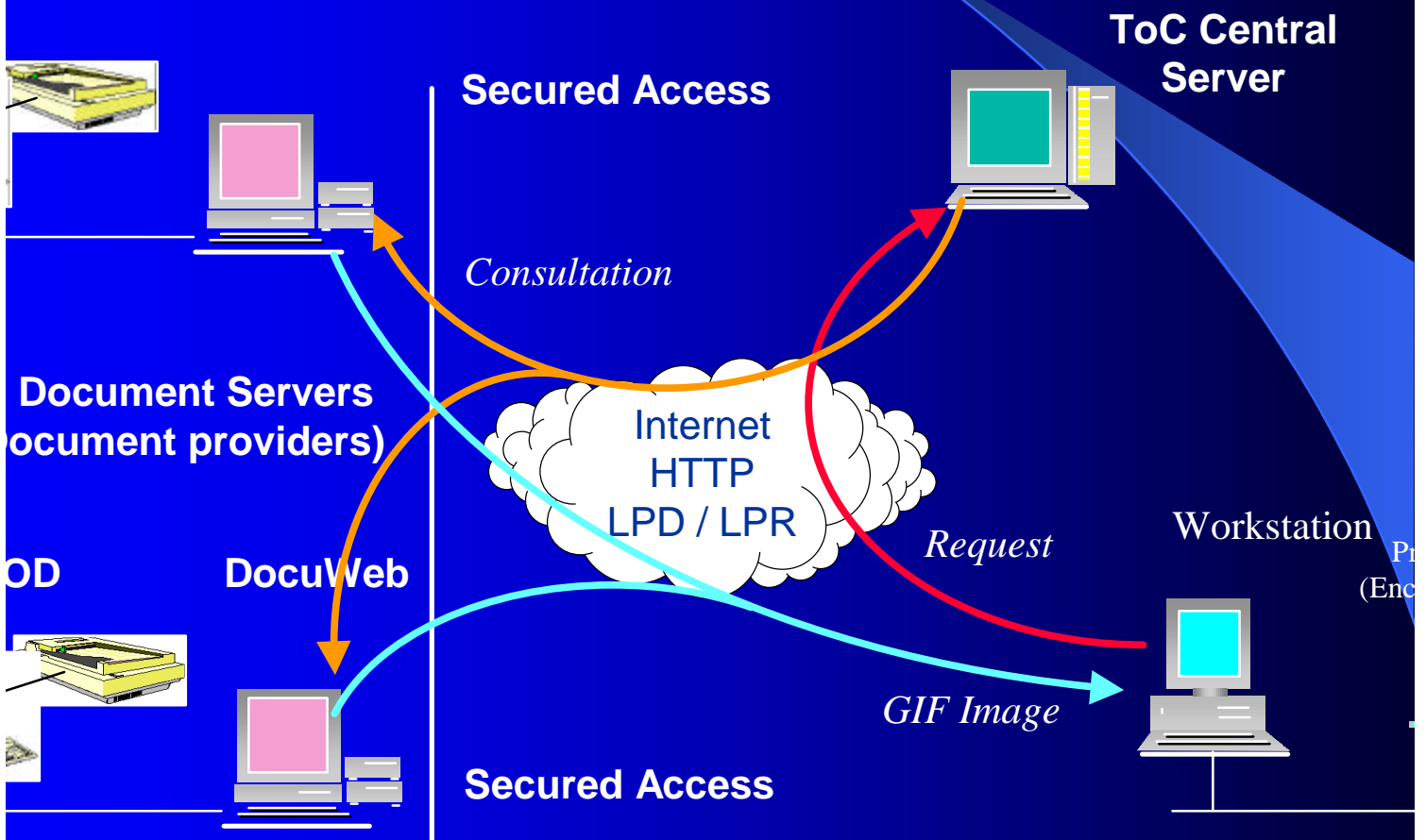
The solution

- ▶ To develop the concept of **telephotocopy**

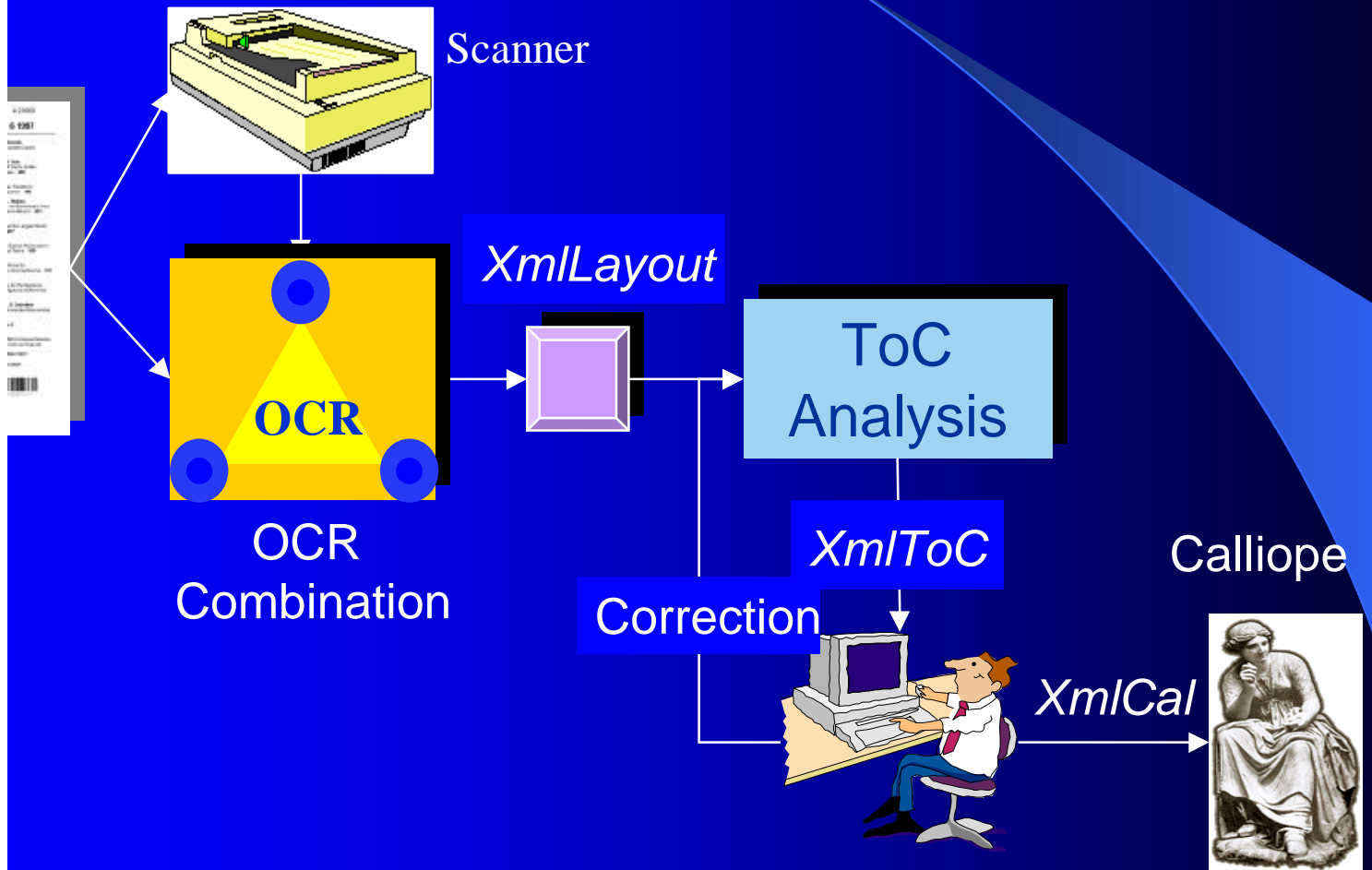
Functionality

- ▶ Access to **table of contents server**
- ▶ Asking of telephotocopy by :
 - Simple click on the article
 - Textual Retrieval on paper titles, authors, journal title
- ▶ Services
 - Availability signaled by email
 - **Get the paper in an image format**
 - Printing at the request of part or total paper
 - Electronic subscription

Architecture



Recognition



ToC Examples

COMPUTER-AIDED DESIGN

• Number 4 • April 1997

Engineering of geometric models
Várady, Hungarian Academy of Sciences,
Marras, University of Wales, Cardiff
Cox, Brigham Young University

Reverse engineering of geometric models
Lorin and J. Cox

Encoding of geometric models – an introduction
Lorin and J. Cox

Reflection: from points to splines

3D object reconstruction from two-dimensional images
Lorin and J. Winget

Image simplification using error measurements
Leon

A wrap-around model using an active contour
Lodley and G. W. Vickers

Model acquisition from range images
D. W. Eggert and R. B. Fisher

is a dedicated web homepage at: <http://www.ele.berlin.fr/aca01/tao/>

ISSN 0013-788X
CODEN CAD-AM
CAGR 1996
CAGR 1997
CAGR 1998
CAGR 1999
CAGR 2000
CAGR 2001
CAGR 2002
CAGR 2003
CAGR 2004
CAGR 2005
CAGR 2006
CAGR 2007
CAGR 2008
CAGR 2009
CAGR 2010
CAGR 2011
CAGR 2012
CAGR 2013
CAGR 2014
CAGR 2015
CAGR 2016
CAGR 2017
CAGR 2018
CAGR 2019
CAGR 2020
CAGR 2021
CAGR 2022
CAGR 2023
CAGR 2024
CAGR 2025
CAGR 2026
CAGR 2027
CAGR 2028
CAGR 2029
CAGR 2030



Applicable Algebra in Engineering, Communication and Computing

A 21053

Vol. 8 No. 6 1997

A. Asperti, J. Chrobocek
Safe Operators: Brackets Closed Forever 437

P. Loustaunau, E. V. York
On the Decoding of Cyclic Codes Using Gröbner Bases 469

F. Clarke
The Discrete Fourier Transform of a Recurrent Sequence 485

A. T. Clayman, G. L. Mullen
Improved $(7, M, S)$ -net Parameters from the Gilbert-Varshamov Bound 481

O. Moussa
An Inequality About the Largest Roots of a Polynomial 497

M. Göbel
On the Number of Special Permutation-Invariant Orbits and Terms 505

G. Villard
Fast Parallel Algorithms for Matrix Reduction to Normal Forms 511

G. Carra-Ferro
A Resultant Theory for the Systems of Two Ordinary Algebraic Differential Equations 539

Y. N. Lakshman, B. D. Saunders
Sparse Shifts for Univariate Polynomials (Erratum) 561

Contents of Volume 8

Online edition in LINK Computer Science
Online Library <http://link.springer.de>

AAECCW 8(6) 437-562 (1997)
December 1997

Printed on acid-free paper



0308-1079(199712)8:6:1-L

Centre de Documentation
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Cmrs-Cm / Inria Lorraine

16112 (3)

Now available online
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Table of Contents — ICPR Conference

Message of the Conference Chairmen
Organizing Committee
Members of the President of IAPR	.....
Members of the Steering Board	.....
IAPR Executive Committee	.....
Regional Committee Chairmen	.....
IAPR Member Societies	.....
Chairpersons of Architecture for Vision and Pattern Recognition	.....
Track the Program Chairmen	.....
Conference ID: Reviewers/Program Committee Members	.....

SESSION D1: NEW CRIPS FOR IMAGE ANALYSIS

Generic Functions for On-Chip Vision	.....
R. Y. Zeng, S. S. Chao, and T. M. Bird	.....
Image Recognition with an Analog Neural Net Chip	.....
H. P. Graf, C. J. Neftci, and J. Ben	.....
SDPA: A VLSI System Array Chip for Image Processing	.....
M. Fanni, F. J. McCabe, and W. Rosenstiel	.....
The Wavelet Transforms — A CMOS VLSI ASIC Implementation	.....
J. J. Hopf and H. Weickert	.....

SESSION D2: SPECIALIZED ARCHITECTURES

A Hardware Architecture for Image Identification and Ground Plane Classification	.....
J. C. Coenig, M. A. Trachten, and C. B. Bivens	.....
A VLSI Hardware Architecture for Dynamic Time Warping	.....
S. K. Sankaranarayanan, S. M. Kulkarni, R. Rajagopalan, and H. J. Zein	.....
Image Processing Hardware for Coding Multiple Object Scenes	.....
A. P. Jones and J. J. Grayford	.....
Labeling Based on Sequential Tracking	.....
T. Ishihara, C. Fournier, F. Ribo, H. Takahashi, and F. Joolet	.....
Neutrosophic Synthesis of Human-Like Appearances in Object Modeling	.....
G. M. Matejka, C. W. Lee, W. R. Rindfleisch, and N. Ashizaka	.....

SESSION D3: MACHINE VISION SYSTEMS

Robust and Reproducible Computational Networks for Computer Vision	.....
S. M. Hossain, A. K. Sengupta, C. Misra, M. B. Johnson, E. Cooper, L. G. Shapiro, J. F. Palacios, J. M. Alvarez, M. Chang, H. H. Tan, C. H. Cho, L. H. Yang, E. Ouyang, B. Lober, K. Leung, T. Miller, J. Park, and A. Minamide	.....
A Miniaturized Active Vision System	.....
S. S. Reddy, A. A. Wald, and S. S. Reddy	.....
High Speed and Robustness 3D Measurement System	.....
E. Araki, M. Shimizu, T. Noda, F. Ohta, Y. Tsuda, K. Ikegami, K. Saitoh, and M. Goto	.....
A Truncated Vision System for a Mobile Robot	.....
M. Mundy, R. M. Hsu, and K. M. Yu	.....
A Hybrid Architecture for a High Performance and Physical Small Low-Level Image Processing System	.....
A. von Elpt and L. D. Hertzberg	.....

Reference Structure

Top down approach

1 column (5 %)

11 Does Machine Learning Really Work?

In this article, based on the author's keynote talk at AAAI-96, Mitchell samples a number of recent accomplishments in machine learning and takes a look at where the field might be headed.

Tom M. Mitchell

2 columns (80 %)

AMEDEO NAPOLI

61

3 columns (15 %)

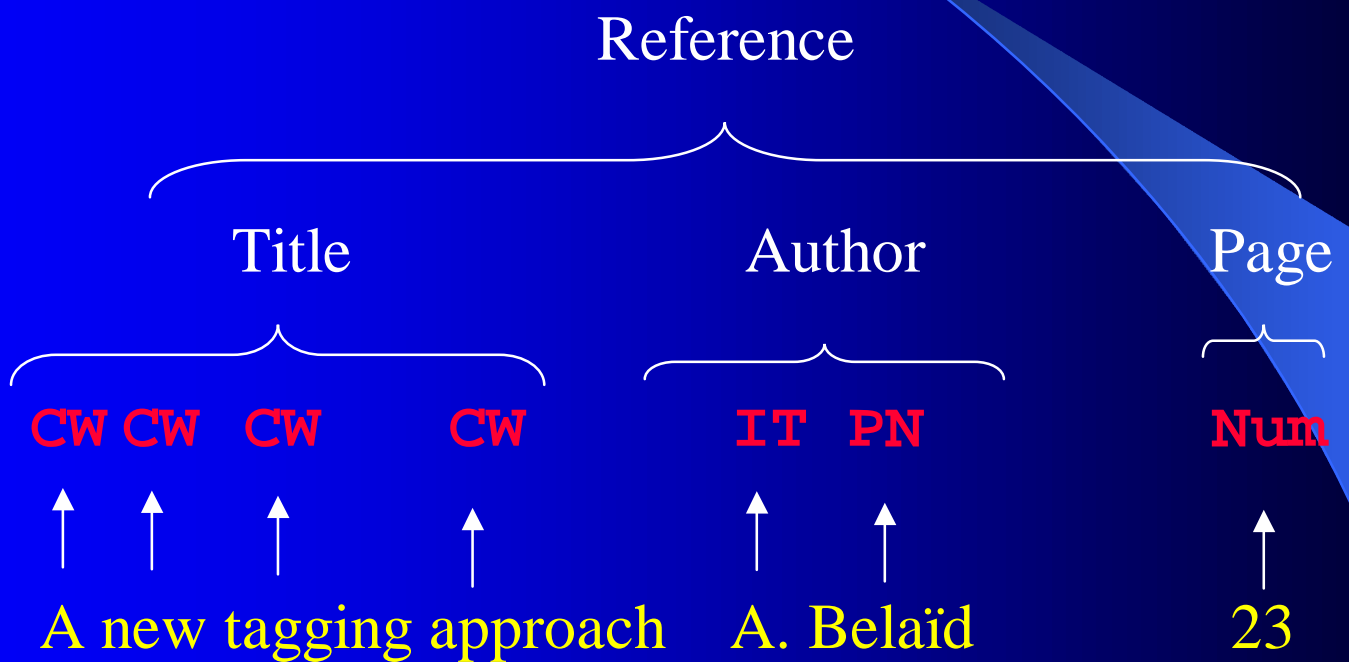
Auts Tit Num
SAuts STit SAuts

Tit Num Auts
STit SAuts

Auts Tit Num
SAuts STit

Tit
STit

Idea : Bottom-Up Approach



Linguistic Help

Reference

title

Verbal Syntagm

Prep Syntagm

ω_1 prep ω_4

Travelling by train

sep

prep

by

author

ω_5 ω_6

Y. Toussaint

page

ω_7

23

Morpho-syntactical Labeling

Role :

- ▶ Annotate text to mark important elements of a corpus
- ▶ Associate these elements in more complex structures (terms) by syntactical agglutination

Initial application domain : terminology

- ▶ Search for terms in a document (comp of several words)

development/CN of/PREP systems/PCN

We can have :

Rule 1 : term ::= CN of/Prep PCN

Advantages

Training :

- ▶ Most of the systems work with a usable learning
- ▶ It is possible to enrich the system and to adapt it for its own use by doing an adequate learning

Prediction :

- ▶ To have a system able to predict a label for an unknown term
- ▶ Example : Brill rule for French : **radical+ion P CN**

Location Principle : labeling error correction by local rules

- ▶ **beginning of a sentence + capital P CN,**
- ▶ **capital in the middle of a sentence P PN**
- ▶ **JJ of/Prep CN P JJ = CN**

Application

al Representation for
ation in Animats

J. Prescon

oring Strategies for
dded Agents: Experiments
nalysis

S. Ackin and R. Cohen

Prep
ep UN

UN . UN

UN Prep
UN : PCN
T

UN . UN CC UN . PN

Remarks

Linguistic defects in lab. come from particularities

- ▶ Terms of the structure : not conform to text notion
- ▶ Word structure : not conform to the morphology of the current language

S/UN ./. Ackin/UN

Solutions :

- ▶ Retrain the system: costly and not adapted
- ▶ Choose a less fine grain for labeling and a set of adapted labels to the application

Adapted Labels

Physical Labels

Blank Line	BL	Beginning Line
Long Space	EL	Ending Line
Current Line	NL	Next Line
Numerical Line	PL	Previous Line
Dotted Line	PT	Punctuation
Tabulation	PU	Item

Morphological Labels

Common Noun	AR	Article
Proper Noun	FN	First name
Initial	CC	Connector
Preposition	UN	Unknown

Reference Location

Typographical aspect combination

Page number detection

Regularity

- Location : position, before/after TB/SL
- Alignment
- Continuity

Reference beginning/ending determination

$CL = BL : NS \ \& \ (\ PL=SL \ | \ PL \ ' \ EL \)$

$CL = EL : NS \ \& \ (\ NL=SL \ | \ NL \ ' \ BL \)$

Column identification

$COL = \{ CL : \approx \text{alignment}, \approx \text{position}, >TB, <TB \}$

ARTICLES

5 Guest Editors' Introduction: Document Image Analysis Systems

Lawrence O'Gorman and Rangachar Kasturi

10 A Prototype Document Image Analysis System for Technical Journals

George Nagy, Sharad Seth, and Mahesh Viswanathan

Intelligent document segmentation can bring electronic browsing within the reach of users. The authors show how this is achieved through document processing, analysis and parsing the graphic sentence.

25 An Interpretation System for Land Register Maps

Luca Boatto, Vincenzo Consorti, Monica Del Buono, Silvana Di Zenzo, Vincenzo Bruno, Alessandra Esposito, Francesco Mellarne, Marco Meucci, Andrea Morel, Marco Mucciari, and Marco Tucci

The semantics of land register maps drive this document conversion system. However its methods of image representation, vectorization, and symbol recognition can be applied to other classes of line drawings.

34 Postal Address Block Location in Real Time

Paul W. Palumbo, Sargur N. Srihari, Jung Soh, RamaRangam Sridhar, and Victor Demjantsev

A postal automation system locates destination address blocks on letter mail pieces with a high success rate. Pipelining and multiprocessor techniques achieve real-time processing.

46 Celestin: CAD Conversion of Mechanical Drawings

Patrice Valenciennes and Karl Tomé

A prototype CAD conversion system extracts higher level structures for knowledge based analysis. It recognizes such entities as screws, ball bearings, and shafts.

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Society

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Primary Labeling

presentation for in Animats	Tony J. Prescon	85	CN SL SL CN SL AJ CN PR TB FN IT PN TB NS CN PR UN SL
Strategies for Agents: Experiments is	Marc S. Ackin and Paul R. Cohen	125	CN CN PR TB FN IT UN CC UN CN CN PT CN CC CN SL
the competitors	Luc Steels	173	CN AR CN TB FN PN TB NS SL UN SL
Adaptations and ry Epistemology	James H. Fetzer	201	CN CN CC TB PN IT UN TB NS CN CN

Combination of linguistic aspects

forming rules :

- ▶ Author(Aut) : {IT ; FN ; PN}
- ▶ Title(Tit) : {CW} - {negative cuttings} : DET, P

regrouping rules :

- ▶ Author : {Aut ; CC ; BY ; PT}
- ▶ Title : {Tit ; CC ; PT}

continuity rules :

- ▶ Author : {IT ; FN} + EL + PN \bar{P} Aut + EL + A

ative Method for Improved Protein Structural Motif Recognition.
BERGER and M. SINGE

cal Adaptations and Lee K. Wang and James H.
onary Epistemology Fetzer

Author Correction :

Re-establishment of the syntax

glutination rules:

Aut + UN + Aut \bar{P} Aut

ension rules:

Aut + UN + {PN} + DL|EL \bar{P} Aut + DL|EL

icipation rules:

Tit + EL + TB + UN⁺ \bar{P} Tit + EL + TB + Aut^P

Aut^P + CC + FN|IT + UN \bar{P} Aut

Bailey, 1. J. Hall, 75
S. Reed and C. J. Colbourn

CBL in engineering: students' use
a learning resource on phase dia

ic Functions for On-Cli Vision.....
BY. Zavidavique and T.M. Bernard

Title Correction :

re-establishment of the syntagm

glutination rules:

$Tit^+ + UN + Tit^+ \bar{P} Tit^+$

$Tit^+ | Tit^P + Prep + Aut + Tit^+ \bar{P} Tit^+$

$Tit^P + Prep + Tit^+ \bar{P} Tit^+$

extension rules + anticipation :

$Tit^+ + Prep|Det + UN^+ \bar{P} Tit^P$

$Tit^+ + Prep|Det + Tit \bar{P} \bar{U} Tit$

$Tit^+ + EL + TB + UN^+ \bar{P} Aut + EL + TB + Tit^P$

ing and evolution in networks

es extracted from the article of /IN Claude Allègre « What I want »

li /NN error /NN measure /NN approach /NN to /TO train /VB feedforwa

neural /NNP networks /NNP for /IN classification /NN problems /NNS

opapproach /NNP usingspreadsheetsfortheteaching /NNP of /IN statis

probability /VBP

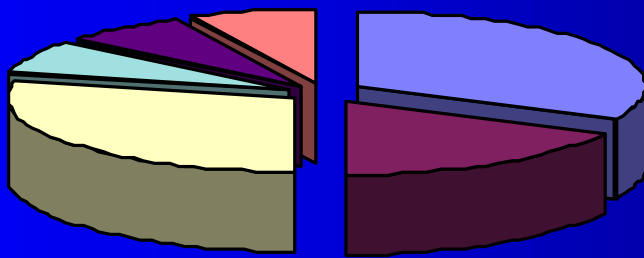
Model Generation

on	7	→	Tit PP
URGER			Aut
s d'interaction une approche modulaire	11	→	TB Tit
LLIETTAZ		→	Aut
ux actionnels dans les interactions verbales			TB Tit
tion de la dimension référentielle du discours	47		TB Stit PP
DBET			Aut
uation prosodique dans les dimensions périodique		→	TB Tit
nationnelle du discours	83		TB Stit PP
MICHE			Aut
sation polyphonique d'un fragment de débat		→	TB Tit
onique	125		TB Stit PP
ULET			Aut
sation polyphonique et l'organisation inférentielle		→	TB Tit
ogue romanesque	149		TB Stit PP

Results (one OCR)

<i>Document Class</i>	<i>Author Field Number</i>	<i>Identified Authors</i>	<i>Article Number</i>	<i>Identified Articles</i>
<i>Journal</i>	1037	857	1256	1233
<i>Journal</i>	302	290	326	326
<i>Proceedings</i>	204	152	207	194
<i>Proceedings</i>	305	227	317	286
<i>Magazine</i>	159	151	168	159
<i>al</i>	2020	1677	2277	2198
		83%		96.5%

Defects



- Page altered
- Page bad or not recognized
- Separator absent or altered
- Non respect of the reference struct
- Error on the last reference
- Section name disturbing

ion DS: Parallel Implementations

ances In Massively Parallel Computing :

view95

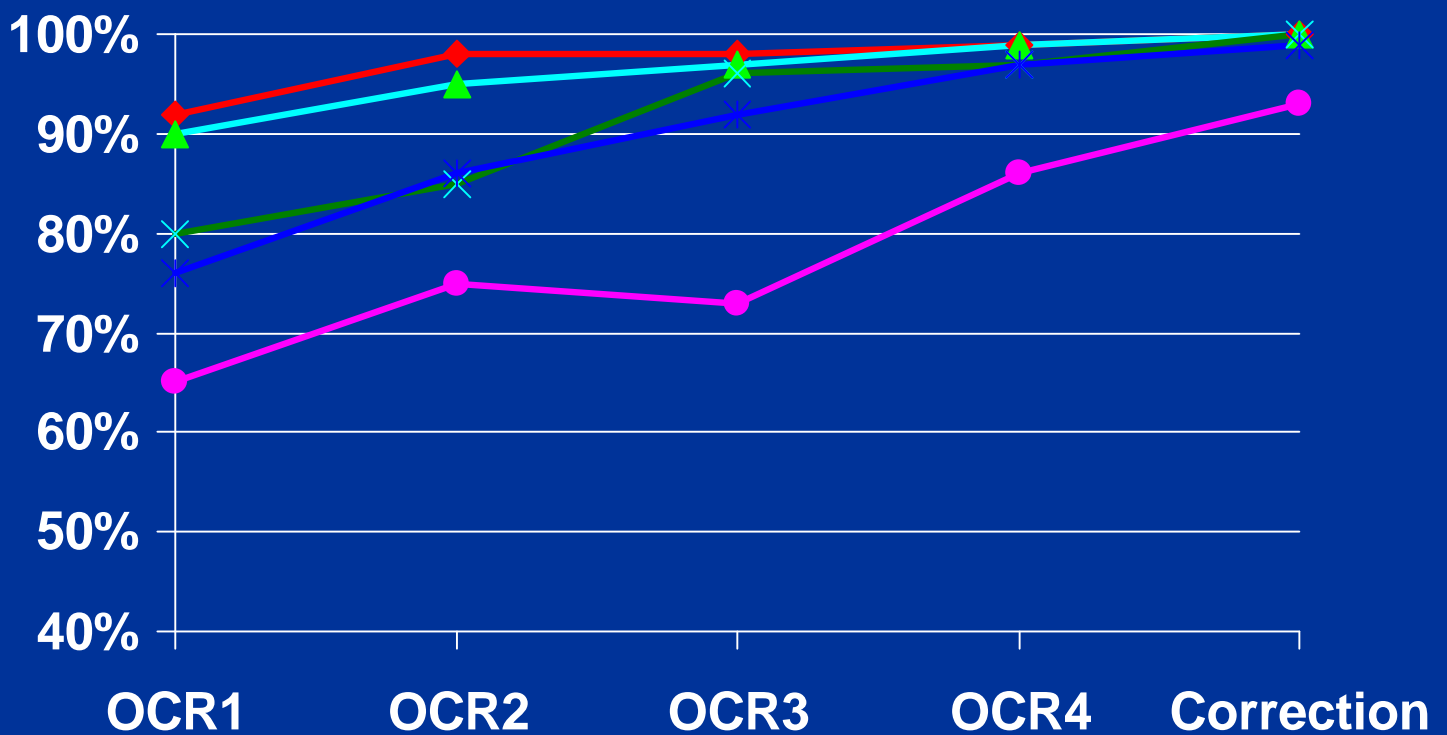
L.C. Sanz

ributing Authors.....95

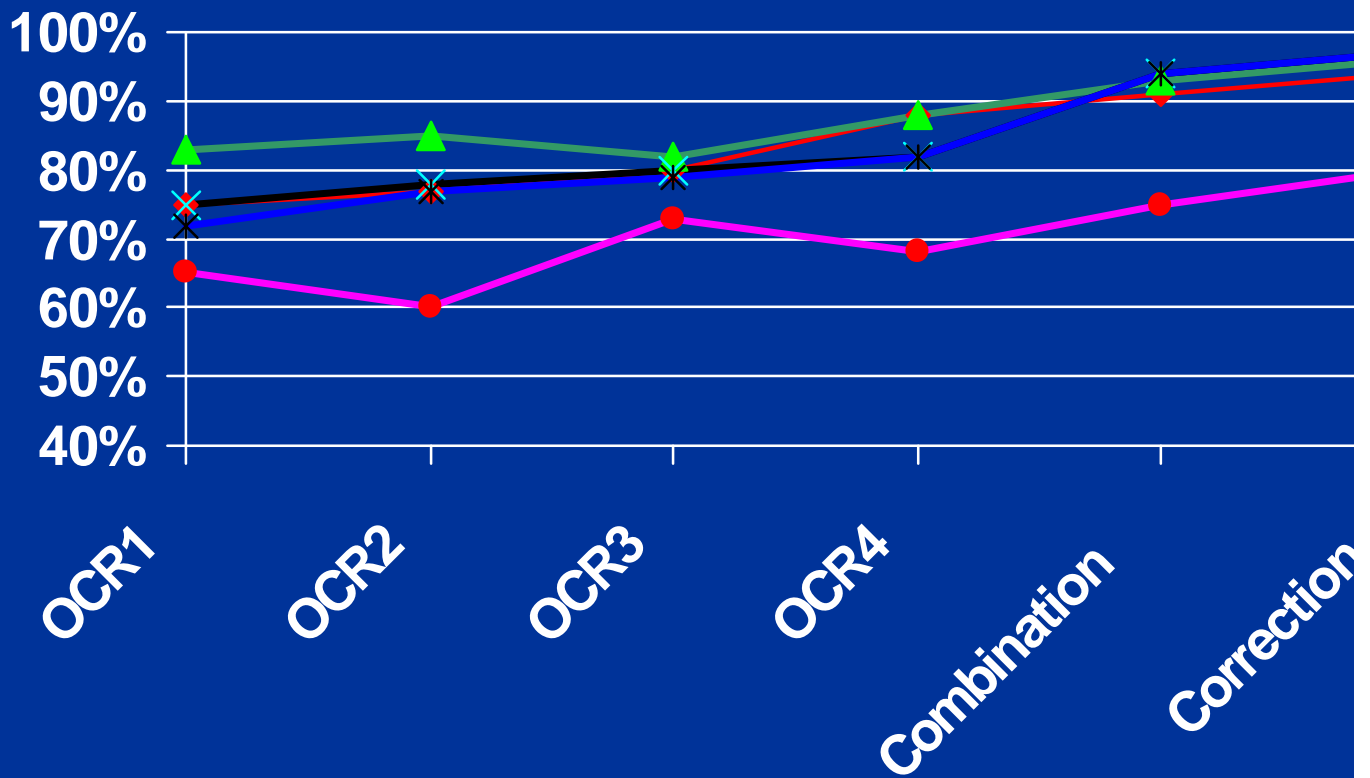
uctions to Authors.....97

Segmentation

—◆— 3C Journal —▲— 2C Journal —×— 2C Conference
—*— 1C Conference —●— Magazine



Structure



Conclusion and perspective

Prototypes :

- ▶ INRIA Unit Library connection
- ▶ Tunisian University Library connection

Research : Problem Serialization

- ▶ Content :
 - OCR Result Improvement
- ▶ Linguistics
 - Revise the tag names, more fine
 - Study of other linguistic extension rules

Scientometrics

How to measure the impact of an institution
in one domain ?

Bibliometrics

Surface Info :
distributions, frequencies per
date, journal, author, domain

**Lab Production,
Country**

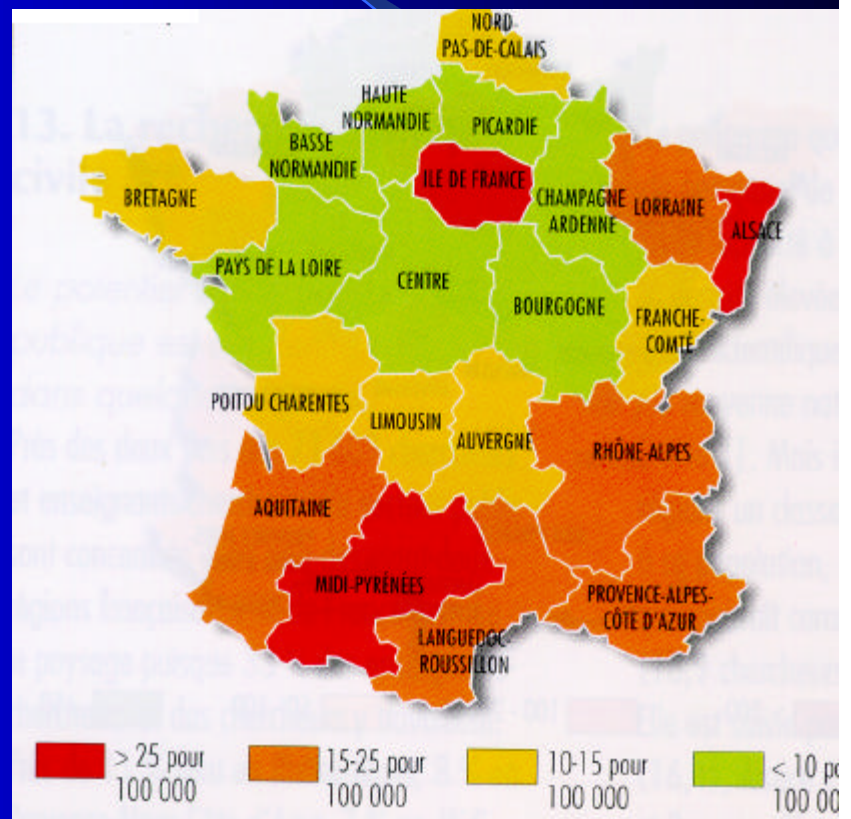
Infometrics

Info on the content :
to highlight
themes, co-citations

**Relational Indicators
between themes and authors**

Bibliometrics

Nb of thesis / population
Predominance of the Ile
de France
Effects on the neighbor
regions



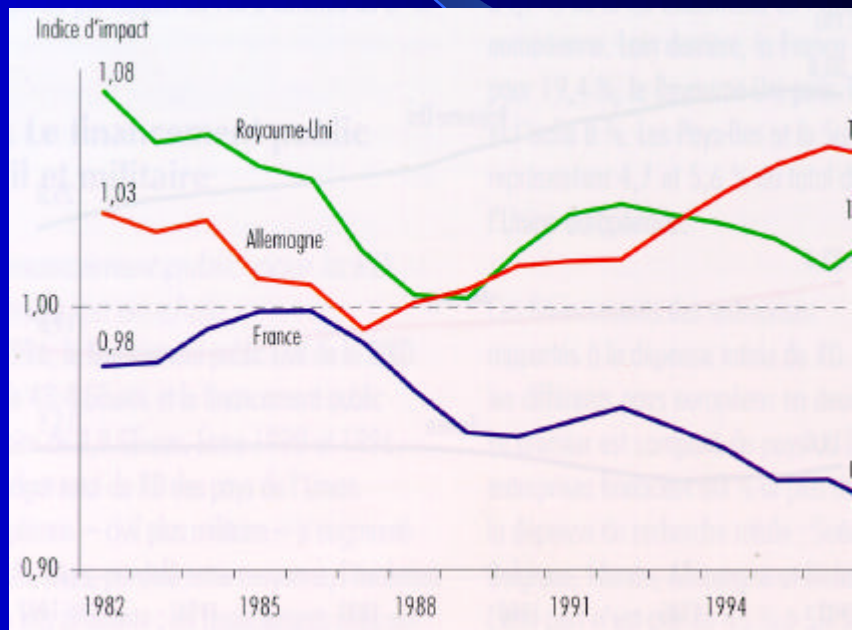
Bibliometrics for article referencing

Impact Index of the scientific publications in the E.U.

Impact = average nb of references per article

One remarks a continuous decreasing in France, i.e. french articles are less and less read and referenced

Several possible causes...



trying to transform not only size and position, but also some using more than one harmonic. r harmonics can better describe s of the characters and would nces to distinguish between ers having close shapes.

& M Biquard, «Signaux èmes Linéaires et Bruit en ronique ». Paris. 1992.

M, Lecolinet E, Cheriet M, . C.Y, Automatic reading of ve scripts using a reading model perceptuel concepts, IJDAR, me1, Number1, 1998, pp 3 - 17.

M.Hamanaka, K.Yamada, ulumo, « On-line Japanese acter Recognition Experiments an Off-line Method Based on nalization-cooperated Feature action », ICDAR, IEEE, 1993, 04-207.

Authorrs (4) : Côte M., Lecolinet E., Cheriet M., Suen C. Y.

Title : Automatic reading of cursive scripts using a reading model and perceptuel concepts

Editor :

Month : Year : 1998

Historical

Volume : 1

Number : 1

Occurrence +
Co-occurrence

Publisher :

Address :

Pages : 3-17

Organization :

Booktitle : IJDAR

Indice d'impact

Series :

Note :

The EU Libraries Program



Telematics program : 1990-1994

- **Availability & accessibility** of modern library services
- More rapid penetration of I&CT in a **cost-effective way**
- **Standardization** required for resource sharing
- **Harmonization** and convergence of national policies

28 projects : 28 MECU



4 Action Lines

- To create, enhance and harmonize machine-readable bibliographies and union catalogues, tools for retrospective conversion of catalogues of important collections
- To impel the international library networking, providing access to source data
- Innovative services for libraries, using new technology
- Development and production of commercially viable product, services and tools specially designed for libraries

Three Projects: OCR/ICR

■ **BIBLIOTHECA:** Spain + Italy + France

- ▶ Study of a pivot format (XML) for the representation of different records
- ▶ Study of a system for indexing and classifying different documents

■ **FACIT:** Denmark+Greece+Italy

- ▶ Search for adapted OCR packages for retroconversion with large set of characters, and tools for fast and cheap mass conversion of catalogues

■ **MORE:** Belgium+France

- ▶ Study of the role & use of dictionaries in the structure modeling and Recognition of catalogues by OCR techniques

Catalogue Indexes

TABLE ALPHABÉTIQUE DES RUBRIQUES

Indiquer au moment d'ordre placé à droite et au-dessus de chaque notice.

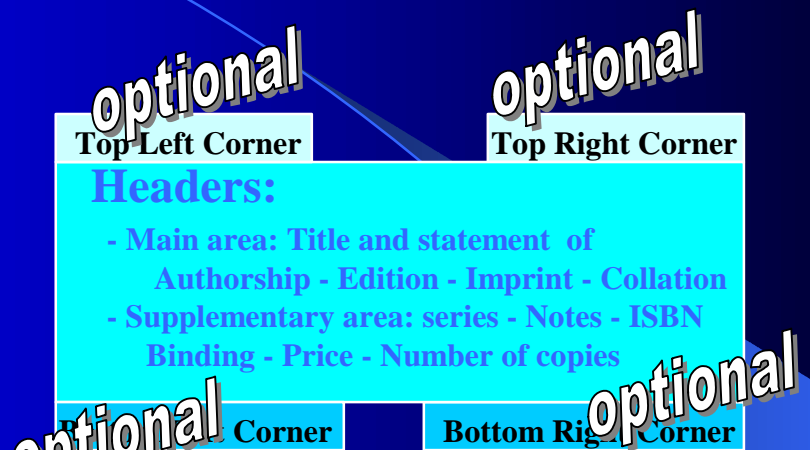
<p>--- B</p> <p>publique, 2380.</p> <p>recherche, 2380.</p> <p>40-2399.</p> <p>2396.</p> <p>2399.</p> <p>2400.</p> <p>82-2285.</p> <p>2428.</p> <p>2397-2399.</p> <p>2428.</p> <p>2429.</p> <p>2430.</p> <p>2431.</p> <p>2432.</p> <p>2433.</p> <p>2434.</p> <p>2435.</p> <p>2436.</p> <p>2437.</p> <p>2438.</p> <p>2439.</p> <p>2440.</p> <p>2441.</p> <p>2442.</p> <p>2443.</p> <p>2444.</p> <p>2445.</p> <p>2446.</p> <p>2447.</p> <p>2448.</p> <p>2449.</p> <p>2450.</p> <p>2451.</p> <p>2452.</p> <p>2453.</p> <p>2454.</p> <p>2455.</p> <p>2456.</p> <p>2457.</p> <p>2458.</p> <p>2459.</p> <p>2460.</p> <p>2461.</p> <p>2462.</p> <p>2463.</p> <p>2464.</p> <p>2465.</p> <p>2466.</p> <p>2467.</p> <p>2468.</p> <p>2469.</p> <p>2470.</p> <p>2471.</p> <p>2472.</p> <p>2473.</p> <p>2474.</p> <p>2475.</p> <p>2476.</p> <p>2477.</p> <p>2478.</p> <p>2479.</p> <p>2480.</p> <p>2481.</p> <p>2482.</p> <p>2483.</p> <p>2484.</p> <p>2485.</p> <p>2486.</p> <p>2487.</p> <p>2488.</p> <p>2489.</p> <p>2490.</p> <p>2491.</p> <p>2492.</p> <p>2493.</p> <p>2494.</p> <p>2495.</p> <p>2496.</p> <p>2497.</p> <p>2498.</p> <p>2499.</p>	<p>Electrotechnique, 2362.</p> <p>Enseignement, 2301-2306.</p> <p>Épave, 2352.</p> <p>Émissions publiques, 2365.</p> <p>Énergie, 2330.</p> <p>Études, 2085-2090.</p> <p>Étymologie, 2431.</p> <p>Ouvrage scolaire, 2433.</p> <p>États, 2232, 2233.</p> <p>Exposition mondiale 1938-1945, 2190-2194.</p>	<p>Morale, 2109-2116.</p> <p>--- . Ouvrages scolaires, 2118.</p> <p>Mari, 2211.</p> <p>Musique, 2324-2327.</p> <p>Navigaton, 2265.</p> <p>Organisation commerciale et industrielle, 2279.</p>
<p>--- C</p> <p>2467.</p> <p>2468.</p> <p>2469.</p> <p>2470.</p> <p>2471.</p> <p>2472.</p> <p>2473.</p> <p>2474.</p> <p>2475.</p> <p>2476.</p> <p>2477.</p> <p>2478.</p> <p>2479.</p> <p>2480.</p> <p>2481.</p> <p>2482.</p> <p>2483.</p> <p>2484.</p> <p>2485.</p> <p>2486.</p> <p>2487.</p> <p>2488.</p> <p>2489.</p> <p>2490.</p> <p>2491.</p> <p>2492.</p> <p>2493.</p> <p>2494.</p> <p>2495.</p> <p>2496.</p> <p>2497.</p> <p>2498.</p> <p>2499.</p>	<p>H -- L</p> <p>Histoire, 2453-2454.</p> <p>--- . Généralités, 2432, 2433.</p> <p>--- . Ouvrages scolaires, 2469-2475.</p> <p>Histoire et sciences auxiliaires, 2433-2434.</p> <p>Hypothèse, 2467.</p> <p>Hydrologie, 2279.</p> <p>Hygiène en Belgique, 2349.</p> <p>Hygiène, 2214-2218.</p> <p>Ouvrages scolaires, 2419-2425.</p> <p>Hygiène, 2329-2430.</p> <p>Hygiène allemande, 2353, 2354.</p> <p>Hygiène anglaise, 2329-2332.</p> <p>Hygiène française, 2308-2422.</p> <p>Hygiène grecque, 2476.</p> <p>Hygiène néerlandaise, 2355-2356.</p> <p>Hygiène suédoise, 2417-2424.</p> <p>Hygiène tchèque, 2438.</p> <p>Hygiène turque et grecque, 2430.</p>	<p>P -- R</p> <p>Paleontologie, 2215.</p> <p>Peinture, 2310, 2311, 2314, 2316-2322.</p> <p>Périodiques généraux, 2084, 2089.</p> <p>Philosophie, 2091-2093.</p> <p>Physique, 2229, 2229.</p> <p>Politique, 2184, 2185, 2189, 2191.</p> <p>Propriété foncière, 2164, 2165.</p> <p>Provenance de la nature, 2379, 2380, 2396.</p> <p>Psychologie, 2098-2108.</p> <p>--- . Ouvrages scolaires, 2117.</p> <p>Publications pour enfants, 2001-2407, 2425-2425.</p> <p>Question des langues en Belgique, 2246-2148.</p> <p>Religion, 2119-2136.</p>
<p>--- D</p> <p>2467.</p> <p>2468.</p> <p>2469.</p> <p>2470.</p> <p>2471.</p> <p>2472.</p> <p>2473.</p> <p>2474.</p> <p>2475.</p> <p>2476.</p> <p>2477.</p> <p>2478.</p> <p>2479.</p> <p>2480.</p> <p>2481.</p> <p>2482.</p> <p>2483.</p> <p>2484.</p> <p>2485.</p> <p>2486.</p> <p>2487.</p> <p>2488.</p> <p>2489.</p> <p>2490.</p> <p>2491.</p> <p>2492.</p> <p>2493.</p> <p>2494.</p> <p>2495.</p> <p>2496.</p> <p>2497.</p> <p>2498.</p> <p>2499.</p>	<p>M -- O</p> <p>Médecine et sciences connexes, 2244-2260.</p> <p>Médecine vétérinaire, 2260.</p> <p>Métallurgie, 2281.</p> <p>Météorologie, 2234.</p> <p>Monnaie, 2168.</p>	<p>S -- Z</p> <p>Sciences appliquées, 2244-2291.</p> <p>Sciences pures, 2226-2239.</p> <p>--- . Ouvrages scolaires, 2240-2243.</p> <p>Sciences sociales, 2137-2233.</p> <p>Sculpture, 2310-2314.</p> <p>Sociologie, 2377-2379.</p> <p>Statistique, 2340, 2341.</p> <p>Technique, 2261, 2263.</p> <p>Transport, 2216.</p> <p>Travail et travailleurs, 2155-2169.</p> <p>Urbainisme, 2100-2301.</p> <p>Volley-ball, 2328.</p> <p>Voyages, 2433-2436, 2438-2442.</p> <p>Voyage, 2091.</p> <p>Zoologie, 2239.</p>

Administration publique, 2189
 Agriculture et sciences complexes
 2266, 2267
 Architecture, 2307-2309
 Architecture de jardins, 2304
 Arpentage, 2227
 ASSistance, 2195, 2196 ...

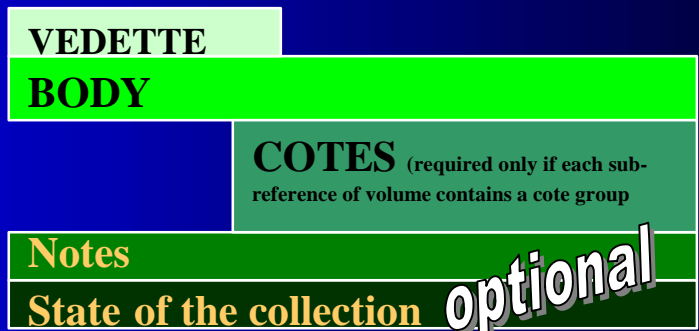
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[J. Juan, Y. Y. Tang, and C. Y. Suen. Four Directional Adjacency Graphs (fdag) and their Application in Locating Fields in Forms. In Third International Conference on Document Analysis and Recognition (ICDAR'95), pages 752-755. IEEE Computer Society Press, Aug. 1995.

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