**CALLS FOR PAPERS ON PAGE 2**

## In this issue...

### ICB 2009
*3rd International Conference on Biomentrics*
Alghero, Italy
Deadline: November 1, 2008
June 2–5, 2009

### MVA 2009
*IAPR Conference on Machine Vision Applications*
Yokohama, Japan
Deadline: November 7, 2008
May 20–22, 2009

### CCIW09
*2nd Computational Color Imaging Workshop*
Saint Etienne, France
Deadline: December 1, 2008
March 26-27, 2009

### SCIA 2009
*16th Scandinavian Conference on Image Analysis*
Oslo, Norway
Deadline: December 14, 2008
June 15-18, 2009

### ICDAR 2009
*10th International Conference on Document Analysis and Recognition*
Barcelona, Spain
Deadline: January 12, 2009
July 26-29, 2009

### CRV 2009
*Sixth Canadian Conference on Computer and Robot Vision*
Kelona, British Columbia, Canada
Deadline: January 30, 2009
May 25-27, 2009

### ICIAP 2009
*15th International Conference on Image Analysis and Processing*
Vietri sul Mare,  Salerno,  Italy
Deadline: January 31, 2009
September 8-11, 2009

### IAPR Newsletter
*Articles, announcements, book reviews, conference and workshop reports*

Send directly to:  **logorman@alumni.duke.edu**

**Deadline:  December 21, 2008**



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# Feature Article

## Six Years of Pattern Recognition Progress

by Lawrence O'Gorman (USA)

log@ieee.org

Back in the late 1980s, I remember a prominent pattern recognition researcher being asked about techniques in our field that were in extensive commercial use. His response consisted of just one item, bar codes. To be fair, pattern recognition systems were already in use – for narrow applications – before this. Optical scanning of multiple-choice forms (such as school tests) was already performed. Money changing machines could distinguish paper currency. The military had so-called smart bombs, which could distinguish targets by their silhouettes (featured in the January 2004 issue of the *IAPR Newsletter*). And rudimentary speech recognition of "yes", "no", and numbers was in use by phone companies. All these systems used pattern recognition techniques to perform classification. However, for most of these, the problem was very constrained to enable the technology of that time to work (and for any of us who tried to change a slightly rumpled bill in a money changing machine, the technology did not always work!).

But that prominent pattern recognition researcher certainly identified a landmark event in pattern recognition, because barcodes were printed on *every* commercially sold item, they became a worldwide standard, and were in plain view of all of us. Directly following and influenced by barcode research, was optical character recognition (OCR). Although not evident to most people, OCR touched all of us through its adoption for postal recognition (which was featured in the April 2006 issue of the *IAPR Newsletter* [html] [pdf]). There were other pattern recognition successes subsequent to OCR, but this article focuses on some of the most prominent in the past six years that have been, not coincidentally, highlighted in this Newsletter.

Back in April 2003, we published a feature article

entitled "Pattern Recognition in Sports". This discussed the work of Gopal Pingali, Yves Jean, and Agata Opalach, then at Lucent Bell Labs, who had developed recognition technology for calling the lines and tracking players on televised tennis matches. The story described their debuts on CBS and ESPN broadcasts. This was a great pattern recognition success story because few things could be more prominent to people than sports on TV. Since then, pattern recognition technology has become commonplace in many televised sports broadcasts from tennis to football to hockey.

In June 2003, the feature article dealt with security and entertainment – a strange combination until one realizes that this refers to watermarking. Ingemar Cox, then at NEC Research Labs, and others were working on embedding watermark signals in pictures and movies to try to prevent illegal downloading, or pirating. Besides describing the technical underpinnings, the article also covered some of the political machinations that involved the Motion Picture Association of America, Recording Industry Association of America, DVD manufacturers, etc. If we fast-forward to 2008, it doesn't appear as if this technology is winning the battle, however there is no question that it is still a hot topic both in and outside of technical circles.

In September 2003, the feature article described Herb Freeman's and Steve Morse's pattern recognition work at MapText for locating text labels on maps. That technology was initially used for US Census Bureau electronic map creation. Now electronic maps are everywhere from the GPS in your car to Google Maps, all using some pattern recognition technologies for their creation.

*(Continued on page 4)*

In the April 2005 issue [html] [pdf], the feature article explored not a commercial application, but one related to the basic science of astronomy. Building upon her insight on the data analysis needs in pattern recognition, Tin Kam Ho of Bell Labs, Alcatel-Lucent, built a tool for interactive pattern discovery, which has been incorporated into the project known as the National Virtual Observatory (NVO). This visual tool makes it convenient for astronomy researchers to analyze astronomical data from ground- and space-based telescopes worldwide that are archived in the NVO.  As it turns out, many others find it useful in various engineering, business, humanities, medical, and military applications.  Notably, Tin's larger body of work in statistical pattern recognition has earned her the 2007 Pierre Devijver Award, and she will present the Pierre Devijver Lecture at this year's S+SSPR workshop immediately before ICPR in December (see advertisement in this issue).

The tremendous leap in the number of surveillance cameras over the past few years elicits strong opinions both pro and con on their security application. The July 2005 issue of the Newsletter [html] [pdf] included a feature article on cameras that employed pattern recognition for improving traffic efficiency. Panos Michalopoulos, a professor at the University of Minnesota described the beginnings of the use of cameras in the field of traffic engineering for controlling traffic lights, and how later systems began to monitor all aspects of traffic flow. Now, OCR of license plates at 100 km/h is being accomplished for cars speeding through camera stations where toll booths once required full stops.

Despite the wide and public impact all these technologies have made, I'd say the one whose benefits impressed me the most was in the field of digital libraries. In the July 2006 issue [html] [pdf], the feature article covered the Greenstone Digital Library project, led by Ian Witten, a professor at the University of Waikato in New Zealand. Greenstone is a suite of software for building and distributing digital library collections, and is developed and distributed in cooperation with UNESCO and the Human Info NGO. One of the premises upon which it was built is that

access to appropriate information is one of the overarching problems facing developing countries. Directly addressing this, Greenstone software has produced libraries on such topics as food and nutrition, humanity development, agricultural development, medicines, and a pictorial library for the world's 20% illiterate (40% of those in sub-Sahara Africa, the middle-East, and South Asia) called *First Aid in Pictures.* The widespread, positive impact of Greenstone, in part employing OCR and document recognition technologies, makes one proud to participate in pattern  recognition research and development.

Finally, although I can't say that it has yet reached widespread use, the feature article that caught my sense of whimsy most was on pattern recognition for origami, the ancient Japanese art of paper folding. In the January 2005 issue [html] [pdf], I followed up on a technical paper I had read by Hiroshi Shimanuki, Jien Kato, and Toyohide Watanabe. This work used pattern recognition and geometric techniques (for which a 2003 MacArthur Award was given to Erik Demaine for his work in describing the polygonal shapes that can be folded from a single rectangular piece of paper) to guide the design from hand-drawn figure to a chosen 3-D shape. I liked two aspects of this story in particular: the use of pattern recognition for an ancient art and the researchers' choice of a novel application.

There are many more fields where the use of pattern recognition has exploded in recent years. Biometrics is one that comes to mind (see January 2006 article which included NIST's work on biometrics [html] [pdf]). Another is pattern recognition for cultural heritage (see *IAPR Newsletter* October 2004 ICPR Special Issue Invited Talk on "The Great Buddha Project" and *IAPR Newsletter* October 2006 Robert Sablatnig's and Paul Kammerer's report on the 1st EVA Vienna "Digital Cultural Heritage—Essential for Tourism and the EVA Vienna 2008 report in this issue). And there are many technologies that will appear from the labs in coming years.

On to more novel, beneficial, and impactful pattern recognition technologies and applications in the future!

# News from the
# IAPR EXECUTIVE COMMITTEE

By Denis Laurendeau

By the time you receive this newsletter, it will be very close to the 19<sup>th</sup> Edition of the International Conference on Pattern Recognition (ICPR), to be held in Tampa, USA, on December 8-11, 2008. ICPR is IAPR's main event and, again this year, has attracted a large number of papers for the conference's seven tracks. We all look forward to an exciting scientific program and look forward to the opportunity to exchange ideas with colleagues and friends from all around the world.

Again this year, the ExCo has announced that a number of travel stipends, to the amount of $700US each, were made available to authors of accepted ICPR papers, oral or poster, who would not be able to attend the ICPR without this contribution. The interest in the community was very high and, after careful examination, 40 stipends were given to ICPR authors – most of them PhD students from all around the world. We wish the lucky recipients, and all other authors and participants, a very pleasant and fruitful attendance at ICPR, and we do hope that the money spent in this way will have beneficial scientific impact on the authors' own research and that of their respective institutions.

This year, the Governing Board has approved unanimously the recommendation of the K.S. Fu Prize Committee that the prize be awarded to Professor Anil K. Jain. The committee was impressed by Prof. Jain's pioneering contributions to the theory and practice of pattern recognition, to computer vision, and to the design of biometric systems. The ExCo extends its warmest congratulations to Prof. Jain.

This ICPR will be the second time that the J.K. Aggarwal Prize will be awarded to a young scientist who has brought a substantial contribution to a field that is relevant to the IAPR community and whose research work has had a major impact on the field. This year, the Governing Board has approved unanimously the recommendation of the J.K. Aggarwal Prize committee that the prize be awarded to Professor Song-Chun Zhu for his fundamental and pioneering contributions to a unified foundation for visual pattern conceptualization, modelling, learning, and inference with applications in computer vision and pattern recognition. The ExCo extends its warmest congratulations to Prof. Zhu.

The Fellowship Committee has also completed its job and has proposed 18 new IAPR Fellows who will receive their Fellow certificate at ICPR. The number of new Fellows to be elected is based on a percentage (0.25%) of the total membership of IAPR.

The Governing Board has recently approved a motion of the ExCo to cancel TC17 on Machine Learning and Data Mining. Initiatives from members of the community for restarting a TC on this important field in pattern recognition are welcome and should be coordinated with IAPR Second Vice-President, Prof. Sergey Ablameyko.

We remind Governing Board (GB) members to check the GB reserved area of the IAPR website, where info on the GB meeting is posted. GB members will be informed by email of when the documents will be available in the GB reserved area of the website. No postal mailing of the documents will be done, and GB members are kindly requested to print the material relevant for the GB meeting directly from the IAPR website.

This is the last "From the ExCo" column written by the outgoing Executive Committee. We all feel that it has been a pleasure and an honour to serve the IAPR community these last two years, and we wish all the best to the new committee, which will be elected at the Governing Board meeting in Tampa.

We look forward to meeting many of you in Tampa.

# *IAPR Newsletter* Report 2006-08

by Lawrence O'Gorman, *IAPR Newsletter* Editor

Over 2007-2008, the *IAPR Newsletter* has had a time of healthy stability in production and distribution, continued growth in content, and added types of features and articles. Here are the numbers comparing the 8 issues of the *Newsletter* for 2007-2008 against those of the previous 2 years.

**Table 1 Comparing most recent 2007-2008 *Newsletter* issues against previous 2 years.**

| Years | Issues | Averages per Issue | | | |
|---|---|---|---|---|---|
| | | pages | articles | conference reports | book reviews |
| **2007-2008** | 8 | 25 | 11 | 4.4 | 3.6 |
| **2006-2007** | 8 | 20 | 9 | 3 | 1.3 |

From this table, one can see that the number of pages per issue has increased by 25%, the number of articles by 22%, the number of conference reports by 50%, and the number of book reviews by 177%.

The increase in conference reports is due in large part to the efforts of Apostolos Antonacopoulos (IAPR Conferences and Meetings Committee chair) and Linda O'Gorman (IAPR Secretariat), who have both diligently informed conference organizers that a report is expected from IAPR-sponsored meetings. I regard the increase in the number of book reviews as a great success. Perhaps the "FREE BOOKS!" headline in each issue has contributed to this. I also have to single out two "star" book reviewers, Jason Dowling and Arjan Kuijper, writing 6 and 4 review articles respectively. Besides the prolificacy of their reviews, I could always count on high quality of writing, unexpected insight into the books they reviewed, and often some much appreciated humor.

Of course, mere numbers do not tell the whole story. The quality of content of the *Newsletter* is the most important factor. During my first 2 years, we ran a series of articles called "Can you help?" in which the authors sought help with particular research questions that fell within IAPR's interests. These articles were particularly interesting, and perhaps some coordination with the TCs would generate more of them. In the second 2-year period, we ran a series of articles, "Pattern Recognition in X" (X= sports, entertainment, etc.). During this most recent 2-year period, we ran a new series called "Global Pattern Recognition". In this series, articles explored the structure and focus of different laboratories throughout the world performing pattern recognition research: US (NIST), France (INRIA), China (NLPR), Germany (DFKI), and India (CSCR). Any of these series could be extended

in the future, preferably with additional contributions and suggestions from readers.

In addition to the feature articles, I have tried to encourage more editorials by writing two myself: "The (Frustrating) State of Peer Review" (which elicited much reader response), and "6 Years of Pattern Recognition Progress" in this issue. These follow a previous editorial from Maria Petrou, however I feel there have been too few during my tenure.

Much credit for the professionalism of the *Newsletter* must go to Linda O'Gorman, *Newsletter* Layout Editor. She has taken advantage of our electronic html and pdf formats to enhance the look of the *Newsletters* with inserted pictures, sidebars, book and conference icons, email and web links to authors, and links to references, past articles, calls for papers, sponsoring institutions, etc. She is also responsible for making sure the grammar, spelling, and readability of the text meets the standards of the *IAPR Newsletter*. I want to also thank Ed Sobczak, IAPR webmaster, who uploaded the issues in a timely manner (and quickly re-uploaded corrected issues after those few mistakes!).

With the October issue, I have completed a 6-year tenure as *Newsletter* editor – 24 issues. The editor duties will be handed off after this issue. I thank three presidents during that time for their support (Rangachar Kasturi, Walter Kropatsch, and Karl Tombre). I thank the readers for their comments, and most of all, I thank the contributors who have made the *IAPR Newsletter* informative and enjoyable reading.

## December 2008

| Su | M | Tu | W | Th | F | Sa |
|----|----|----|----|----|----|----|
| | 1 | 2 | 3 | 4 | 5 | 6 |
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| 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| 21 | 22 | 23 | 24 | 25 | 26 | 27 |
| 28 | 29 | 30 | 31 | | | |

# IAPR Conferences in Florida

**4-6 December 2008**

## S+SSPR 2008 Orlando, Florida

The *Joint IAPR International Workshops on Structural and Syntactic Pattern Recognition and Statistical Techniques in Pattern Recognition* aim at promoting interaction and collaboration not only among researchers working directly in areas mentioned but also among those in other fields who use statistical, structural or syntactic techniques extensively.

**7 December 2008**

## PRRS 2008 Tampa, Florida

Held in conjunction with the most important IAPR event, the biennial International Conference on Pattern Recognition (ICPR 2008), the Pattern Recognition in Remote Sensing workshop has established itself as an important event for scientists involved in the combined fields of pattern recognition and remote sensing.

These two research fields have always overlapped, but the large volumes of remote sensing data now coming from last generation sensors require new advanced algorithms and techniques for automatic analysis. This one-day workshop will be the ideal means to spread and exchange experiences by international researchers.

**8-11 December 2008**

## ICPR 2008 Tampa, Florida

ICPR 2008 will be an international forum for discussions on recent advances in the fields of
Computer vision
Pattern recognition (theory, methods and algorithms),
Image, speech and signal analysis,
Multimedia and video analysis,
Biometrics,
Document analysis, and
Bioinformatics and biomedical applications.

# INSIDE the IAPR

## Introducing the web site of the

**The International Association for Pattern Recognition**
**IAPR** — **Education Committee & Resources**

*homepages.inf.ed.ac.uk/rbf/IAPR/*

by Bob Fisher (UK), University of Edinburgh

Developing an education web site that can support students, researchers and staff in the area of Pattern Recognition has been one of the main activities during my tenure as chair of the Education Committee. Of course, advances in pattern recognition and its subfields means that developing the site will be a never-ending process. However, we believe that the current site is now well developed enough for general use.

### What resources does the IAPR Education web site have?

The most important resources are for students, researchers and educators. These include lists with URLs to:

- Tutorials and surveys
- Explanatory texts
- Online demos
- Datasets
- Book lists
- Free code
- Course notes
- Lecture slides
- Course reading lists
- Coursework/homework
- A list of course web pages at many universities

There are many areas for extension in the web pages, but they already link to more than 3000 resources. These resources are subdivided into five areas. Of course, the boundaries are never distinct, and we undoubtedly will also provoke a few dissenting opinions; however, we have tried to address the main work done by the IAPR community, as clustered into 3 core technology areas and 2 broad families of application areas:

1. Symbolic Pattern Recognition
2. Statistical Pattern Recognition
3. Machine Learning
4. 1D Signal Analysis
5. Computer vision/Image Processing/Machine Vision

### What future developments do we expect?

We hope that in the next Education Committee cycle, two additional developments can take place. The first is to smooth the look and feel of the site, which has somewhat different styles in places because of the many contributors. The second development is one of substance: we would like to develop several example curricula for courses of different lengths, in the core technologies and for the application areas. Finally, the existing resources will be extended and refreshed (a never-ending process, no doubt).
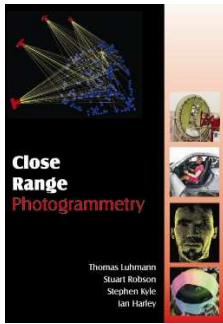
### Acknowledgements

# BOOKSBOOKSBOOKS

## *Close Range Photogrammetry*
### *Principles, Methods, and Applications*

by Thomas Luhmann, Stuart Robson, Stephen Kyle, Ian Harley
Whittles Publishing, 2006

Reviewed by
Kai Huang (Australia)

Photogrammetry is a fascinating subject whose aim is to derive the shape and location of an object from one or more of its photographs. This is achieved by constructing a three dimensional digital model of the object. As the authors describe, "the task is to determine a number of unknown parameters of a model from a number of observed (measured) values which have a functional relationship to each other."

Using interesting examples and illustrative figures, the authors begin with an overview of the fundamentals of photogrammetry, explaining the basic principles of photogrammetric systems, the general procedures of constructing mathematical models from objects, the applications of photogrammetry, and cast glimpses at this technology from the historical perspective.

The authors carry on to: elaborate the mathematical fundamentals of photogrammetry; present details about the coordinate systems and the transformations of image, camera, object, model, and 3D instrument; discuss the general techniques of model parameter adjustments for improving the accuracy of photogrammetric measurements; and enumerate the common geometric components used in object modelling and their mathematical parameters in equation form. This information sets the frame of reference in accurate mathematical descriptions, and is very valuable to readers new to this field.

An extensive survey on imaging technologies follows, in which the authors describe a wide variety of applications and instrumentation used in capturing accurate object images for photogrammetry. Apart from the commonly found imaging concepts such as single and stereo imaging configuration, optical imaging lenses, and cameras, the authors elaborate on numerous analogue and digital imaging equipments and detail their applications and strengths and weaknesses to help readers to select the right tool for the job. I especially value the information provided by the authors on the sources of imaging errors, e.g. optical distortion and sensor deformation, and thermal effects including drifting, blooming and smear. These are scattered at various places in the text associated with the corresponding types of instrumentation, and they provide fascinating insights into how to minimise the effects of these system errors. A few selectively included numerical examples also help to enhance the understanding of the functions of various imaging system parameters.

The authors present a substantial collection of analytical methods for photogrammetric measurements, which are essential for calculating the orientation parameters, object coordinates, and its geometric elements. These methods are classified from several perspectives: according to the number of images involved, e.g. single images,

stereo image pairs, and multiple images; according to the type of photogrammetric settings, e.g. straight lines optics, multi-media where light refraction occurs at media interfaces, and panoramic techniques; and according to the type of parameters to be estimated, e.g. orientation, bundle triangulation, and object reconstruction. This is the most difficult part of the whole book, and I am still puzzled by how bundle adjustment actually works. Many readers would probably need to go through this chapter carefully more than once to fully understand it. Here again the clear illustrations and the inclusion of selected numerical examples in grey boxes greatly enhance the material described.

Next, digital image processing techniques that are useful in photogrammetry are discussed. These include image pyramid, image compression, image transformation, histogram- and filter-based image enhancement techniques, e.g. contrast enhancement, edge extraction, morphological operations, 3D visualisation and reconstruction, and image matching techniques. The authors provide adequate general introduction of digital image processing. Moreover, the techniques closely related to photogrammetry, such as contour following, feature point extraction, and image matching under geometric constraints, are appropriately emphasized.

In the survey of practical photogrammetric measuring systems, the authors classify them into comparators, single camera systems, stereoscopic processing systems, and multi-image measuring systems. The operating principles of representative systems are illustrated well with clear figures, and photos of actual instruments are also provided as appropriate.

The chapter on measurement concepts and solutions in practice enumerates the set of general principles to follow in order to achieve good calibration for photogrammetric measurement accuracy. In addition to the static settings, this chapter also touches upon dynamic photogrammetry and close-range aerial imagery. The chapter is relatively short.

The last chapter on example applications gives a list of tasks accomplished with close-range photogrammetry and also a taste of things to come. Analytical stereo instruments and increasingly digital multi-image systems are being employed on the architecture and cultural heritage fronts. Photogrammetric reconstructions of the [Siena Cathedral](#) and the historic Gunpowder Tower in Oldenburg are two stunning examples. Similarly, for engineering surveying and civil engineering, the applications include measuring shape and deformation of large structures, such as steel converters and underground tunnels. Power stations and industrial plants utilise 3D photogrammetric techniques to record the complex structures and arrangements of pipes and machinery. There are also numerous applications in car, ship, aircraft and space industries, as well as examples in medicine and forensics.

There is a list of references at the end of each chapter for readers to dive in for more details. The references are mostly journal and book publications before or near the year 2000. The book also includes several coloured brochures at the end from companies that provide 3D photogrammetric measurement systems and services, followed by an index of the technical terms.

This book contains much useful background information and reference material. It is easy to read mostly due to the well presented illustrations and large figures and diagrams that intelligently employ the use of red ink lines and markings to good effect. I especially value the inclusion of practical aspects in this book, e.g. the 3D model parameter adjustment and bundling triangulation techniques for improving modelling accuracy. However, the chapter on solution in practice is a bit too short. Interested readers can make good use of the list of references. In my opinion, this book is a good starting point for sourcing information on close-range photogrammetry. It is suitable for academics and engineers who wish to understand how it works and look into applying photogrammetric techniques in practical situations.

# BOOKSBOOKSBOOKS
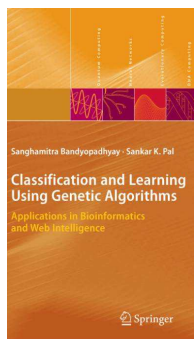
## *Classification and Learning Using Genetic Algorithms: Applications in Bioinformatics and Web Intelligence*

**by Sanghamitra Bandyopadhyay and Sankar K. Pal**
Springer, June 2007

Reviewed by: Zheng Liu (Canada)

A genetic algorithm (GA) is a search technique that can be applied for large, complex, and multimodal search spaces. It emulates biological principles, such as inheritance, mutation, selection, and crossover, to solve complex optimization problems. This 10-chapter book provides a framework describing how GAs can be applied to pattern recognition (PR) and learning systems. Each chapter consists of introduction/ background information, theoretical details, experimental results, and a summary. These chapters are well connected through their introductions. Readers can clearly see how the whole book is developed. From the experimental results, readers can also learn how the GA-based method is compared with traditional PR methods.

The first chapter gives a brief introduction to pattern recognition, which is good for those who may not have such a background. Chapters 3 to 8 describe the details of the GA algorithm and its use for classification, clustering, and multi-objective optimization. Two specific applications, i.e., learning in bioinformatics and web intelligence, are presented in the last two chapters.

The basic principles of GA algorithms are described in Chapter 2. Chapter 3 discusses how the GA algorithm can be applied to one of the "classic problems" in pattern recognition, i.e., supervised classification. GA can be used to facilitate fuzzy rule-based classification and optimize the decision tree method. Moreover, a GA classifier can be created with the training samples by searching for a number of linear segments that form the boundaries between different

classes and minimize the misclassification rate. It is interesting to see the performance comparison with some classical methods, such as Bayes maximum likelihood classifier, k-NN (k-nearest neighborhood) classifier, and MLP (multilayer perceptron). It is no surprise that the GA classifier is comparable to, or even better than, those methods. However, the parameter, string length H, is crucial for good performance so needs to be selected carefully.

Chapter 4 presents a theoretical analysis of the GA classifier in comparison with the Bayes classifier. For a Bayes classifier, *a priori* probability and the class conditional density need to be known. However, in a practical application, this may not be possible and this is the gap that a GA classifier can fill.

The discussion of the importance of string-length H is continued in Chapter 5. An empirical estimation may degrade the performance of a GA classifier. An automatic evolving process to generate a value of H is described in this chapter. With this value, both the number of misclassified samples and the number of hyperplanes are minimized. The concept of variable length strings in GA is introduced, i.e., the length of the string is not fixed. The name "variable string length genetic algorithm" (VGA) is derived.

Chapter 6 describes the integration of variable length chromosomes and GA with chromosome differentiation (GACD), which results in a nonparametric VGACD classifier. The test results of classifying the SPOT image of Calcutta demonstrate

the superiority of the VGACD classifier to the VGA classifier, Bayes classifier, and k-NN classifier.

In Chapter 7, a multi-objective GA-based classifier is described. Three optimization techniques based on constrained elitist multi-objective GA (CEMOGA), Pareto archived evolutionary strategies (PAES), and non-dominated sorting GA (NSGA-II) are used to develop the multi-objective classifiers. The validating and testing results are presented in the experiments, which indicate the GA-based multi-objective classifier outperforms other multi-objective optimization techniques.

Chapter 8 deals with another classical problem in pattern recognition, i.e. clustering or unsupervised classification. Similar to Chapter 3, the authors started with the traditional methods like K-means, and fuzzy c-means clustering. Then, the use of GA to search the appropriate cluster center is described. The details of GA-based approaches for crisp clustering and fuzzy clustering into fixed or variable number of clusters are presented.

Two applications using GA-based methods are given in Chapters 9 and 10 respectively. One is bioinformatics and the other is web intelligence. Although few implementation details are provided,

readers can learn how to solve a practical problem with GA-based approaches.

A flaw in an otherwise perfect book may be some of the figures, which are not uniformly formatted due to the different aspect ratios or to the limitation of paper size. However, this does not hurt the excellent contents presented in the book. This book tries to balance the mixture of theories, algorithms, and applications and is a good reference for people who want to solve a complex optimization problem for their field. As a reader, I may be more curious about how to implement the GA algorithms and how they work for the datasets provided,  and I used in this book, even without going through the equations. If the theories were demonstrated with "codes", either commercial or open source software, this would be helpful to a novice. Some information or links about the GA software or the authors' own implementation in the appendix would be an added value and especially helpful to students. Overall, this book is well organized and well written. There is no doubt that this is another good pattern recognition reference to have on one's bookshelf.

# BOOKSBOOKSBOOKS
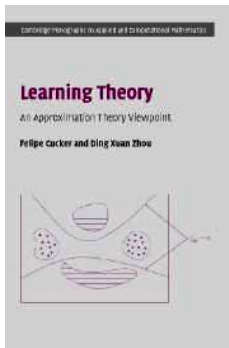
## *Learning Theory:*
## *An Approximation Theory Viewpoint*

**by Felipe Cucker, Ding Xuan Zhou**
Cambridge Monographs on Applied & Computational Mathematics
Cambridge University Press; May 2007

Reviewed by: David Suter (Australia)

I was looking forward to reviewing this book because I have long held the view that the "right way" to look at machine learning is the approximation theoretic one. Thus the title was certainly appealing. However, what I was looking for was a book that would convince the community at large that such was the way they should be thinking of machine learning. This is not that sort of book, unfortunately. However, for specialists, it will still be a useful addition to their bookshelves.

This is a book for mathematicians, or, at the very least, for those with a taste for, and a solid grounding in mathematics. Not only is it demanding in terms of the mathematical content, but it is also written in a very hard-core mathematical style. There are many theorems but little material to motivate the theorems, to interpret the theorems in useful ways (to the practitioner); indeed there is very little material helping the reader determine the significance of many of the theorems.

The stated aims of the book (quoting from the preface) are "to give a general overview of the theoretical foundations of learning theory…to emphasise a viewpoint that has drawn little attention …namely that of approximation theory. Second, …to attract mathematicians". In my view, the book may not be successful at either, but the style of the book seems more aimed at the latter.

I will try to further characterise what the book actually does do.

Chapter 1 puts (or begins to put) certain familiar cases into the formal setting used by the book and approximation theorists. The cases are: regression, curve fitting, neural networks (a case, that many readers will perhaps be disappointed to find that the book says little that can be related to very easily), classification (of letters—hence multiple classes) and binary classification. The essence of the common characterisation is that there is a set X and a set Y and we are trying to recover a function f from X to Y. In regression and curve fitting, this is an easily recognised situation (domain and range of the function/curve being fitted). In the classification examples, Y is a discrete space (taking on only 26 distinct values or 2 distinct values, respectively; rather than say Y=R, the real line). One then takes samples from X Cartesian product Y (locations and function values, training samples and their labels) and tries to recover f by assuming something about f. This is the basic and relatively easy to understand setting. An immediate complication, a point that appears subtle and not commonly emphasised, is that one also has an associated probability measure on X Cartesian product Y. This measure both governs the samples (learning samples) produces and is also the measure used for characterising the deviation of the recovered function from the "true" one. We have to assume something about the regularity of f; otherwise we have no way of inferring the missing values between training samples. The restrictions we place on f (.) are where the book

rapidly becomes one that demands a certain degree of mathematical background and sophistication. The assumed regularity makes f belong to a corresponding function space (Sobolev space, reproducing kernel Hilbert space or RKHS, Lipshitz, various restrictions of these spaces—such as compact balls in an RKHS, etc.). The degree to which we may reasonably expect our recovered function to agree with the ground truth then depends on the number (and distribution of) samples and on the type of space. The rest of the book, is, in essence, providing theorems to characterise these dependencies.

The practitioner (even one with a taste for the theory and a desire for sound theoretical underpinnings) will likely find the results disappointing for several reasons. Firstly, the derived bounds—essentially the only `results'—are often very complex (lots of complex pre-conditions that must be satisfied before the theorem even applies and then a very complex looking formula with many terms and many parameters). Secondly, if/when she/he gets his/her head around the theorem (and I suspect only a fraction of readers will persevere to that point) there is the realisation that there is essentially no way in a practical setting to know (or implement a test to determine) whether it is reasonable to assume the functions and sampling probabilities (etc.) involved meet the preconditions. This, of course, is a problem not with this book per se but with much if not all of similar approximation theoretic settings and results.

Chapter 2 introduces some spaces from which the learnt function can be "selected". Briefly treated are one finite dimensional space (homogeneous polynomials), general linear function spaces; and then more in depth treatment of Sobolev spaces, RKHS spaces and certain subsets (compact balls) of RKHS spaces. It concludes with a note that, in the latter case, the solution can be found by convex quadratic programming. The chapter is interspersed with two "reminders": one on function spaces and one on convex programming. Personally, I would rather these

were moved to appendices as they disturb the flow when the reader tries to reconstruct the thematic flow/ main message.

Chapter 3 produces estimates of the probability of error (technically, the sampling error) in terms of the number of samples and in terms of two technical concepts related to the assumed function space—the M-bound and the covering number. It immediately states what is, I deduced, the main theorem (3.3) but does not explicitly state that the rest of the chapter is largely devoted to a derivation of that theorem. I was only reasonably certain of that after 10 pages when I encountered "toward the proof of theorem 3.3"—sealed by, 3 pages later, the proof being announced. The remarks at the end of the chapter hint at generalisations using loss functions.

Chapter 4 derives results for the "approximation error" (one of the quite subtle things that may challenge the reader is to clearly understand the distinction between this and the sampling error treated in the previous chapter). The distinction appeared to me to be buried in a mass of definitions from page 5-8, and I would have appreciated some more helpful exposition/discussion on how the emphasis here relates to that of chapter 3.

Chapter 5 seems to discontinue the theme of chapter 4 and return to that of chapter 3, giving some ways to estimate the covering number required to make explicit the bounds derived in chapter 3.

Chapter 6 seems to then restart with the themes/ concerns of chapter 4. This order seems a bit strange. Why not place the material in chapter 5 (immediately) after chapter 3 and likewise for chapters 4 and 6?

Chapter 7 is a very short chapter: focussing in the relatively well-known bias-variance problem. This chapter, at least, does depend directly on all of the preceding chapters.

Chapter 8 shifts foundation/setting away from insisting the functions be drawn from a compact space. The

potential price (and dangerous one) would be that overfitting might be a likely result. A penalized (regularisation) formulation is imposed to try to counteract this. Once more the majority of the chapter seems to be devoted to proving a theorem (8.1). I found it disappointing that, considering this was a shift of foundation, there wasn't direct cross-referencing between the theorems in this chapter and the corresponding results in previous chapters (with the alternative foundations). Indeed, I found it pretty impossible to make my own comparisons in this regards.

Chapter 9 looks at the special case where Y is binary and treats SVM's as a special case of such as setting.

Finally, Chapter 10 involves generalisations of the settings in chapter 9. Once again the chapter starts with a theorem (well actually two—10.2 and 10.3) without proof and most of the chapter is apparently devoted to building up to the proofs. In this case, again, it isn't clearly signposted that this is happening and where the proofs are made. About 20 pages into this chapter, we simply have the unadorned statements to the effect that the proofs now follow from some just introduced corollaries.

As I've indicated above, the book is hard to read. This is almost all because of, not surprisingly, the degree of mathematical sophistication and effort required. In the main, the prose is easy to read (though, as stated, it is minimal). There are a few minor typos (e.g., "a standand (sic) theme" p. 133), only one rather odd grammatical construction I spotted (p. 188 "The main result of this chapter, Theorem 10.24, this goal achieves for various kernels K and classifying loss functions"), and few production errors. The book seems well prepared and polished from this viewpoint. However, let me declare, should the reader not already be sufficiently aware, that I did not take the trouble to check many of the hundreds of equations and derivations! Also, as I have indicated, I don't think the main chapter order is perhaps the best.

I am reasonably sure I will find the book a useful reference; and, albeit by some very hard work, it has already helped me gain a better sense of certain parts of approximation theoretic treatments of machine learning. However it is not a book I would highly recommend.

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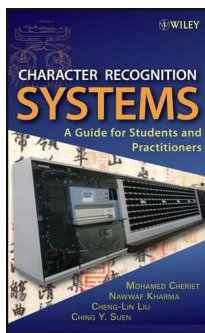
## *Character Recognition Systems—*
## *A Guide for Students and Practitioners*

### by Mohamed Cheriet, Nawwaf Kharma, Cheng-Lin Liu, and Ching Y. Suen
### Wiley, October 2007

Reviewed by: Simone Marinai (Italy)

*Character Recognition Systems* is a textbook that deeply analyzes the main processing steps required to build a working Document Image Analysis and Recognition (DIAR) system.

The book coverage is not limited to character segmentation and classification, but also covers other fundamental steps in the overall processing chain of a contemporary DIAR system, ranging from pre-processing and feature extraction to the main techniques for word and string recognition. An important feature for readers interested in system integration is the description at the end of the book of three case studies coming from the authors' research. There is also analysis of a form processing system in Chapter 2 that makes use of large-scale optical character recognition (OCR).

The book is comprehensive; all the main algorithms and techniques in the field can be found. This coverage is especially useful for students interested in understanding the basic DIAR algorithms, which are sometimes difficult to find in the current literature. Additionally, the book describes the state-of-the-art in DIAR research. As an example, we can mention the discussion of pre-processing techniques that includes an analysis of the problems with web document processing. Another important feature is the large and updated bibliography included in each chapter.

Besides these positive aspects, there are a very few minor drawbacks that could be improved in future editions. Sometimes while reading the book, I felt that different sections were like watertight compartments, each independent from other sections. For instance, there was sometimes repetition of methods (e.g. the description of skeletonization algorithms) and there are few cross-references among different parts of the book. However, the latter problem is mitigated by the presence of a broad subject index at the end of the book. I felt another minor issue is the deep hierarchical structure of the book with sub-sectioning extending down to a fourth level in some cases.

Despite these limits I would recommend the book as a handy reference for students and academic and industrial researchers working in the DIAR area.

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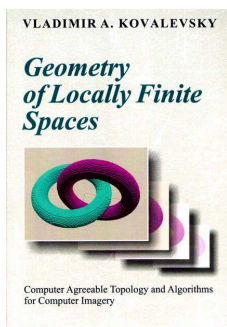
## *Geometry of Locally Finite Spaces*

**by Vladimir A. Kovalevsky**
Publishing House Dr. Baerbel Kovalevski, 2008

Reviewed by:  Petra Wiederhold (Mexico)

The monograph by Professor Vladimir Kovalevsky presents an original self-contained digital approach to Topology and Geometry for modelling discrete sets, as appearing in Digital Image Processing and Analysis, and in Computer Graphics. The book is based on research of the author within theoretical and algorithmic aspects of digital topology and digital geometry during the last thirty years. The work not only assembles all contributions made by the author into a unique context, where methods and algorithms are consequently founded by and deduced from the theoretical base, but also extends previous investigations, presenting new definitions and theorems and new efficient algorithms for digital image processing and analysis.

The book is clearly written, well structured, and contains numerous good illustrations. In my opinion, it can serve as a textbook for teaching and guiding students, as well as a study base or reference book for researchers. I think, it is of interest for anyone interested in digital topology, digital geometry and computer imagery, but also in other fields where discrete sets are of importance.

The book is an important contribution to the development of a self-contained digital topology and geometry, whose necessity has been recognized by numerous authors. Pioneering proposals for digital topology and geometry were those based on graph theory, for example by the school of Rosenfeld. These models, at their origin, analogously as in the development of a topological space, start with describing local nearness, considering together with each space element, some neighborhood of it. Nevertheless, these models do not provide a topological space which is distinct from the discrete one, where all subsets are open, and which (as a topological space) is totally disconnected. Kovalevsky's approach is based on the construction of a topological locally finite $T_0$ Alexandroff space, which is related to *posets* (partially ordered sets) and to the cell complexes from combinatorial topology. This approach has been named by other authors *the topological approach to digital topology*. Kovalevsky develops geometrical concepts within cell complexes, and finally, the whole theoretical base is consequently applied to develop algorithms for digital image processing and analysis.

The 330-page book is subdivided into 14 chapters. The introductory chapter presents a short retrospect to the origin of the book followed by an overview of the contents and of the pursued aims.

In **Chapter 2**, Kovalevsky presents an interesting and original axiomatic way to deduce from suppositions "which are *natural* from the point of view of our intuition and of practical demands" (page 7) that a space suitable for describing topology in discrete sets, has to be a locally finite non-discrete topological space, which turns out to be a $T_0$ Alexandroff space. The construction starts with a locally finite Fréchet space (a set with a local neighborhood system, which not necessarily defines a topological space), named here *LF space*. Kovalevsky proves that under the imposition of four axioms, where the concept of

frontier plays a central role, that the neighborhood system of a LF space, named then *ALF space*, generates a $T_0$ non-$T_1$ Alexandroff space.

**Chapter 3** is devoted to a detailed treatment of basics and topological properties of *abstract cell complexes*, defined as ALF spaces equipped with a local monotone dimension function. In particular, *K-complexes* are described, where the dimension function is the poset dimension known from lattice theory. Here we find interesting proposals of definitions of balls and spheres, without reference to any metric or to the Euclidean space, of combinatorial homeomorphisms based on elementary subdivisions of cells, of generalized notions of boundary, and of the orientation of abstract complexes. Most concrete algorithms presented in the book work on a special class of abstract cell complexes named *cartesian complexes*. Such a cartesian complex corresponds to an Alexandroff space which is homeomorphic to a cartesian product of bounded segments (probably of distinct length in each "coordinate axis") of the Khalimsky line. This chapter also investigates combinatorial manifolds, and analyzes (m,n)-adjacencies due to Kong.

**Chapter 4** considers a new approach to maps among ALF spaces, similar to continuous maps and homeomorphism, which turn out to be isomorphism between complexes. Kovalevsky suggests to use connectedness preserving correspondences (CPMs) which can map one space element to many elements, instead of single-valued functions. He shows that a combinatorial homeomorphism based on elementary subdivisions of space elements uniquely defines a continuous CPM whose inverse is also continuous. **Chapter 5** investigates some problems concerning interlaced (interlinked) spheres of different dimensions in n-dimensional cell complexes.

**Chapters 6 to 9** are devoted to the development of digital geometry. The author motivates and claims that all geometrical concepts in this book are independent of Euclidean geometry, and that "geometry must be constructed in a topological space which must be

completely defined before starting with the construction of geometry. Such a topological space is an abstract cell complex .. " (page 107) . Arithmetics on cell complexes is introduced as on the rationals, and collinearity and convexity are carefully handled by using inequalities and arithmetics within rationals. However, when dealing with rotation as an isometry, Kovalevsky says, "It is easily seen that the only suitable metric is the Euclidean one. It is of course possible to employ Euclidean metric in a space which is not the Euclidean one!" (page 114). Well, at this point I felt "And here, poor fool! with all my lore, I stand, no wiser than before" [F], because, then, geometry has nothing to do with the topological space just constructed before. Actually, any metric would have this effect, because it would generate a Hausdorff topology which definitively cannot be the Alexandroff topology of our complex. **Chapter 7** is devoted to digital straight segments (DSS) in two-dimensional complexes, which are consequently considered as one-dimensional complexes, and using rational calculus, and to digital plane patches (DPP) in three-dimensional complexes. (We recall, however, that DSS and DPP were invented in order to estimate geometrical properties of Euclidean objects, under the multi-grid convergence requirement, which has a strong relation to the Euclidean space). **Chapter 8** deals with surfaces and manifolds, **Chapter 9** with digital circular arcs.

In **Chapters 10 to 13**, Kovalevsky presents numerous algorithms for digital image processing, analysis, compression, and reconstruction from decodings, based on the modelling of (the domain of) digital images by cell complexes, many of them in full detail, with examples and C++-pseudocodes, others by presenting the main ideas. Data structures for handling the cell complexes in the computer are described, too, as well as ideas for visualization. Some chapters of the book contain problems to be solved that will stimulate further research. Additionally, **Chapter 14** presents additional topics for discussion, containing ideas and questions about

avoiding the usage of irrational numbers.

In conclusion, Kovalevsky's book is interesting and important, and I am sure that it will have to be studied seriously. However, I would like to note that it could have been even more integrated in the context of actual research. For example, although deduced or motivated in other ways as by Kovalevsky, parts of the topological approach to topology and geometry, have been independently developed by other authors; for example by Khalimsky, Kopperman, Meyer, Kong, (Julian) Webster, Kronheimer, to mention just a few. Various works, strongly related to the topological approach to digital topology, are not mentioned or cited in Kovalevsky's book. We have also no mention of Gabor Herman's book "Geometry of Digital Spaces" (Birkhäuser Boston, USA, 1998), and of the works of Li Chen, in relation to the modelling of surfaces. The reader of Kovalevsky's book can get the impression that the topological approach is the unique reasonable one to develop digital topology. Nevertheless, recently several new investigation lines have appeared within the development of digital topology and geometry, based on structures distinct from graphs and topological spaces, for example, on lattices, domains and matroids.

With respect to the importance of Kovalevsky's book, remember that Computer Science is not the only field interested in such digital models. Topology and Geometry, since their beginnings, have had as one principal aim to describe the earth and universe. At the moment that Newton invented the infinitesimal calculus in order to find good approximations for the calculation of tremendous expressions of sums and differences, continuous models as (locally) Euclidean spaces, began their triumphal procession for describing reality. Today we don't know if a continuous or a digital space should model the universe; surely each of them describes distinct aspects of reality. On our way that we "may detect the innermost force which binds the world, and guides its course" [F], we are just at the beginning.

### Reference:

[F] J.W.v. Goethe, Faust, First Part of the Tragedy, Scene "Night" (Faust's Monologue), 1808.

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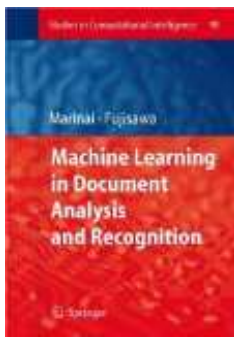
## *Machine Learning in Document Analysis and Recognition*

### by Simone Marinai and Hiromichi Fujisawa (Eds.)
Springer, 2008

Reviewed by: L. Venkata Subramaniam (India)

This book is a collection of research papers and reviews linking together document analysis and recognition (DAR) research with machine learning research. Stated goals of the book's editors are: the identification of good practices for the use of learning strategies in DAR, identification of DAR tasks more appropriate for learning strategies, and highlighting new learning algorithms that may be successfully applied to DAR. The papers in this book cover different topics in DAR including layout analysis, text recognition, and classification.

Document analysis and recognition is a mature field of research. The first papers in this area appeared in the 1960's. This book has sixteen papers covering pretty much the most recent research in this area. The editors mention that they have deliberately not grouped the papers so that readers can choose their own path through the book. However, the first paper gives an introduction to DAR and ties the whole book together by citing the papers in the book under appropriate sections. This is the must read chapter of the book.

Several papers cover physical layout analysis, with one covering logical layout analysis. Text recognition is a widely studied topic that has resulted in many applications and products. Still there are challenges in dealing with noisy documents and non-standard fonts. There are several papers covering both online and offline recognition of characters and words. Supervised and unsupervised classifiers have been considered for various tasks like pixel and region classification, reading order detection, text recognition, character segmentation, script identification, signature verification, writer identification, and document categorization.

Neural networks, inductive logic programming, support vector machines, latent semantic indexing, and a host of other machine learning techniques have been applied to the various DAR tasks in this book. Indeed this book is about learning methods that can be used in DAR. Each of the papers has an experiments section where the proposed approaches have been evaluated on actual datasets including several public ones.

The collection of papers in this book will prove useful for an advanced researcher in the field or graduate students planning to do a thesis in DAR. The book would also be very useful for researchers in machine learning to understand key applications of learning approaches.

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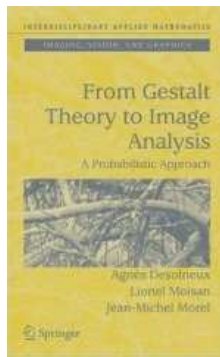
## *From Gestalt Theory to Image Analysis— A Probabilistic Approach*

**By Agnes Desolneux, Lionel Moisan, Jean-Michel Morel**
Springer, 2008

Reviewed by: Tim Patterson

This self-described collection of notes used for course material was published by Springer in their interdisciplinary mathematics series. These notes have been assembled into a 273- page book of largely independent chapters with copious references and notes. Opinions about the book will likely be mixed due to varying coverage of the material. From the book title, one expects a grand scope for the material to be covered. However, the authors have chosen to avoid a "peanut butter" approach of covering each topic evenly. Indeed, with the span of material in this text, in-depth coverage would probably require a massive tome or multiple-volume collection. Instead, the authors have chosen to cover some material in depth and others almost in passing. For example, detection of vanishing points is very well developed and presented, while Shannon and Nyquist are almost an aside.

The general format of this book is significantly different than for most computer vision texts, which usually start with an explanation of the physics or domain behind the pixels. Instead, starting with gestalt theory enables the authors to assume a collection of pixels as their starting point. With this starting point, it is the task of the book to consider various patterns in the image as either random or meaningful. This approach allows a general application of the material but does limit the development, since no underlying statistical model for the pixels can be assumed.

The book begins with a very good development of gestalt theory. The theory could be linguistically elusive, however the ample illustrations make the material easy to read and understand. The first six chapters comprise a well-illustrated description of many of the basics of the theory. The number of figures alone doesn't tell the story because most are multipart figures; although the text connecting the figures often does not support the development of the theory. Chapter 1 is titled "Gestalt Theory and Computer Vision". "From Gestalt Theory to Computer Vision" may have been a more accurate title for the book because throughout the text, the pattern of pixels is far more important than the value of the pixels.

Most of the images used in this book are different from the norm in imagery texts. It was almost refreshing to read an imagery book in which the "Lena" image does not appear until more than halfway through and then only as a counter example. In the latter portion of the book, the authors turn to more traditional imagery with a section on edge detection - or boundary detection in their parlance. They include the Mumford-Shah model and the Canny edge detector. Multiple examples are shown on different images under varying conditions. This leads to a section discussing objections and questions about the techniques. Edge detection is then coupled back to the gestalt theory to provide a

natural segue into boundary detection. In the topic of boundary detection, snakes or active contours are compared with "meaningful boundaries." Perhaps the major point in the comparison is that meaningful boundaries or fully automatic and parameter-less snakes are not really possible.

At this point, the grand tour resumes with a higher flyover on the topic of clusters. A dozen pages are dedicated to the topic on the way to binocular grouping. On this topic the authors dive deep again. Many readers might know the material better as stereo vision. The geometry is covered well with an introduction of epipolar constraints. The epipolar constraints lead to the seven point algorithm for stereo pair matching. The authors have included a very nice discussion and approaches to the problem. The approaches covered are rich in depth and wide in scope. They discuss common problems and solutions to the problems.

Following the excellent section on stereo vision, the authors come full circle returning to a study on detection and its relationship to the Helmholtz principle. This brief study section is followed by a chapter tying in the full Gestalt program. The table in this chapter provides a good point of reference for the gestalt material. The final chapter in the book is titled **"other theories, discussion."** For many readers this actually might be a good chapter to begin reading the book as it places the material in context with other developments in the imagery world.

# Conference Report: ICISP 2008
# 3rd International Conference on Image and Signal Processing

1-3 July 2008
Cherbourg-Octeville, Normandy, France

**General Chairs:**
**Abderrahim Elmoataz (France)**
**Fathallah Nouboud (Canada)**

**Program Chairs:**
**Olivier Lezoray (France)**
**Driss Mammass (Morocco)**

**Report prepared by:**
**Olivier Lezoray (France)**
**Abderrahim Elmoataz (France)**

The third International Conference on Image and Signal Processing brought together about 150 researchers from more than 20 countries at the beautiful city of Cherbourg-Octeville, in Normandy, France. Historically, ICISP is a conference resulting from the actions of researchers of Canada, France, and Morocco. Second and first editions of ICISP were held in Agadir, Morocco in 2003 and 2001. ICISP 2008 was sponsored by EURASIP (European Association for Image and Signal Processing) and IAPR (International Association for Pattern Recognition). From 193 full papers submitted, 70 were finally accepted (48 oral presentations, and 22 posters) giving an acceptance rate of 36 percent. We took pride in arranging a one-track conference and could not accept more contributions. The Program Committee members carried out the review process. Each paper was reviewed by at-least two reviewers, and also checked by the conference co-chairs.

In addition to presentations by the authors of accepted papers, there were also invited talks presented by four prominent researchers:

- "Image Compression with Partial Differential Equations" by Prof. Joachim Weickert, Full Professor of Mathematics and Computer Science at Saarland University, Germany, where he heads the Mathematical Image Analysis Group.

- "Point Pattern Matching in One Dimension: Applications to Music Information Retrieval." by Prof. Godfried T. Toussaint, Professor Emeritus at the School of Computer Science and the Centre for Interdisciplinary Research in Music Media and Technology at McGill University, Montreal, Quebec, Canada.

- "Fast frequency template matching algorithms using second and higher order statistics" by Prof. Driss Aboutajdine, Full Professor at the Science Faculty of Rabat University, Morocco.

- "Tensor-directed Smoothing of Multi-Valued Images with Curvature-Preserving Diffusion PDE's" by David Tschumperlé, permanent CNRS researcher in

the Image group of the GREYC research laboratory, Caen, France.

The best paper was selected out of a short list of papers that received the highest scores during the review process, while a Committee took the final decision after attending the oral presentations during the first two days of the ICISP 2008 Conference. Finally, the best paper was awarded to Ville Ojanvisu for his paper on "Blur Insensitive Texture Classification Using Local Phase Quantization". The award was handed out at the conference banquet.

Highlights of the Conference were also the social events. The welcome reception took place in the city hall of Cherbourg-Octeville where invited Speakers received the famous "Parapluie de Cherbourg". The Conference banquet took place in "La cité de la mer" along with a visit of the Aquarium and of a nuclear submarine.

The next ICISP will be organized in Trois-Rivières, Québec, Canada in 2010.

**Proceedings of the conference have been published by Springer-Verlag in Lecture Notes in Computer Science Series (volume number 5099).**

# Workshop Report: ANNPR 2008
# 3rd IAPR Workshop on
# Artificial Neural Networks in Pattern Recognition

2-4 July 2008
Paris, France

**Co-chairs:**
**Simone Marinai** (Italy)
**Lionel Prevost** (France)

**Report prepared by:**
**Cheng-Lin Liu**

ANNPR 2008 was sponsored by the IAPR Technical Committee TC3 on Neural Networks and Computational Intelligence and was co-organized by the TC3 Chair Simone Marinai (University of Florence, Italy) and Prof. Lionel Prevost of UPMC. The workshop received 57 submissions, from which 29 were accepted for presentation, including 18 oral presentations and 11 poster presentations. About 40 participants from five continents (Europe, Asia, North America, South America, and Africa) attended the workshop.

The third Workshop on ANNPR follows the first in Florence (Italy) in 2003 and the second in Ulm (Germany) in 2006. The background of this series of workshop is that artificial neural networks have been successfully applied to pattern recognition since the 1980s, and have received much attention from the research community. Many new machine learning methods, like support vector machines and ensemble methods, have joined neural networks to solve problems of classification, regression, clustering, feature extraction, and so on. The aim of the Workshop ANNPR is thus to provide a forum for exchanging advances in the joint areas of neural networks, machine learning, and pattern recognition.

The program of the ANNPR 2008 included seven oral sessions, one poster session, and an invited talk. The oral sessions were titled "Unsupervised Learning", "Supervised Learning", "Clustering", "Neural Networks", "Multiple Classifiers", Speech Recognition", and "Feature Selection". Each oral presentation was allocated 30 minutes such that there was plenty of time for questions and discussion. There were indeed plenty of discussions on the presented topics, not only at the sessions, but also at the breaks and lunch/dinner times.

*TC3's web site:*

*www.dsi.unifi.it/TC3*

The invited talk, titled "Predicting Structured Outputs—A Reinforcement Learning Approach", was given by Prof. Patrick Gallinari of UPMC. Structured prediction is involved in many pattern recognition applications, and poses a new challenge of machine learning. The talk by Prof. Gallinari summarized generative and discriminative models for structured prediction and presented the authors' own work on successful use of reinforcement learning to solve this problem.

The active discussions at the workshop were partially due to the host's nice organization: three lunches and a dinner were provided at the venue. The attendees also enjoyed a cruiser tour on the Seine River, a visit to the Museum d'Orsay, and the banquet at the Maison de l'Amérique Latine in the historic center of Paris.

During ANNPR 2008, the attendees discussed how to organize the next workshop of the series in 2010. Possibilities of holding ANNPR out of Europe and in combination with other large-scale conferences will be considered.

**Proceedings of the workshop have been published by Springer-Verlag in Lecture Notes in Computer Science Series (volume number 5064).**

# Conference Report: AMDO 2008

# V International Conference on
# Articulated Motion and Deformable Objects

9-11 July 2008
Puerto Andratx, Mallorca, Spain

**Report prepared by the Conference Co-chairs:**
**Francisco Jose Perales** (Spain)
**Bob Fisher** (UK)



AMDO 2008 closing ceremony and all participants.

AMDO2008 was institutionally sponsored by the International Association for Pattern Recognition (IAPR), the MCYT (Comision Interministerial de Ciencia y Tecnologia, Spanish Government), the Consell de Mallorca, the AERFAI (Spanish Association in Pattern Recognition and Artificial Intelligence), the EG (Eurographics Association), and the Mathematics and Computer Science Department of the Universitat de les Illes Balears (UIB). Also, important commercial sponsors collaborated with practical demonstrations; the main contributors were: VICOM Tech, ANDROME Iberica, Ndigital (NDI), Robot S.A., CESA, and DAT S.L.

The subject of the conference was ongoing research in articulated motion on a sequence of images and sophisticated models for deformable objects. The goals of these areas are to understand and interpret the motion of complex objects that can be found in sequences of images in the real world. The main topics considered as priority are: geometric and physics deformable models, motion analysis, articulated models and animation, visualization of deformable models, 3D recovery from motion, single

or multiple human motion analysis and synthesis, applications of deformable models and motion analysis, face tracking, recovering and recognition models, and virtual and augmented reality systems.

The main objective of this conference was to relate fields using computer graphics, computer animation, or applications in several disciplines combining synthetic and analytical images. The use of new graphical user interfaces will be very important in the near future, meaning that convergence between multidisciplinary areas will be necessary to reach new perceptual or multimodal interfaces including combination of several perspectives of the topics above mentioned.

In this regard, it is of particular interest to encourage links between researchers in the areas of computer vision and computer graphics who have common problems and frequently use similar techniques. The conference included several sessions of oral paper presentations and three tutorials. We also had three invited speakers treating various aspects of the main

topics. These invited speakers were: Prof. M. Pantic (Imperial College London, UK / Univ. of Twente, Netherlands), Prof. E. Boyer (LJK / UJF / INRIA Rhone-Alpes, France), and Prof. J. Abascal (Univ. of Pais Vasc, Spain).

Several nice social events contributed to stimulate scientific discussions. The welcome cocktail at Castell de Bellver given by the Local Government was simply perfect. The gala dinner was delightful, and we understood what a "typically Mallorcan" dinner means in the town of Esporlas at the "La Granja" restaurant. The conference venue was very conveniently located in the Hotel Mon Port near the small village of Puerto Andratx. Also, the weather was very pleasant. As you have understood, AMDO 2008 was a success and a great event.

The next AMDO 2010 Conference will be held in Palma de Mallorca, Spain, again in July 2010 and will be organised by the Computer Graphics & Vision Group from the Mathematics & Computer Science department at UIB. Also, an extended version of papers and new contributions has been proposed as a journal Special Issue (to be announced soon). All contributions are welcomed. See *dmi.uib.es/~ugiv/ AMDO2008/* for more details about AMDO 2010. The web page will be active, including new related conferences, interesting papers, and contents.

Best regards to all participants and we hope to see everyone again in 2010.

## Awards for Researchers in AMDO 2008

**AMDO Best Paper:** "Inverse Kinematics using Sequential Monte Carlo Methods" by Nicolas Courty and Elise Arnaud.

**Honourable Mention:** "Learning to Look at Humans – What are the parts of a Moving Body?" by Thomas Walther and Rolf P. Würtz.

**Honourable Mention:** "A Generative Model for Motion Synthesis and Blending Using Probability Density Estimation" by Dumebi Okwechime and Richard Bowden.

**AMDO Best Poster Paper:** " Towards Efficiency in Cloth Simulation" by Fernando Birra and Manuel Santos.

**Most Suitable for Commercial Application:** "Autonomous Virtual Agents for Performance Evaluation of Tracking Algorithms" by Pau Baiget, Xavier Roca and Jordi Gonzàlez.

**Selected for publication in a Journal in the Fifth International Conference on Articulated Motion and Deformable Objects (AMDO-e 2008):** "Autonomous Virtual Agents for Performance Evaluation of Tracking Algorithms" by Pau Baiget, Xavier Roca and Jordi Gonzàlez.

**Proceedings of the conference have been published by Springer-Verlag in Lecture Notes in Computer Science Series (volume number 5098).**
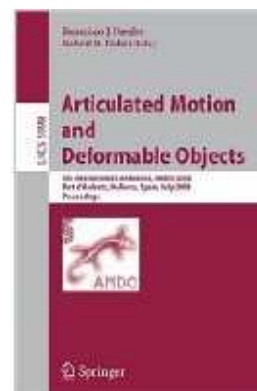
# Workshop Report: AND 2008
# 2nd Workshop on Analytics for Noisy Unstructured Text Data

24 July 2008
Singapore

**Organizing Committee**
**Daniel Lopresti** (USA)
**Shourya Roy** (India)
**Klaus U. Schulz** (Germany)
**L. Venkata Subramaniam**

**Report prepared by Shourya Roy (India)**

Noise in text can be defined as any kind of difference between the surface form of a coded representation of the text and the intended, correct, or original text. By its very nature, noisy text warrants moving beyond traditional text analytics techniques. Noise introduces challenges that need special handling, either through new methods or improved versions of existing ones. To raise and address some of those issues, the 2nd Workshop on Analytics for Noisy Unstructured Text Data (AND-II) was organized as a part of the 31st ACM Conference of the Special Interest Group on Information Retrieval (SIGIR) and held on 24 July 2008 in Singapore. The inaugural chapter of the Workshop took place in January 2007 in Hyderabad, India, in conjunction with International Joint Conference on Artificial Intelligence (IJCAI) (report on AND 2007 is available in the April 2007 issue of the *IAPR Newsletter* [html] [pdf]).

AND-II was very successful, like the first edition, and was attended by over 40 researchers from various academic institutions and companies from around the world. The workshop was chaired by Daniel Lopresti (Associate Professor, Lehigh University), Shourya Roy
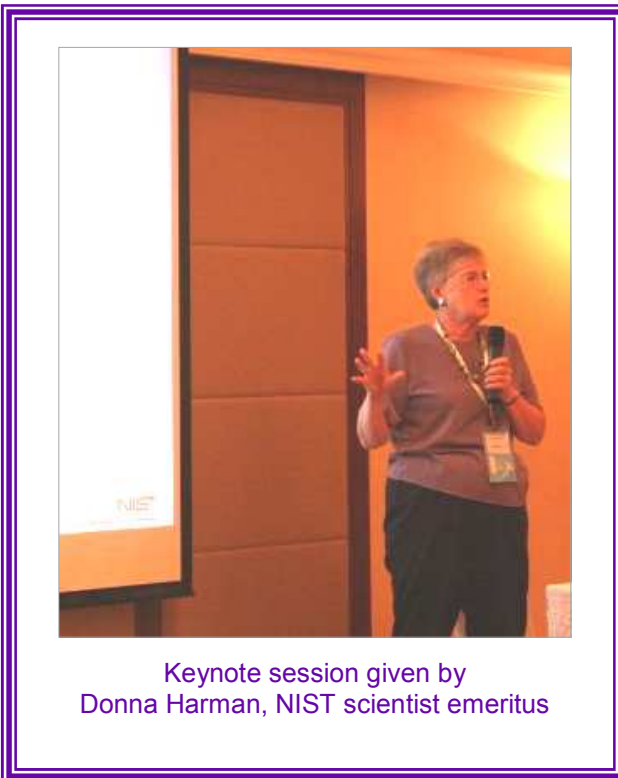


Keynote session given by
Donna Harman, NIST scientist emeritus

(Technical Staff Member, IBM Research, India Research Lab), Klaus U. Schulz (Professor, Univ. of Munich), and L. Venkata Subramaniam (Research Staff Member, IBM Research, India Research Lab).

The workshop began with the keynote session by Donna Harman from the US National Institute of Standards and Technology (NIST), where she is a scientist emeritus. Donna has been associated with various areas of text analytics and natural language processing for many years. In 1992, she started the Text Retrieval Conference (TREC), an ongoing forum that brings together researchers from industry and academia to test their search engines against a common corpus involving over a million documents, with appropriate topics and relevance judgments. In the keynote, titled "Some Thoughts on Failure Analysis for Noisy Data", she talked about some current failure analysis techniques and how the techniques could be extended to retrieval from noisy data.

Following the keynote, John Tait from IRF Australia gave an invited talk on the notion of noise and its application to Information Retrieval. He urged the

community to consider noise as an intrinsic property of information, not merely a problem to be eliminated.

There were total 27 submissions addressing various issues surrounding noisy text, out of which 12 papers were selected as full papers and 4 as posters. The papers were organized in 3 sessions. Apart from regular paper and poster presentations, AND-II had organized working group discussions around several topics relating to noisy text analytics. At the end of the conference the working groups presented their views on selected topics.

The oral sessions were:

- Errors and effects: This session was thought-provoking as speakers addressed various types of errors that creep into text when it is first generated or thereafter. It raised issues ranging from text typed by dyslexic users to OCR errors and their effects.  The paper on "Latent Dirichlet allocation based multi-document summarization" by Rachit Arora and Balaraman Ravindran from the Indian Institute of Technology (IIT) Madras, from this session, was chosen for the IAPR-sponsored best student paper award. The authors showed how the use of latent Dirichlet allocation and mixture models can capture various topics being discussed in a document, and subsequently form the summary with sentences representing these different topics.

- Named entities and blogs: Four interesting papers were presented in this session. These papers addressed issues ranging from rule-based extraction of named entities to various issues pertaining to informally written blogs.

- Noisy environments: The final oral session was on issues arising from noisy environments. Text generated from such environments is inherently noisy but also can require special handling depending on the environment. Speakers talked about issues ranging from SMS ("short message service") processing to opinion mining from noisy text data. At the end of this session, discussions were held in the three working groups, after which the group leaders presented short summaries of each group's thoughts. The discussion topics were (1) data sets, benchmarks, and evaluation techniques for analysis of noisy text, (2) formal models for noise, characterization and classification of noise, and (3) linguistic analysis of noisy textual data and its role in information retrieval

The four poster papers were presented over tea before the final paper session. The posters addressed diverse topics such as blogs, Arabic lemmatization, etc. There was a "boaster" session in the morning where each presenter was given five minutes to boast about their work and encourage the audience to see their work during the afternoon session.

**The workshop proceedings are available in electronic format at the ACM Digital Library**

**A special issue consisting of selected papers will appear in the International Journal of Document Analysis and Recognition (IJDAR) at a future date. Invitations have already been extended to authors of the selected papers.**

# Workshop Report:  IWCF 2008
# 2nd International Workshop on Computational Forensics

**Report prepared by the Workshop Co-chairs:**
**Sargur N. Srihari** (USA)
**Katrin Franke** (Norway)

It was a great honor for the organizers to host the scientific event at the renowned National Academy of Sciences: Keck Center. Computational Forensics is a quantitative approach to the methodology of forensic sciences. It is an emerging interdisciplinary research domain that is rooted in pattern recognition algorithms and associated statistical methods of data analysis. It is also understood as the hypothesis-driven investigation of a specific forensic problem using computers, with the primary goal of discovery and advancement of forensic knowledge. CF works towards

- in-depth understanding of a forensic discipline,
- evaluation of a particular scientific method basis, and
- systematic approach to forensic sciences by applying techniques of computer science, applied mathematics and statistics.

The Computational Forensics workshop series is intended as a forum for researchers and practitioner in all areas of computational and forensic sciences to discuss current challenges in computer-assisted forensic investigations and to present recent progress and advances.

IWCF addresses a broad spectrum of forensic disciplines that use computer tools for criminal investigation.  This year's edition covered presentations on computer-based 3D processing and analysis, as for example virtual autopsy and anthropology, shoe print preprocessing and analysis, computational methods for individuality studies, natural language analysis and information retrieval to support law enforcement, analysis and group visualization of speech recordings, scanner and print device forensics, computer-based questioned document and signature

analysis.

In total, 39 papers from 13 countries were submitted to IWCF 2008, of which 19 (48%) were accepted. We appreciated the number of papers submitted and the diversity of the topics covered. We regret that not all manuscripts could be accepted for publication. The review process was a delicate and challenging task for the Program Committee. We are especially grateful to the 19 internationally established forensic and computational science experts who supported the IWCF as members of the Program Committee. In particular, their encouragement, advice, and active contribution ensured the high scientific standard of the workshop.

The IWCF workshop was fashioned around dialogue, not just presentation. Each presentation was followed by an extensive discussion providing guidance and inspiration for the benefit of the researchers. In particular, the different backgrounds of workshop participants supported controversial discussions from various points of view and hence scientific discourse. This stimulating atmosphere served as a basis for fruitful panel discussions on the future of computational forensics as a research discipline. As a result of these discussions, and more importantly to promote active

cooperation and exchange among researchers around the world, a mailing list was established for announcements related to computational forensics. Researchers, developers and students are welcome to join us at *groups.google.com/group/compfor*.

The organization of such an event is not possible without the effort and the enthusiasm of the people involved. We therefore thank all members of the Local Organizing Committee. Our special thanks goes to Eugenia H. Smith for coordinating the entire organization of the event.

Each ending is also a new beginning. We are now looking very much forward to the Computational Forensics workshop 2009. It will be hosted at the Netherlands Forensics Institute (*english.forensischinstituut.nl/* ). You are welcome to join us in The Hague, August 20-21, 2009. Please check the IWCF2009 website of more detailed information (*iwcf2009.arsforensica.org*).

**Proceedings of the workshop have been published by Springer-Verlag in Lecture Notes in Computer Science Series (volume number 5158).**

**The proceedings are also available online at the publisher's web site.**

# 11th International Conference on Frontiers in Handwriting Recognition

19—21 August 2008
Montréal, Canada

**Co-chairs:**
**Ching Y. Suen** (Canada)
**Mohamed Cheriet** (Canada)

**Report prepared by Marcus Liwicki (Germany)**

After ten intensive and productive editions of the International Workshop on Frontiers in Handwriting Recognition (FHR), the workshop has been promoted to an International Conference on FHR. It took place in Montréal, the largest city in the Canadian province of Québec. It was a conference with a large community response, numerous fruitful discussions, and a lot of "surprises".

ICFHR provides an international forum for the exchange of knowledge in the field of handwriting recognition. It is a perfect opportunity to exchange ideas on ways of advancing the state of the art in on-line and off-line recognition of handwriting, pen-based interface systems for the processing of multilingual handwritten documents and forms, and their applications.

The FHR series of workshops and conferences is an activity of IAPR's TC11 Reading Systems

*www.iapr-tc11.org*

For ICFHR 2008, a total of 161 submissions from 26 different countries were received. This large number indicates that the field of HWR is in a prosperous state. After the review process, 39 papers were selected for

oral and 79 for poster presentation.

The presentations were organized in nine oral and three poster sessions. The posters were orally introduced by the authors in a poster teaser session, where each author was given one minute time to highlight the main contributions of his or her poster. As a novel, key feature, a special session with 2-minute presentations to encourage the "Blooming of One Hundred Flowers" was included in the technical program. During this session the participants were able to present research projects in their early stage or interesting outcomes or announcements which would not suit as a conference article. It was a pleasure to see that especially young PhD-students took the chance to bring up their research ideas at an early stage and discuss them with the community.

As introduced two years ago, there were two invited talks. These were selected by Réjean Plamondon, who was responsible for invited speeches and special sessions. The first invited speaker, Hans-Leo Teulings, spoke about the "Quantification of Medication Side Effects Based on Dynamic Handwriting Features", where he showed that handwriting movement analysis could help to guide psychiatrists when prescribing medication to their patients. Second, Graziella Pettinati spoke about challenges facing the "Questioned Document Examiners" during their work. These two talks went beyond the usual scope of the topics of ICFHR and provided some information about related topics in the fields of motor control and handwriting analysis. It was a good selection of talks, leading to a lot of fruitful discussions with the speakers and other domain experts.

As ICFHR 2008 is the first edition as a conference, a panel discussion was added. Chaired by M. Cheriet, the panelists—M. El Yacoubi, H. Fujisawa, D. Lopresti, and G. Lorette— spoke about the achievements of more than 20 years of handwriting recognition and its future. After the presentation, all attendees had time to bring up their questions and

concerns during an open discussion. It is planned to write a detailed report about the outcome of this discussion in a separate article.

Besides the huge variety of technical program points, there was a good selection of social events at beautiful sites in Montréal. First, there was the Welcome Reception held on top (11th floor) of the Concordia building. Despite the rainy weather, we enjoyed the view over Montréal and the impressive lightning strokes. It was a wonderful scenic experience.

The conference banquet was sited at "Hélène De Champlain" in the middle of Île Ste-Hélène. The wonderful evening started with a nice sight-seeing tour to Mont Royal and the old town. The delicious menu was selected to fit everyone's taste, and the dinner was accompanied by a live band playing Jazz, one of Montréal's trademarks. The speeches of Prof. Suen and Prof. Cheriet were full of pleasant surprises. And we learned that it is always important to read the fine print … Altogether, it was a very enjoyable and entertaining evening.

During the closing session, the best poster presentation award was handed to Abdullah Almaksour for his outstanding presentation on "Fast Online Incremental Learning with few Examples for Online Handwritten Character Recognition". Furthermore, the best papers of the ICFHR 2008 were selected for publication consideration in a Special Issue on Handwriting Recognition of the Pattern Recognition journal.

In addition to IAPR, there were a number of sponsors of this workshop: the corporate sponsors Hitachi, Parascript, IMDS Software, A2iA, aiLeader Pattern Recognition, and Fujitsu; and the academic sponsors CENPARMI, Synchromedia, Concordia University, and École de Technologie Supérieure.

Due to the large number of high-quality contributions, the continuation of previously defined standards, and

the newly introduced features, the ICFHR 2008 was a successful first edition as a conference. We are all looking forward to seeing old friends and making new ones at the next edition of the conference, the 12$^{th}$ ICFHR, which will take place on September 27-30, 2010, in Calcutta, India. The location of the 13th ICFHR has also been decided by the attendees. It will take place in Bari, Italy, in September 2012.

**CD (US$60) and
Paper (US$180)
Proceedings
are still available from
CENPARMI:**

***icfhr@cenparmi.concordia.ca***

**An electronic version of the proceedings can be found in a digital library accessible from the ICFHR 2008 website:**

***www.icfhr2008.ca***
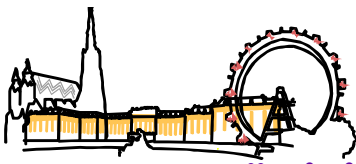
# 2nd EVA Vienna - 2008 -
## "Digital Cultural Heritage—Essential for Tourism"
### EVA Conferences International IAPR-TC19 Workshop on Cultural Heritage
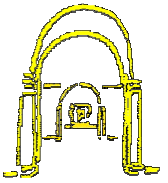
25-28 August 2008
Vienna, Austria

**Co-chairs:**
**Robert Sablatnig** (Austria)
**James Hemsley** (UK)

**Report prepared by Robert Sablatnig (Austria)**

The second conference of the EVA (Electronic Information, the Visual Arts & Beyond) series in Vienna under the topic "Digital Cultural Heritage—Essential for Tourism", was organized by the Pattern Recognition and Image Processing (PRIP) Group and the Austrian Computer Society (OCG). The conference was endorsed by Technical Committee (TC) 19 Computer Vision for Cultural Heritage Applications of the International Association for Pattern Recognition (IAPR). The main aim of EVA Vienna 2008 was to create a forum for discussions between the cultural heritage research community, technology researchers, and cultural institutions. Our mission is to establish new technical tools for experts in the cultural heritage field. The accompanying motto of the conference is "Digital Cultural Heritage—Essential for Tourism". Therefore the conference is focused on image analysis, cultural tourism, speech and communication in cultural heritage, archaeography, and museum and archaeological applications. The emphasis is on applied work as well as theoretical advances.

EVA Vienna 2008 was a small but very successful event, which brought together 40 participants from ten different countries. Thirteen out of 25 contributions were presented in five oral sessions.  Each submitted paper received three reviews, with decisions being based on correctness, presentation, technical depth, scientific significance, and originality. In addition to our conference delegates, Prof. Armin Grün (ETH Zürich, Switzerland) gave a very interesting invited presentation on "Image-Based 3D Modeling of Cultural and Natural Heritage Objects".  The EVA Vienna 2008

conference also hosted one workshop on "Quality, Accessibility, and Usability of Cultural Websites" and Special Sessions dedicated to "Coin Recognition" and "Cultural Archives for Virtual Tourists".



Elena Bonini (IAPR Best Paper Award) and
Robert Sablatnig (Chair)

To motivate students to work in the area of Computer Vision Applications for Cultural Heritage this year for the first time an IAPR Best Student Paper Prize was awarded to the author of the best paper written solely or primarily by a student appearing in the workshop proceedings. Elena Bonini received this IAPR Best Student Paper Award for her work entitled "*Building Virtual Cultural Heritage Environments: The Embodied Mind at the Core of the Learning Processes*" because

of the clarity and quality of the written paper. The award was presented at the Conference dinner held at the beautiful Vienna City Hall.

The success of the conference was possible due to the authors who contributed their work to the symposium, the dedicated work of the members of the program committee, and finally to the organizing committee. Following the tradition of all EVA conferences, the conference will not only impact on the current research of the readers but will also represent important archival material. The EVA Vienna also featured an outstanding venue at the Austrian Academy of Sciences and a well organized social program.

The next EVA conference in Vienna is planned in 2010. For information about EVA Conferences International visit the website.

*TC19's web site:*

*iapr-tc19.prip.tuwien.ac.at/*

*EVA Conferences:*

*www.eva-conferences.com*

# 13th Iberoamerican Congress on Pattern Recognition

9-12 September 2008
Havana, Cuba

**Co-chairs:**
**José Ruiz-Shulcloper (Cuba)**
**Walter Kropatsch (Austria)**

**Report prepared by Pedro Real Jurado (Spain)**



CIARP 2008 was organized by the Cuban Association for Pattern Recognition (ACRP) and the Advanced Technologies Applications Center (CENATAV) of Cuba. It was sponsored by the International Association for Pattern Recognition (IAPR), the Mexican Association for Computer Vision, Neural Computing and Robotics (MACVNR), the Portuguese Association for Pattern Recognition (APRP), the Spanish Association for Pattern Recognition and Image Analysis (AERFAI), the Special Interest Group on Pattern Recognition of the Brazilian Computer Society (SIGPR-SBC), and the Chilean Association for Pattern Recognition (AChiRP).

Before starting the scientific report about this congress, it is necessary to point out that the Hurricane Ike negatively affected the carefully arranged program and schedule prepared by the organizing committee of CIARP08. Due to this natural phenomenon which swept across all Cuba, a non-negligible number of researchers (from both Cuba and elsewhere) could not reach Havana for the beginning of this event, Tuesday, September 9. For obvious security reasons, the population in Havana moved to shelters or sought refuge in houses and hotels. Despite this uninvited and terrible "participant", I can say that the reaction by the different committees was extremely impressive, preparing in just a few hours a new schedule, program, diplomas, accreditations….



Hurricane Ike over Cuba

The result was a 1-day delay in the 13th (an unlucky number?) CIARP. However, any ramifications of this delay were minimized as much as possible in the remaining three days of the conference.

After adjustments for Ike, the congress numbers were the following: 74 papers (oral presentations and posters) from 93 registered authors were presented; 2 of the 3 plenary talks were given; 3 of the 4 tutorials were exhibited; and although all the social events were readjusted to this special situation, all but one took place.

Hurricane aside, and focussing on strictly scientific aspects, CIARP2008 has continued the tradition of being a forum for the exchange of scientific results and experiences, for sharing new knowledge, and for increased co-operation between research groups in pattern recognition and related areas. This year, the forum attracted participants from 34 countries (8 from Iberoamerica), who submitted a total of 182 papers. After the double-blind reviewing process, 93 papers by 180 authors from 29 countries were accepted. Topics spanned pattern recognition, computer vision, image analysis, and speech recognition and their application to technological areas. It is important to say that the breakdown in oral and poster papers was not related to quality grading.

This year, after the discussions during the conference, the authors of the best papers were also invited to prepare extended versions for a special issue of the prestigious journal Pattern Recognition Letters. The purpose of this was to enhance the visibility of the best submissions and to stimulate further good scientific papers.

Three invited speakers gave lectures on topics ranging from text recognition to computer vision:

- Professor Karl Tombre, from the Institut National Polytechnique de Lorraine (France), gave a tutorial entitled "Graphics Recognition"

in which a complete survey of this issue was given.

- Professor Michael Berry, from the University of Tennessee, USA talked about "The art and science of text mining", revealing the area of text analytics to non-experts in this field.

- Professor Xiaoyi Jiang from the University of Münster (Germany) presented a tutorial on "Processing and Applications of 3D Range Images: Fundamentals and new developments", highlighting the technological applications of these "volumes".

In addition, an IAPR-CIARP 2008 award was presented to the authors Sergei Lewin, Xiaoyi Jiang and Achim Clausing of the best paper "Perceptually Motivated Shape Evolution with Shape-Preserving Property". The aim of this award is to acknowledge and encourage excellence, originality, and innovativeness of new models, method, and techniques with an outstanding theoretical contribution and practical application to the field of pattern recognition and/or data mining.

The social program was appreciated as well. It is worth highlighting the moving Camerata Romeu Orchestra concert given at the Havana International Convention Center the last night of the conference.

The next CIARP 2009 conference will be held in Guadalajara, Mexico, organized by the CINVESTAV, with Prof. Eduardo Bayro-Corrochano as General Chair.

**Proceedings of the conference have been published by Springer-Verlag in Lecture Notes in Computer Science Series (volume number 5197).**

# O f   i n t e r e s t . . .

**CALL FOR SUBMISSIONS**
**IEEE Transactions on Systems, Man, and Cybernetics Part B: Cybernetics**
**Special Issue on**
**New Advances in Video-based Gait Analysis and Applications: Challenges and Solutions**

The study of human gait has generated much interest in the fields including biomechanics, clinical analysis, computer animation, robotics, and biometrics. In the early studies, traditional sensor-based obtrusive methods were commonly used. Recently, with the development of widespread availability of cameras and techniques of automated video analysis, video-based gait analysis has been one of most active but challenging research topics. As a relatively new biometric, gait can be used to signify the identification of individuals in image sequences. From a surveillance perspective, gait recognition is an attractive modality because it may be performed at a distance, surreptitiously. Gait motion capture and understanding are important in HCI and entertainment such as computer game and automation. Recently, gait has also been used for gender discrimination and age estimation, as well as traditional applications in medical diagnosis and rehabilitation.

There has been great progress made in the area of video-based gait analysis over the past few years, but not without limitations such as view dependence, simple and controlled environment, insufficient consideration of temporal influences on gait (such as clothes, carrying conditions, health states, body build variations due to weight), etc. This poses a number of significant challenges in video-based gait analysis and applications. More advanced solutions are thus needed to meet emerging application needs. As one major frontier for computer vision and pattern recognition research, statistical learning theories and techniques have been successfully applied for human tracking, motion modeling and recognition, which have evidenced rapid and fruitful developments, and are under the way to make further significant contributions to the area of vision-based gait analysis. To present and highlight the latest developments in vision-based gait analysis and applications in terms of both challenging areas and research approaches, this special issue is designed to aim at new advances in video-based gait analysis for different applications and will feature papers proposing new solutions to these real difficulties. We will solicit original contributions of researchers and  practitioners from academia as well as industry, which address a wide range of theoretical and applied issues. Topics of interest include, but are not limited to:
* Viewpoint invariant gait analysis from a single camera
* Gait and scene of crime analysis
* Invariant description of exploratory variables
* Abnormal gait detection and analysis
* Robust segmentation and tracking in complex scenes
* Real time gait video analysis
* Efficient storage, processing and retrieval of large amounts of video data
* Gait classification and recognition
* Gender and/or age classification from gait analysis
* Gait-assisted diagnosis and/or treatment
* Gait motion capture and performance evaluation
* Gait biomechanics
* Gait detection and tracking in videos
* Gait feature fusion from camera networks
* Semantic linkage between camera networks and other sensors
* Gait databases
* Other related aspects

The submitted articles must not have been previously published and must not be currently submitted for publication elsewhere. Prospective authors are responsible for understanding and adhering to the submission guidelines listed on the journal website. All submitted papers will be reviewed by at least three independent reviewers. Prospective authors should submit an electronic copy of their complete manuscript by the journal Manuscript Central, according to the following timetable:

* Full paper due: March 1, 2009
* First notification: June 1, 2009
* Revised manuscript due: August 1, 2009
* Acceptance Notification: October 1, 2009
* Final manuscript due: November 1, 2009
* Publication of the special issue: 2nd quarter of 2010

Please address all correspondence regarding this special issue to any of the following guest editors:
Liang Wang (wangliangnlpr@gmail.com), The University of Melbourne, Australia
Guoying Zhao (gyzhao@ee.oulu.fi), University of Oulu, Finland
Nasir Rajpoot (nasir@dcs.warwick.ac.uk), University of Warwick, UK
Mark Nixon (msn@ecs.soton.ac.uk), Southampton University, UK

# To the editor...

*Zheng Liu is with the Institute for Research in Construction National Research Council, and also contributed a book review (Classification and Learning Using Genetic Algorithms: Applications in Bioinformatics and Web Intelligence) to this issue of the Newsletter.*

*In the course of our correspondence regarding that book review, Zheng also passed along these ideas for ways to improve communication in the Pattern Recognition community.*

*~L. O'Gorman, Ed.*

Larry,

I had some ideas for your consideration.

1.  You may know Prof. Bob Duin's web (*www.ph.tn.tudelft.nl/PRInfo/*). It is no longer being updated, but I believe if the PR community can have such a website, it will be great. A similar one for computer vision community is (*www.cs.cmu.edu/~cil/vision.html*).

2.  e-letter can be subscribed by any confirmed user. Let's share the information of job openings, conference CFP, new publication (article, book), software, etc. through the *Newsletter*.

3.  The current E-letter may be changed to an e-journal. As an e-journal, it could be different from IAPR's other journals. I suggest a combination of peer-review and an opened public-review and a submission with data and code. With data and code, the e-journal may attract more attention. There could be some concerns about the IP. The code does not have to be source code. It could be executable only.

4.  A forum for (registered) people to discuss and exchange technical information. Dr. Blur (the editor-in-chief of Journal Information Fusion) created a PR club on Yahoo, but it is not that active.

These ideas have been in my mind for some time, and I just wanted to pass them along.

Thanks,

Zheng

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# Conference Planner

| Highlighting indicates that paper submission deadline has not yet passed. | | | |
|---|---|---|---|
| **2008** | | | |
| PRIB 2008 | *3rd IAPR International Conference on Pattern Recognition in Bioinformatics* | Melbourne, Australia | 15–17 Oct 08 |
| CATIMAG08* | *Computational Algebraic Topology within Image Context* | Seville, Spain | 3-5 Nov 08 |
| IVCNZ 2008 | *23rd International Conference on Image and Vision Computing New Zealand* | Christchurch, NewZealand | 26-28 Nov 08 |
| DICTA 2008 | *Digital Image Computing Techniques & Applications 2008* | Canberra, Australia | 1-3 Dec 08 |
| S+SSPR 2008 | *Joint IAPR International Workshops on Structural and Syntactic Pattern Recognition and Statistical Techniques in Pattern Recognition* | Orlando, Florida, USA | 4-6 Dec 08 |
| PRRS 2008 | *5th IAPR Workshop on Pattern Recognition in Remote Sensing* | Tampa, Florida, USA | 7 Dec 08 |
| ICPR 2008 | *19th International Conference on Pattern Recognition* | Tampa, Florida, USA | 8-11 Dec 08 |
| **2009** | | | |
| CCIW09 | *2nd Computational Color Imaging Workshop* | Saint Etienne, France | 26-27 Mar 09 |
| OAGM/AAPR 2009* | *33rd Workshop of the Austrian Association for Pattern Recognition* | Stainz, Austria | 14-15 May 09 |
| MVA 2009 | *IAPR Conference on Machine Vision Applications* | Yokohama, Japan | 20-22 May 09 |
| CRV 2009 | *Sixth Canadian Conference on Computer and Robot Vision* | Kelona, British Columbia, Canada | 25-27 May 09 |
| ICB 2009 | *3rd International Conference on Biomentrics* | Alghero, Italy | 2-5 Jun 09 |
| SCIA 2009 | *16th Scandinavian Conference on Image Analysis* | Oslo, Norway | 15-18 Jun 09 |
| ICDAR 2009 | *10th International Conference on Document Analysis and Recognition* | Barcelona, Spain | 26-29 Jul 09 |
| ICIAP 2009 | *15th International Conference on Image Analysis and Processing* | Vietri sul Mare, Salerno, Italy | 8-11 Sep 09 |