This is the first electronic edition of the *IAPR Newsletter*.

For more information, see
"From the ExCo"

Calls for Papers

SCIA 2005
14th Scandinavian Conference on Image Analysis
Joensuu, Finland
Deadline: 28 February 2005
19-22 June 2005

ICDAR 2005
*8th International Conference on
Document Analysis and Recognition*
Seoul, Korea
deadline: February 28, 2005
August 29 - September 1, 2005

ICIAP 2005
*13th International Conference on
Image Analysis and Processing*
Cagliari, Italy
Deadline: 15 February 2005
6-8 September 2005

PReMI'05
*First International Conference on
Pattern Recognition and Machine Intelligence*
Kolkata, India
Deadline: 15 February 2005
18-22 December 2005

DAS 06
Document Analysis Systems
Nelson, New Zealand
Deadline: ?, 2005
13-15 February 2006

IWFHR 06
*10th International Workshop on
Frontiers in Handwriting Recognition*
La Baule, France
Deadline: ?, 2005
23-26 October 2006

Feature Article

Pattern Recognition in Origami

By Larry O'Gorman

The link between origami and mathematics became widely known in 2003 when a MacArthur Award was given to Erik Demaine, a young mathematician now at MIT. Demaine and his co-authors solved a problem originally posed by Martin Gardner in a 1960 article in Scientific American. The problem was to determine the limits of polygonal shapes that can be made by folding a rectangular piece of paper and cutting it with a single straight cut. What Demaine, et al., found is that – surprisingly – there are no limits. Every polygonal shape can be produced. Furthermore, the mathematicians showed how to design computational geometry algorithms to tell the origami designer where to fold and cut. These mathematical results have generated a newfound interest in origami by scientists, including pattern recognition researchers.

Origami, from the Japanese words "oru" (to fold) and "kami" (paper), is a craft that is synonymous with Japanese culture, but traces its origins to China, perhaps as far back as the origins of paper in the first or second century. In 1797, Akisato Rito published a book, "How to Fold 1000 Cranes." It was based on a Japanese custom that if a person folded 1000 cranes, he or she would be granted a wish. In the mid 20th century, in the context of industrialization and war, origami had declined in popularity. But a young girl and the 1000 cranes would bring about a renewed, worldwide interest in the art. An 11-year old Japanese girl, Sasaki Sadako developed leukemia as a result of radiation exposure from the Hiroshima bombing. When told of the custom, she endeavored to fold 1000 cranes, originally for her wish of good health, but ultimately for world peace. She died after making 644 cranes. But now each year on Peace Day in Japan (6 August), thousands of origami cranes are sent from around the world to be displayed at the Children's Peace Memorial in Hiroshima.

I had been aware of some of this cultural and mathematical background of origami when I serendipitously came upon a paper presented at the recent ICPR in Cambridge entitled, "Constituting Origami Models from Sketches," by Shimanuki, Kato, and Watanabe. Always excited to learn of new applications in pattern recognition, I asked the authors to further explain their motivation and work.

Hiroshi Shimanuki is a doctoral student in the Department of Information Engineering at Nagoya University. Wanting to combine his interests in image recognition and Japanese culture, he found Dr. Jien Kato at the university, who was already exploring ori-

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For more information:

Web Links:
Erik Demaine's web site

History of Origami:
K's Origami
and
JapanZone

Web site of the Origami Group, part of Watanabe's lab at Nagoya University

Publications:
Shimanuki, Kato, Watanabe, "Recognition of Folding Process from Origami Drill Books", in Proc. of 7th International Conference on Document Analysis and Recognition (ICDAR'03), pp. 550-554, 2003.

Shimanuki, Kato, Watanabe, "Constituting origami models from sketches," Int. Conf. Pattern Recognition (ICPR'04).

gami in Professor Toyohide Watanabe's laboratory. This laboratory, which included the complementary topics of computer vision, document image processing, and machine understanding, would be a perfect home to foster their interests.

The initial motivation for applying pattern recognition techniques to origami was to encourage more people to participate in the craft. The problem, as explained by Shimanuki, is that it is sometimes difficult for people – especially children – to understand and follow directions from the folding steps of most origami drill books. In particular, these steps cannot show all perspectives of the model. Therefore, this group proposed a system showing how a computer model of an origami piece can be created, then how the folding can be shown in 3-D, computer animated space. The computer model contains full information on the 3-D shape and this model is modified throughout the folding process. In this way, any intermediate folds can be viewed from different perspectives for better understanding of the steps toward the final result.

A second endeavor of this group was to start the origami not with existing folding instructions, but with a hand-drawn sketch of a target object, for instance an animal. The approach here was inspired in part by mathematicians' use of geometrical techniques, but also incorporates pattern recognition and image processing techniques. Steps in this process are as follows. The target object is first hand-sketched. This sketch is skeletonized.

Nodes are found from this skeleton and arranged to be symmetric and to fit onto a square that will be the origami paper. From these nodes, dividing polygons are computed that meet geometric constraints such that they will be the folded faces of the final result. Finally, the mountain and valley crease patterns are identified. After this, the folding steps generated here can be displayed using the computer animation approach described above.

Currently, there is a human component involved
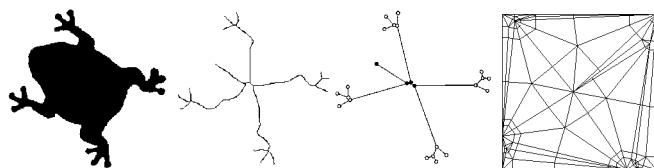
Figure shows some of the processing steps from frog drawing to origami folding model.

to adjust the automatically found fold locations to create a result that also incorporates the designer's aesthetic sense. Shimanuki is working now to improve the process, and feels that other shape detection techniques than skeletonization might yield better results.

Now that the ancient art of origami has crossed bounds into the fields of mathematics and pattern recognition, perhaps we will see more researchers taking up the challenge that Demaine and Shimanuki have begun.

Letter from the President Walter G. Kropatsch

Can you recognize a pattern in the following lines? After doing first steps in studying the mystery of the big tables of numbers which we nowadays display as digital pictures on the computer screen, I participated in a workshop in southern Italy. From journal articles I knew some names of speakers of the workshop, Herb Freeman, Azriel Rosenfeld, Robert M. Haralick, Julian Ullman, ...

My first pattern recognition task was to locate the remote place where the workshop took place. About half of the participants were students like me. The most surprising experience of this workshop was that the 'big names' were nice people sitting at the same table during lunch and dinner, willing to explain the problems they were addressing during their speech again for those who did not understand the message in full depth. This informal setting was created by the way it was organized, with a mixture of state-of-the-art in science and technology and of social activities that broadened the communication channels. At one of these discussions somebody mentioned that he was preparing a paper for the next ICPR, the big conference where all people working in pattern recognition meet every two years.

This was the conference to attend! But what a difference to the family atmosphere of the workshop. It was like a big marketplace; presentations were given at several places simultaneously and it was difficult to plan which presentations to attend and to realize the plan because you might end up in a different hall than the one you wanted. In contrast to the small workshop where one could systematically speak with every other participant, only a comparably small fraction of the talks could be planned in advance. The larger fraction led to many new contacts, forming the basis of a network of scientific contacts and friendships that is essential for many of our professional activities. Many ideas are discussed informally much earlier than they appear in literature.

Since those early days the community has grown considerably. One can now spend most of one's time traveling from one conference to another. There are more than a dozen periodicals for publishing the newest research results. And there is the pressure to publish because counting publications has become the common way to assess academic qualification. A direct consequence is the frequently applied strategy to split the result into many small pieces and publish each in a separate paper. The large number of publications and the wide spread of the relevant information makes it very difficult to assess the state of the art on a particular topic.

The following two initiatives are proposed in order to improve access to the current state of knowledge and to recognize high quality work more systematically.

Develop a Well-Structured Curriculum of Pattern Recognition
Pattern Recognition and its allied fields have developed a substantial amount of scientific know-how that is the basis of our current technology and of further research. There now exist many books and courses with diverse specialization are given worldwide. It seems to be time to work on a modular

reference curriculum of pattern recognition including course content and structure that could be either integrated into existing study plans or form the core of a master course plan in pattern recognition.

As a first step the Education Committee of the IAPR will collect existing courses, course material, books, slides, demos, etc. If you can contribute please contact the chair of the Education Committee.

Make Scientific and Professional Quality Visible
Publications are the primary means of exchanging new results within the scientific community. Scientific articles are submitted to journals specializing in the related subject or to conferences and workshops. In both cases the value of the submitted material is subject to reviewing. Two or three experts in the field read the submitted paper and write a review which grades the paper with respect to different aspects. Their judgment should be accompanied by detailed comments explaining the reasons and by suggestions on how to improve the quality of the paper. While authors of journal articles have the chance to go through several iterations, the decision for a conference submission is usually final after a single review.

Although the above sketched process is similar in most cases there are considerable differences both in the process and the resulting quality of the publications and across different scientific disciplines. Since the quality of the scientific work of a young scientist is judged by senior scientists, sometimes from a different community and background, it is important to assess the quality of the different types of publications and to make it visible by some facts that can be used in a qualitative argumentation. This is the task of a newly created Task Force on Scientific Quality, the members of which will prepare the first steps in this direction. In the long term IAPR should become a recognized label of quality for the works appearing with its logo.

A large organization like IAPR lives through the activities that are executed under its umbrella. To a certain extent these activities can be initiated by the people acting in its committees, but to a large extent it depends on individuals devoting their energy to develop the scientific field and the community. Let me therefore repeat my invitation to actively participate in some of the above activities or in some of the technical committees.

I am indebted to many individuals for their constant support in my career. I would like to thank the Governing Board for its confidence by electing me as president. It is a great honor to work with a group of dedicated and enthusiastic volunteers serving on the executive committee and in the many other committees. I would like in particular to express my deep thanks to my two predecessors, presidents Rangachar Kasturi and Gabriella Sanniti Di Baja, for their advice and help in the past and the present. I sincerely hope that the growing IAPR family can maintain its specific identity, now and into the future!

News from the IAPR Executive Committee

Since the publication of the last Newsletter, the ExCo has been busy forming IAPR's standing committees. This implies the solicitation of a significant number of members in the pattern recognition community. Despite the additional workload that comes with the participation in such committees, the response has been excellent and almost all standing committees are now complete. The composition of the committees is available on the IAPR Web page. The ballot for the Nominating Committee and the K.S. Fu Prize Committee is complete and these results will also be posted at *www.iapr.org*.

This issue is an important milestone in the Newsletter's history since, as approved by the GB at the last meeting in Cambridge in August, 2004, it is the first one to be published electronically. The ExCo would like to express its sincere thanks to the Newsletter Editor, Larry O'Gorman, for taking care of this task and for making a smooth transition between the paper edition mode and the e-newsletter mode. We hope that, in addition to saving money for the IAPR, this way of circulating the newsletter will provide a better service to the IAPR community. The ExCo would also like to thank GB representatives for providing the address to which the newsletter should be dispatched by the Editor. Members' comments and suggestions on this new format for the newsletter are welcome and

should be sent to the IAPR secretary, Denis Laurendeau, who will compile them and send them to the Editor.

The ExCo has also contacted the IFIP to identify the potential for developing a closer relationship between the IPAR and the IFIP.

The Task Force on Scientific Quality has started thinking about possible means of measuring the scientific quality of papers published in IAPR sponsored conferences. It is well known that obtaining tenure track or full professorship positions in universities strongly depends on the applicant's scientific productivity which is measured in terms of papers published in highly ranked journals. Conference papers are often not counted. However, for researchers working in disciplines such as computer science and engineering, publishing a journal paper involves an enormous amount of work, compared to traditional disciplines, since it implies that a complex system is designed, built, and tested in addition to the writing of the paper. This work of the Task Force stems from discussions that first took place within TC-11. A document entitled "Measuring Scientific Quality in the IAPR" (author L. Schomaker) emanated from these discussions and will serve as a basis for a wider discussion within the IAPR. It is not an easy subject and views on how to assess the quality of confer-

ence/workshop papers may vary but, as one contributor to the discussion within TC-11 wisely said: "If quality isn't discussed, it will only be attained by chance".

This discussion on scientific quality of IAPR conference papers must be considered in the perspective of events that have occurred recently. Indeed, recently, the ExCo has faced a rather unexpected yet worrying situation: a member reported to the ExCo that he had found the announcement of ICPR 2005 on the Web!!! An investigation was conducted and it was found that ICPR's name was "borrowed" by another event that has nothing to do with IAPR. A letter was sent to the conference organizers urging them to change the name of their event. They complied with the request, and the name of the event is no longer ICPR. Nevertheless, it was also discovered that some conference organizers did not know that they were on the organizing committee of this "fake" ICPR. Consequently, we ask IAPR members to be alert and to report any similar situation to the ExCo so the quality standards and reputation of ICPR can be preserved…as well as the quality of the papers that are published in ICPR proceedings.

By the time you receive this newsletter, it is certainly timely for us to wish you a very successful and happy new year 2005.

BOOKSBOOKSBOOKS

Salil Prabhakar Reviews *The Guide to Biometrics*

Authors: Ruud M. Bolle, Jonathan H. Connell, Sharathchandra Pankanti, Nalini K. Ratha and Andrew W. Senior
Springer Professional Computing, 2004
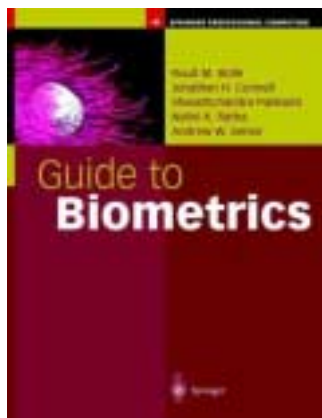
Biometrics, which refers to automatic recognition of persons based on their distinctive physiological and behavioral characteristics, is an application of the fields of image processing and pattern recognition. Most of the readers of this newsletter are familiar with biometrics, as technical articles on the topic have appeared regularly in IAPR and IEEE publications over the past three decades. It is somewhat surprising that the first monograph on the subject, *The Guide to Biometrics*, would publish as late as in 2004, but it is a pleasure to find that it is well written. This monograph has a very good consistency of terminology and notation and avoids repetition of content among various chapters – qualities that are hard to find in edited volumes. Another great strength of this book is that it discusses common fundamentals underlying the entire biometrics field instead of concentrating on individual biometric characteristics or implementations. The authors of this book are distinguished researchers in the field of biometrics; their outstanding background and firm grasp of the subject is evident throughout the book. Along with a discussion of the underlying concepts, the authors have shared numerous practical insights and suggestions from their experience throughout the book, which is very valuable for practitioners in the field.

The book is divided into four parts. Part I is introductory; subsequent parts get increasingly sophisticated. Depending on their expertise, readers can choose to selectively read any part. The book contains an extensive bibliography and an index, which makes it valuable as a reference text. In Chapters 1 and 2, the authors acquaint the reader with the common terminology used in biometrics and their meanings, e.g., the authors explain the difference between verification, identification, screening, and continuity of identity systems. The authors illustrate how pattern recognition centric probabilistic biometric matching fundamentally differs from computer security centric exact password matching. While password-based verification systems have several limitations (common passwords can be easily guessed, cryptic passwords can be easily forgotten, and all passwords can be shared), their information content (i.e., cryptographic strength) can be arbitrarily increased (at the expense of inconvenience to the user in remembering a long cryptic string). On the other hand, the cryptographic strength (accuracy) offered by biometric systems is limited by the inherent information content in the biometric characteristic, and the accuracy of the feature extraction and classification methods used by the system. In spite of three decades of research, designing highly accurate biometric systems remains a very challenging pattern recognition research problem. In Chapters 3 and 4, while introducing the basic concepts underlying common (fingerprint, face, speaker, iris, hand geometry, and signature) and emerging (DNA, retina, thermograms, gait, keystroke, ear, skin reflectance, lip motion, and body odor) biometric systems, the authors guide the readers through the difficulties and challenges one would encounter in designing an accurate system for any of these biometric characteristics. This compels the reader to read the rest of the book.

In Part II, the basic concepts on biometrics performance estimation introduced in Part I are expanded and formalized with mathematical notation. False match rate, false non-match rate, false accept rate, false reject rate, receiver operating characteristic curve, equal error rate, d-prime, failure to acquire, and failure to enroll, are first explained for biometric verification in Chapter 5. These are then extended to biometric identification performance matrices of reliability, selectivity, recall, precision, identification false accept rate, and identification false reject rate in Chapter 6. Chapter 6 is certain to enhance a reader's understanding of biometric identification, which is a much harder problem than verification. Estimating real-world performance from laboratory evaluation of biometric system has proven to be elusive, especially since the error rates are very small and depend upon a large number of factors such as demographics, weather/illumination, user behavior, and application. In Chapter 7, the authors point out that the best strategy to evaluate biometric systems is to organize competitions among biometric systems and conduct comparative evaluations on a common database and testing protocol. The authors summarize the implications of biometric error rates and quote range of error rates of the state-of-the-art biometric systems from public comparative tests. No single biometric is suitable for all applications; the choice of a biometric depends upon not only the system error rates but also numerous other factors. In Chapter 8, the authors, based on their vast experience, provide guidelines to the reader on which factors to consider and how to select a suitable biometric for their application. The pros and cons of each biometric technology are discussed and some of the prevalent myths are debunked.

Part III of this book reads like a 'practitioner's guide'

and deals with system issues associated with implementing biometric systems. Enrollment is a significant part of a practical biometric system and the authors have devoted Chapter 9 to discuss enrollment issues such as positive and negative enrollment, enrollment for screening, quality control of enrollment data, enrollment integrity, etc. Many system level issues arise when the database size is very large. In case of certain biometric applications, such as national identification card or driver's license, the database could contain tens of millions of identities and hundreds of millions of biometric samples. In Chapter 10, the authors walk the readers through large-scale system issues such as implication of matcher error rates, throughput, and exception handling. Among applications that require extremely accurate biometric matchers and very high throughput, there is vigorous interest in the community to use multi-modal biometric systems. Decision and score level fusions are discussed in Chapter 11 for verification and identification systems. Common design techniques used to secure end-to-end biometric systems are discussed in Chapter 12, and standards for APIs and databases, certification and legislation in Chapter 13.

Part IV of this book covers advanced topics that would be of immense interest to graduate students and experts working in the field. Estimating the inherent information content present in a biometric characteristic has profound consequences in understanding the theoretical upper bounds of achievable accuracy and, in the case of fingerprints, value as legal evidence. In Chapter 14, the authors present model-based theoretical esti-

mation of individuality in iris and fingerprint biometrics. As mentioned earlier, biometric system evaluation is empirical. Empirical error rates may not be very accurate when the sample size is small and error rates are very small, which is very common in biometric systems. Therefore, it is important to report the statistical significance of estimates error rates. As discussed in Chapter 15, the most common method of reporting the statistical significance is through confidence intervals, which can provide indication of generalization of estimated error rates (in a probabilistic sense). Confidence interval estimation could be parametric or non-parametric. Since parametric methods are based on certain assumptions (e.g., distribution of matching scores follows Normal distributions and are independently, identically distributed), which may often be violated, authors discuss these methods only briefly. The nonparametric methods are then discussed in detail, in particular, the highly successful subset bootstrap method of confidence interval estimation. In Chapter 16, the authors discuss how cost functions can be used to choose an operating point of a matcher. Finally, methods of estimating the cumulative match curve (in identification systems) and its relation to the false accept/reject rates are discussed.

The value of this book as a textbook could have been strengthened with a summary, discussion, future research trends, and student exercises at the end of each chapter. Since Chapter 17 of the book discusses future trends, this may at best be a minor weakness. Overall, this is an excellent technical book on biometrics, capturing the common basic fundamentals underlying biometrics technology. It is poised to become a classic in

Workshop Report: MCS 2004

General Chairs:
H. Fujisawa
Guy Lorette

5th International Workshop on Multiple Classifier Systems

9-11 June 2004, Cagliari, Sardinia, Italy
Report prepared by: Nikunj C. Oza

The International Workshop on Multiple Classifier Systems is a series of conferences whose goal is the development of theories, algorithms, and applications of ensemble machine learning methods. This series, started in the year 2000, was spawned by the theoretical and empirical successes of ensemble methods especially in the 1990s. The series has served as a forum for the various groups working in this area to come together and help each other keep up with this active area of research. The fifth in this series of conferences was held last June in beautiful, sunny Sardinia. The beautiful beaches, casual atmosphere, and delicious Italian food led to educational and energetic talks and discussions.

This conference contained the usual excellent mix of theory, algorithms, and applications of ensemble methods. The conference included a panel discussion, organized by Prof. Joydeep Ghosh and Dr. Nikunj Oza. The first of the discussion's two components was a story telling competition in which people shared anecdotes of successes or failures of particular ensemble approaches. The second component was a discussion of how to carry the field forward, including topics to de-emphasize and topics that need greater attention. The topics that people felt needed greater attention can be summarized as applying ensemble methods to modern data mining problems. These include problems that have changing environments, data distributed across many computers, complex data forms (e.g., text), and/or other characteristics that make the use of traditional machine learning algorithms difficult.

This theme also appeared in the first two invited talks. The first talk, "Classifier Ensembles for Changing Environments," by Lucy Kuncheva, neatly summarized the work that has been done so far that goes in the direction of working on problems with changing environments, and discussed the gaps that need to be filled. Nagi Rao's talk, "A Generic Sensor Fusion Problem: Classification and Function Estimation," discussed sensor fusion, which is becoming an increasingly important problem with the growth of the area of Integrated System Health Management (ISHM). The third talk, "Security and Dependability in the Ambient Intelligence Space: Challenges and Opportunities for European R&D" by Andrea Servida also discussed a problem---security---whose importance is greatly increasing in our modern world.

The talks and discussions of MCS 2004 gave the attendees an excellent overview of the work done within the last year in the field of ensemble learning methods as well as new problems to focus on. Next year's conference should reveal important progress in these new directions as well as interesting extensions to active topics. The next MCS will be held in the USA (Monterey, California, *www.monterey.org*) for the first time, but will still provide as much time in the sun as last year's conference. The dates will be June 13-15, 2005. Please watch *www.diee.unica.it/mcs* over the next few months for further developments.

For more information:

TC1
Statistical Techniques in
Pattern Recognition

MCS Conference Proceedings

Workshop Report: DAS 2004
Co-Chairs:
Simone Marinai
Andreas Dengel

6th International Workshop on Document Analysis Systems
7-10 September 2004, Florence, Italy
Report prepared by: Dimosthenis Karatzas

Picture courtesy of **Koichi Kise**

Central to the DAS workshops series is the emphasis on complete document analysis systems' demos and papers that present applications of document analysis research on real-life problems. As such, the DAS series stands at the crossroad between academia and industry, and is a focal point for professionals in the area.

Following the success of its predecessors, DAS 2004 brought together more than 70 representatives of both academia and industry from 19 countries. The programme of the workshop included 31 oral presentations and 22 posters selected from 79 submissions. These were coupled with group discussions on selected topics and two invited talks on image quality issues for historical documents and the future of document imaging.

The group discussions are considered by many as the most interesting and valuable time in DAS. Apart from giving a chance to participants to exchange views and ideas, the new topics selected for discussion each time reflect the current developments in the area, while reappearing topics effectively pinpoint problems that are still unsolved. The five topics discussed in DAS 2004 were *Performance Analysis and Evaluation*, *Document Structure and Semantics, Historical Document Analysis*, *Camera-Based and Colour Document Analysis*, and *Future Applications of Document Analysis.* The reports of the working groups are available online at the DAS web site: *www.dsi.unifi.it/DAS04*.

DAS 2004 identified new trends and suggested new directions in the field of Document Image Analysis. Perhaps the most interesting observation has to do with the large number of papers, as well as a focused discussion group and an invited talk, related to digital libraries and the processing of historical documents. The number of papers dealing with these problems has gone up, from only a couple of papers in DAS 2002, to 17 papers in DAS 2004.

There are a number of reasons contributing to this shift, most importantly the increased number of research projects funded by the EU and the NFS on topics related to historical documents and digital libraries, which manifested itself through the fact that most of the papers related to these topics were linked to such research projects.

This comes as no surprise, since the Document Analysis field has matured, reaching a certain level of knowledge, which makes it confident enough to take on projects related to historical documents and digital libraries, and tackle inherent problems such as the analysis of colour documents. On the other hand, the focus on culture and heritage by the EU and NSF seemed to be catalytic to the allocation of resources to attack these problems through large scale projects. Last but not least, focused events, like the recent DIAL workshop organised by H. Baird and V. Govindaraju in Palo Alto, helped shape this new research direction, which fortunately emerged as a trend in this year's DAS in Florence, a city of significant artistic and cultural heritage.

The rest of the papers presented in DAS 2004 described new developments in traditional subjects like handwritten document analysis and layout analysis, but also revealed a continuation of interest on Web Document Analysis, a really strong topic two years ago. Finally a focused section on Document Analysis Systems, gave a taste of the state of the art of document analysis applications, which are continuously moving away from the document analysis specialist and focused on the end user.

Concluding, DAS 2004 in Florence, on par with its predecessors, drew together high quality contributions, inspiring invited talks, and exciting discussions through working groups, arranged in a flawless programme. It has been a valuable experience for the participants, and maintained the reputation of the DAS series as a highly recommended event to participate to, for everybody interested in document image analysis.
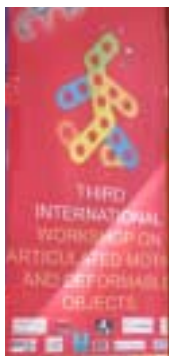
Workshop Report: AMDO 2004
Co-Chairs:
Francisco Jose Perales
B.A. Draper

3rd International Workshop on Articulated Motion and Deformable Objects
22-24 September, Universitat de les Illes Balears (UIB), Palma de Mallorca, Spain

AMDO2004 workshop was institutionally sponsored by the International Association for Pattern Recognition (IAPR), the MCYT (Comision Interministerial de Ciencia y Tecnologia, Spanish Government), the AERFAI (Spanish Association in Pattern Recognition and Artificial Intelligence), the EG (Eurographics Association) and the Mathematics and Computer Science Department of the UIB. Commercial sponsors were Barco Electronics Systems (Title Sponsor), VICOM Tech, ANDROME Iberica, CESA and TAGrv.

The subject of the workshop 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.

Demo by Invited Speaker Richard Bowden.

The main objective of this workshop 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, as convergence between multidisciplinary areas will be necessary to reach new perceptual or multimodal interfaces.

In this regard it is of particular interest to encourage links between researchers in areas of computer vision and computer graphics who have common problems and frequently use similar techniques.

The workshop included several sessions of oral presented papers and three tutorials. We also had three invited speakers treating various aspects of the main topics. These invited speakers were: Professor B. Draper from Colorado University (USA), Professor P. Brunet from Polytechnics Catalonia University (UPC-Spain), and Prof. R. Bowden from Surrey University (UK).

Best paper award

Several nice social events contributed to stimulate scientific discussions.
The welcome cocktail at Castell de Bellver given by Local Government was simply perfect. The Mallorcan gala dinner was delightful. The conference venue was very conveniently located in the Cas Jai Building at UIB near Valldemossa. As you have understood, this AMDO 2004 was a success and a great event.

Proceedings for conferences in the AMDO series have been published by Springer in *Lecture Notes in Computer Science*. Also an extended version of papers and new contributions has been proposed as a Special Issue of ELCVIA Newsletter. Use the link to see the call for papers.

The next AMDO 2006 Conference will also be held in Palma de Mallorca, Spain, in September, 2006.
Best regards to all participants and I hope to see again in 2006 at the fourth AMDO workshop.

Workshop Report: IWFHR-9
General Chairs:
H. Fujisawa
G. Lorette

9th International Workshop on Frontiers of Handwriting Recognition
26-29 October 2004, Central Research Laboratory of Hitachi, Ltd. (HCRL), Kokubunji, Tokyo, Japan

IWFHR-9 was sponsored by the Technical Committee TC-11 (Reading Systems) of the IAPR, and was financially supported by IBM (USA), Microsoft (USA), and Hitachi (Japan). The general chairs, Dr. H. Fujisawa and Prof. G. Lorette, led the organization of the IWFHR-9 to great success: 100 presentations (selected from over 120 submissions), over 140 participants, and stimulating discussions.

The technical sessions of the IWFHR-9 included 47 oral presentations and 53 poster presentations. The oral presentations were organized into sessions titled
- "Handwriting Recognition and Shape Analysis",
- "Classification Techniques",
- "Handwriting Analysis and Gesture Recognition",
- "Signature Verification and Writer Identification",
- "Recognition of Word and Text", and
- "Document Analysis and Applications".

The poster presentations were grouped into eight topics ranging from fundamental techniques to applications.

 In addition to the regular sessions, Prof. S.N. Srihari, from SUNY at Buffalo, gave an invited talk on "Machine Learning in Questioned Handwriting Examination".

The presentations reported progress on traditional technical issues and applications, as well as emerging techniques like Bayesian networks and new applications like pen-based hand-drawing and gesture analysis. The program committee rated the presentations and announced three awards.
- The best paper award was given to S.-J. Cho, et al. (Samsung, Korea) for the work on a new device and algorithm for hand-drawn gesture recognition;
- The best student paper award was given to H. Choi (KAIST, Korea) for the work on handwriting generation using Bayesian network;
- The best poster award was given to J. Sadri (CENPARMI, Canada) for the work on numeral string segmentation.

A panel discussion was organized on "The Present and Future of the Postal Automation System: In Quest of More Advanced Recognition Technology". The panelists were invited from major postal companies of America, Europe, and Asia, and the research community of handwriting recognition. They discussed the urgent need to improve address recognition performance, especially error the reduction, and showed some possibilities of accomplishing this need.

The IWFHR-9 also featured an outstanding venue and well-organized social programs. The participants were impressed by the park-like campus of HCRL. On having lunch at the cafeteria of HCRL, they enjoyed walking around the garden in the campus. In the workshop banquet, held in a business hotel located in the downtown area of Kichijoji, the participants were excited by a performance of Japanese drum. On the last day afternoon, an optional excursion to Mt Fuji was organized, which attracted about 40 participants and companions.

During the IWFHR-9, a meeting was held to approve the proposal by Prof. M. Cheriet for holding the 11th IWFHR in 2008 in Montreal, Canada. The 10th IWFHR, chaired by Professors G. Lorette, H. Bunke, and L. Schomaker, will be held in October, 2006, in La Baul, France.

Letters to the Editor

Dear Dr. O'Gorman,

Although I have not been actively involved in pattern recognition research for more years than I care to admit, from time to time I do continue to try to keep some contact with activities in the field. Thus, it was with unexpected pleasure that I read your article entitled "Books, Books, Books" in the July IAPR Newsletter.

When Peter Hart and I wrote the predecessor to DHS almost 30 years ago, we had no idea how explosively the field would develop. I still remember expressing my concerns to Tom Cover about how one could justify teaching a university course on a topic of such narrow interest. Tom's response was that statistical pattern recognition was a perfectly good excuse for teaching linear algebra and probability theory, and that students would find these basic topics valuable even if they never encountered any pattern recognition applications.

Without Peter's great encouragement and David Stork's energy, creativity and enthusiasm, the second edition would never have seen the light of day. Some of the reviews of DHS that appear on amazon.com are considerably more harsh than the mild complaint that you included. As you can imagine, there is no honor that is more gratifying than to receive recognition from one's peers, and I am still basking in the warm glow of your report.

Sincerely,
Dick Duda