INTERNATIONAL ASSOCIATION FOR PATTERN RECOGNITION

IAPR Newsletter

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April 2010

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Calls for Papers

CIARP 2010
15th Iberoamerican Congress on Pattern Recognition
São Paulo, Brazil
Deadline: June 7, 2010
November 8–11, 2010

IWCF 2010
4th International Workshop on Computational Forensics
Tokyo, Japan
Deadline: June 25, 2010
November 11-12, 2010

MVA 2011
12th IAPR Conference on Machine Vision Applications
Nara City, Japan
Deadline: December 15, 2010
June 6–8, 2011

SCIA 2011
17th Scandinavian Conference on Image Analysis
Ystad Saltsjöbad, Sweden
Deadline: December 15, 2010
May 23-27, 2011

GbR 2011
TC-15 Workshop on Graph-based Representations in Pattern Recognition
Münster, Germany
Deadline: January 10, 2011
May 18–20, 2011

ICDAR2011
11th International Conference on Document Analysis and Recognition
Beijing, China
Deadline: March 1, 2011
September 18-21, 2011

Call for Submissions

IAPR Newsletter

Articles, announcements, book reviews, conference and workshop reports

Contact the editor:
Alexandra Branzan Albu, *aalbu@ece.uvic.ca*

Deadline: June 21, 2010

IAPR Newsletter

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Getting to Know...
Larry O'Gorman, IAPR Fellow

Has the time for telepresence finally come?

By Larry O'Gorman, IAPR Fellow (USA)

In the early 1990s, before the World-Wide-Web, I was involved in research applied to digital libraries. At Bell Labs, we built the RightPages Library, which incorporated novel methods in document image processing and watermarking and introduced several publishers (including IEEE, ACM, and Elsevier) to the complexities of the new digital publishing era. It was a pioneering time both in technology and in publishing, which was very exciting. Today, digital libraries are commonplace. (Some of the most impressive are UNESCO libraries for developing countries, built using the Greenstone digital library software, see "Pattern Recognition in Digital Libraries", IAPR Newsletter, July 2006 [html] [pdf]).

After digital libraries, in the late 1990s, I was lucky enough to become involved in another pioneering technology era, although this I'd describe more as the "wild west". There was an explosion of interest in biometrics for the purpose of expanding application beyond its traditional use in criminal investigation and forensics. The first solid-state fingerprint scanner was developed at Bell Labs, and I felt that this was the device that would finally free us from passwords, PINs, and keys. During this time, I came to understand the value and limitations of biometrics and where it fits in with other technologies. I summed up my thoughts in a paper in the Proceedings of the IEEE, "Comparing Passwords, Tokens, and Biometrics".

I have recently become involved in another technical area that I think has the potential to bring about great positive change in the world. The new area is telepresence. At Bell Labs we call this "immersion at a distance". I am always self-conscious when talking about this as "new" work, because at the New York

(Continued on page 4)

Lawrence O'Gorman is a Distinguished Member of Technical Staff at Bell Laboratories working in areas of image and signal processing, pattern recognition, and multimedia security. Before that he was a Research Scientist at Avaya Labs, Chief Scientist and co-founder of Veridicom (a fingerprint device company), and at Bell Labs (for the first time).

He has written over 70 technical papers, eight book chapters, holds 15 patents, and is co-author of the books, "Practical Algorithms for Image Analysis" published by Cambridge University Press, and "Document Image Processing" published by IEEE Press. He is a Fellow of the IEEE and of the International Association for Pattern Recognition. In 1996, he won the Best Industrial Paper Award at the International Conference for Pattern Recognition(ICPR) and an R&D 100 Award for one of "the top 100 innovative technologies of that year."

He has served on US government panels to NIST, NSF, and NAE, and to France's INRIA. He is an adjunct faculty member at Poly/NYU and the Cooper Union.

He received the B.A.Sc., M.S., and Ph.D. degrees in electrical and computer engineering from the University of Ottawa, University of Washington, and Carnegie Mellon University respectively.

(Continued from page 3)

Worlds Fair in 1964, AT&T first introduced the Picturephone. That was supposed to change the world, too. Yet 46 years later, most people still have voice-only telephones in their offices and homes. Granted, about 46% of Skype calls are video, but these small, low bit-rate video windows could not be called immersive.

So, why in a half century has telepresence not caught on? The answer is multifaceted and we are working on a few ideas at Bell Labs that we hope will address the issues. One issue is the lack of control that you, the remote user, have to see anything at the other end outside of the camera's range. With remote control of the camera view, you would be able to look around the room as if you were there. Some pattern recognition features can be added to this such that your remote surrogate would automatically turn your view to a sound source or a visual change in your "peripheral vision". I was recently on a short trip to Europe. I realized that I could have shipped my surrogate "eyes, and ears, and mouth" by express mail to the meeting, participated remotely, and then even discarding all of the equipment would have cost less than my flight and hotel!

Another reason that telepresence has not caught on may be privacy. It may be that they don't want a camera constantly transmitting their image. An answer to this may be to capture and store pre-screened images, then to match facial expressions and pose on a real-time basis and send these matched images versus real-time video. This is like an avatar, but those on the receiving end see the real person. The privacy concern may also relate to the background of the video: fear that video from a home office may look unprofessional, or video of an office background may reveal proprietary material. In this case, the background could be suppressed. Background suppression algorithms exist, but they currently lack the quality to smoothly replace the actual surroundings with the desired background.

A third issue that may have prevented telepresence from taking off may be simply that current methods don't scale well. This is obvious for bandwidth, but it is also true for screen real-estate. I've recently been on some teleconferences with about 30 other people. To the best of my knowledge, there isn't a videoconferencing system that scales well to that size. Again we can use pattern recognition to help address this. Speech and motion analysis can detect state changes where one or a few of the 30 people can be displayed to direct the viewers to those with audible or visible reactions. Speech and vision analytics that are tuned to each person can even eliminate the need to send video by recognizing the emotion or intent of a person and conveying messages such as, "Mr. X has a question." or, "Ms. Y appears to disagree with what was said."

I don't know which of these or other ideas will finally make telepresence comfortable and desirable to users. However, I do know that after 46 years, telephony's halted step into the 21st century is more than overdue. Just as for digital libraries and biometrics, I hope to participate in this next step.

Other articles in the Getting to Know...Series:

Biometrics: The key to the gates of a secure and modern paradise by Nalini K. Ratha
January 2010 [html] [pdf]

Recognition of Human Activities: A Grand Challenge by J.K. Aggarwal
October 2009 [html] [pdf]

Pattern Recognition in the Media: Data Mining

by Linda J. O'Gorman (USA)

Data mining touches my life every day in the form of targeted marketing efforts. If I weren't already aware of this, the point was brought home as I was listening to the radio the other day. Terry O'Reilly was being interviewed by Leonard Lopate. O'Reilly, a former advertising copywriter, currently co-hosts with Mike Tennant a radio program called "The Age of Persuasion" on the Canadian Broadcasting Corporation and Sirius Radio. They also co-authored a book called *The Age of Persuasion: How Marketing Ate Our Culture*.

> ***Lopate:*** […] Now we're hearing about things like data mining. And I guess those are the things that also scare a lot of people.
>
> ***O'Reilly:*** Yeah. And I get that, too. I'm very ambivalent on that issue, Leonard, because on one hand, as an ad man, I want as much information about you as possible, not to pry, but I want to understand you so the advertising I create is relevant. On the other hand, I'm a consumer, too, and when I go and buy a pair of socks at a store and they ask me for my phone number it drives me crazy.
>
> And I look at my daughters. I have three teenaged daughters, and they so easily give away their information online. And my wife and I are always so fearful of that. But then I realize that one of the reasons they do it is because they know instinctively that if they give away information, what they get back will be much more relevant to them.

Personalized shopping experiences

For quite a while now, when I go to the grocery store, targeted coupons appear with my register receipt. And, of course, when I shop online, I invariably see the phrase "people who bought [this], also bought [that]. But, according to an article that appeared in the Novelties column of the New York Times last year, I might also expect kiosks to appear in other stores where I shop. These stations would help me choose the right hair color and style, make-up color and application technique, and outfit.

Prototypes from Intel were department store oriented. Rather than wandering from department to department in a large store, customers would flash an identification card at a kiosk to enter the system. Based on prior knowledge of the customer's purchases and information from current choices, new recommendations would be made. For the customer, shopping is more efficient; for the retailer, there is the opportunity to upgrade or increase purchasing.

The Virtual Mirror kiosk from IBM and EZface captures and stores an image of the customer along with a list of the products in which he or she was interested. By scanning a cosmetic product, the virtual customer can try it on and evaluate the new look.

I had clipped this article a year ago because of its

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connection to pattern recognition. Sadly, I have not, as yet, seen any cool kiosks in my favorite stores. I did, however, find the EZface Virtual Mirror online. (I wonder…how would I look with purple hair?)

Measuring a Nation's Mood

If multiple measurements of a physical object can vary, imagine the difficulties involved in measuring an emotion like happiness. Peter Dodds and Chris Danforth, two applied mathematicians at the University of Vermont, have done just that.

In the interview segment quoted above, Terry O'Reilly tells Leonard Lopate that his motivation for using data mining techniques in his work is relevancy. Similarly, Dodds and Danforth say in their abstract:

> The importance of quantifying the nature and intensity of emotional states at the level of populations is evident: we would like to know how, when, and why individuals feel as they do if we wish, for example, to better construct public policy, build more successful organizations, and, from a scientific perspective, more fully understand economic and social phenomena. [1]

So what did they do to obtain relevant data about population level happiness? In the paper cited, they studied song lyrics (from *www.hotlyrics.net*), song titles (from *www.freedb.org*), first person blog sentences containing the word "feel' (obtained from *www.wefeelfine.org*), and State of the Union addresses given by U.S. Presidents (from the American Presidency Project at *www.presidency.ucsb.edu/*). The words from these sources were given a happiness score based on the "psychological valence" assigned to the words by the Affective Norms for English Words (ANEW) study.

The blog study results showed that Election Day 2008 was the happiest day in the preceding four years, with elevated use of the word "proud". On the other side, the day Michael Jackson died was among the least happy.

The methods are now also being applied to Twitter messages.

For more information:

Introduction

Terry O'Reilly's web site

Personalized shopping experiences

Virtual Mirror from EZface, Inc.

Measuring a nation's mood

Joshua E. Brown, "If You're Happy, Then We Know It: Research Measures Mood", University of Vermont, University Communication, 23 July 2009

Margaret Bradley and Peter J. Lang, "Affective Norms for English Words (ANEW)"

Sources:

"Persuasion", *The Leonard Lopate Show*, WNYC, New York, April 19, 2010

Personalized shopping
"Thinking of Going Blond? Consult the Kiosk First", The New York Times, March 28, 2009

Measuring a nations's mood
"Measuring a nation's mood", Health & Science, The Week Magazine, August 21, 2009

References:

[1] Dodds, Peter Sheridan, and Christopher M. Danforth, "Measuring the Happiness of Large-Scale Written Expression: Songs, Blogs, and Presidents", Journal of Happiness Studies, 17 July 2009.

News from the
IAPR EXECUTIVE COMMITTEE

By Denis Laurendeau (Canada)

The IAPR community is preparing for the 20th Edition of the International Conference on Pattern Recognition (ICPR), to be held in Istanbul, Turkey, on August 23-26, 2010. ICPR is IAPR's main event and, again this year, will attract a large number of papers in the conference's six tracks. We all look forward to an exciting scientific program. Once the final submission of the manuscript is completed, the Conference Program will be available at the ICPR2010 web site. Visit the conference website *www.icpr2010.org/* for this and other news on the event.

Again this year, the ExCo announced that a number of travel stipends, to the amount of US$700 each, would be 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 from the community was very high and a significant number of applications have been received to date. The announcement of the list of recipients will be made before the deadline for early bird registration at ICPR 2010.

The ballots on the K. S. Fu and J. K. Aggarwal Prizes are currently being held. The results of the vote will be announced later this summer and the recipients will be invited to present a lecture at the ICPR2010.

The IAPR Fellow Committee has also completed its job and has proposed 17 new IAPR Fellows who will receive their Fellow certificates at ICPR2010. The number of new Fellows to be elected is based on a percentage (0.25%) of the total membership of IAPR. In addition to the traditional certificate, a new IAPR Fellow pin will be given to all recipients. The Fellow Committee was pleased to follow up on this idea from the ExCo and to make it happen with the help of Linda O'Gorman from the IAPR Secretariat. It is worth mentioning that this year the nomination/endorsement process was entirely web-based, thanks to the Chair of the Fellow Committee, Walter Kropatsch, and to the IAPR Webmaster, Edward J. Sobczak.

The next Governing Board (GB) meeting will be held in Istanbul on Tuesday August 24, 2010. The venue and time of the meeting will be know in a short while and communicated to GB members in due time. Again, the information and documents on the GB meeting will be posted in the GB reserved area of the IAPR website. GB members will be informed by email of when the documents will be available. No mailing of the documents will be done.

BOOKSBOOKSBOOKS

Book reviews previously published in the IAPR Newsletter

Augmented Vision Perception in Infrared: Algorithms and Applied Systems by Riad Ibrahim Hammoud, editor, *(reviewed in this issue)*

Handbook of Texture Analysis by Majid Mirmehdi, Xianghua Xie, and Jasjit Suri, editors, Oct '09

Markov Random Field Modeling in Image Analysis By Stan Z. Li, Oct '09

Pattern Recognition and Neural Networks by B.D. Ripley Apr '09

Close Range Photogrammetry: Principles, Methods, and Applications by Luhmann, Robson, Kyle, and Harley, Oct '08

Classification and Learning Using Genetic Algorithms: Applications in Bioinformatics and Web Intelligence by Bandyopadhyay and Pal, Oct '08

Learning Theory: An Approximation Theory Viewpoint by Cucker and Zhou, Oct '08

Character Recognition Systems—A Guide for Students and Practitioners by Cheriet, Kharma, Liu, and Suen, Oct '08

Geometry of Locally Finite Spaces by Kovalevsky, Oct '08

Machine Learning in Document Analysis and Recognition by Marinai and Fujisawa (Editors), Oct '08

*From Gestalt Theory to Image Analysis—A Probabilistic Approach b*y Desolneux, Moisan, and Morel, Oct '08

Numerical Recipes: The art of scientific computing, 3rd ed. by Press, Teukolsky, Vetterling and Flannery, Jul '08

Feature Extraction and Image Processing, 2nd ed. by Nixon and Aguado, Jul '08

Digital Watermarking and Steganography:Fundamentals and Techniques by Shih, Jul '08

Springer Handbook of Speech Processing by Benesty, Sondhi, and Huang, eds., Jul '08

Digital Image Processing: An Algorithmic Introduction Using Java by Burger and Burge, Jul '08

Bézier and Splines in Image Processing and Machine Vision by Biswas and Lovell, Jul '08

Practical Algorithms for Image Analysis, 2 ed. by O'Gorman, Sammon and Seul, Apr '08

The Dissimilarity Representation for Pattern Recognition: Foundations and Applications by Pekalska and Duin, Apr '08

Handbook of Biometrics by Jain, Flynn, and Ross (Editors), Apr '08

Advances in Biometrics – Sensors, Algorithms, and Systems by Ratha and Govindaraju, (Editors), Apr '08

Dynamic Vision for Perception and Control of Motion by Dickmanns, Jan '08

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Bioinformatics by Polanski and Kimmel, Jan '08

Introduction to clustering large and high-dimensional data by Kogan, Jan '08

The Text Mining Handbook by Feldman and Sanger, Jan '08

Information Theory, Inference, and Learning Algorithms by Makay, Jan '08

Geometric Tomography by Gardner, Oct '07

"Foundations and Trends in Computer Graphics and Vision" Curless, Van Gool, and Szeliski., Editors, Oct '07

Applied Combinatorics on Words by M. Lothaire, Jul '07

Human Identification Based on Gait by Nixon, Tan and Chellappar, Apr '07

Mathematics of Digital Images by Stuart Hogan, Apr '07

Advances in Image and Video Segmentation Zhang, Editor, Jan '07

Graph-Theoretic Techniques for Web Content Mining by Schenker, Bunke, Last and Kandel, Jan '07

Handbook of Mathematical Models in Computer Vision by Paragios, Chen, and Faugeras (Editors), Oct '06

The Geometry of Information Retrieval by van Rijsbergen, Oct '06

Biometric Inverse Problems by Yanushkevich, Stoica, Shmerko and Popel, Oct '06

Correlation Pattern Recognition by Kumar, Mahalanobis, and Juday, Jul. '06

Pattern Recognition 3rd Edition by Theodoridis and Koutroumbas, Apr. '06

Dictionary of Computer Vision and Image Processing by R.B. Fisher, et. Al, Jan. '06

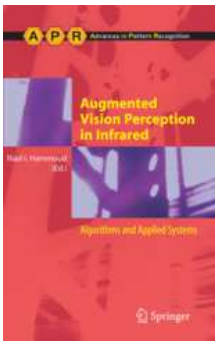
Kernel Methods for Pattern Analysis by Shawe-Taylor and Cristianini, Oct. '05

Machine Vision Books Jul. '05

CVonline: an overview, Apr. '05

The Guide to Biometrics by Bolle, et al, Jan. '05

Pattern Recognition Books, Jul. '04



Augmented Vision Perception in Infrared: Algorithms and Applied Systems

Edited by Riad Ibrahim Hammoud
Springer, Advances in Pattern Recognition Series, 2009

Reviewed by
Antonio Fernández Caballero (Spain)

The book "Augmented Vision Perception in Infrared: Algorithms and Applied Systems", edited by Riad Ibrahim Hammoud with contributions from a number of excellent researchers in the fields of Infrared Thermography, Intensified Imagery, Thermal Imagery, Infrared Imagery and Hyperspectral Imagery, introduces itself as "a comprehensive review of recent deployment of infrared sensors in modern applications of computer vision, along with in-depth description of the world's best machine vision algorithms and intelligent analytics".

Indeed, the book includes a wide range of machine perception applications in intensified, near infrared, thermal infrared, laser, polarimetric, and hyperspectral bands. Nevertheless, the book is not only devoted to infrared technologies as stated in its title. It would be better defined by the title provided by the same editor and Professor James W. Davis in their co-edited Special Issue of *Computer Vision and Image Understanding* on "Advances in Vision Algorithms and Systems beyond the Visible Spectrum" that appeared during year 2007. In fact, this book introduces many chapters related to machine vision beyond the visible. On the other hand, the vision perception is called "augmented" in a double sense in the book. Firstly, some chapters emphasize the merging of visual and non-visual imaging, and in the second place, there are some approaches described for the fusion of multiple visible and thermal sensors. For the previous reasons, the book offers an outstanding opportunity to look into the current trends in computer vision technologies beyond the visible spectrum.

There are some very instructive chapters that could be taught in an advanced graduate course. While some chapters are accessible to readers of all levels, many others are too hard for a starter, and some proposals provide details of very specific as well as complex methodologies. Therefore, there is a significant amount of prior knowledge necessary for a student to understand most of the book chapters.

The book contains eighteen chapters organized into seven parts. Next, a summary for each chapter contained in the book is offered.

Chapter 1: Infrared Thermography for Land Mine Detection.
This chapter proposes a landmine detection approach with a thermal-infrared camera, taking into account physical characteristics of the soil, mines geometric and thermal properties (depth, height), and establishes a method to classify detected objects based on the thermal and geometric properties of the detected anomalies. The approach consists of three stages for data acquisition, preprocessing, and anomaly detection to classify the detected anomalies. The main emphasis is devoted to the detection

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and classification of buried objects in terms of geometric and thermal properties.

Chapter 2: Passive Polarimetric Information Processing for Target Classification
This chapter presents a brief overview of electromagnetic waves, polarization, and refraction, as well as the particulars of the sensor placement geometry necessary for successful measurement of the angle of incidence. Two methods for exploiting information that can be derived from passive polarimetric imagery are shown. First, a method for extracting 3D information and indices of refraction from a scene by means of a pair of polarimetric passive-imaging sensors is presented, and, for the second case, an approach to the extraction of attributes that remain invariant through different polarization transformation is presented.

Chapter 3: Vehicle Classification in Infrared Video Using the Sequential Probability Ratio Test
This chapter presents a single-look, vehicle classification system for infrared video. The approach supposes an existing algorithm to get ROIs (chips). The classifier takes a sequence of chips and extracts a signature from each chip based on a histogram of gradient orientations selected from a set of regions that cover the detected object. Signatures are matched with learned templates using multinomial pattern matching and its scores are fused by means of the sequential probability ratio test.

Chapter 4: Multiresolution Approach for Noncontact Measurements of Arterial Pulse Using Thermal Imaging
This chapter introduces an approach for noncontact and nonintrusive measurement of arterial pulse. A thermal IR camera is used to capture the heat pattern from superficial arteries and propose a blood vessel model to describe the pulsatile nature of the blood flow. A multiresolution wavelet-based signal analysis is applied to extract the pulse waveform. This requires a multiscale image decomposition to identify the subbands at which the pulse propagation is more pronounced and the noisy heat patterns are minimal.

Chapter 5: Coalitional Tracker for Deception Detection in Thermal Imagery
This chapter proposes a tracking method based on a network of independent particle filter trackers whose interactions are modeled using a coalitional game theory. The tracking is able to monitor the motion of the target's surface even in the presence of deformation or partial occlusion, and can work on both infrared and visual video without an explicit modeling. The trackers are viewed as players in a cooperative game in which the objective is to increase their influence by forming coalitions with others. The winning coalition is used to compute the state vector of the target and to propagate its influence onto the entire tracking network.

Chapter 6: Thermal Infrared Imaging in Early Breast Cancer Detection
This chapter provides a survey of recent achievements from pathophysiological-based understanding of IR images. The problems arising from the current techniques, such as mammography, magnetic resonance imaging, or computed tomography, are pointed out. IR techniques have been applied for breast cancer detection trying to find asymmetric hot spots and vascularity in IR images of the breasts. This phenomenon is due to the heat emanating from the high metabolic rate of cancer cells compared to the normal cells.

Chapter 7: Hyperspectral Image Analysis for Skin Tumor Detection
This chapter presents hyperspectral imaging of fluorescence for noninvasive detection of skin tumors. Hyperspectral imaging sensors collect two-dimensional image data in a number of narrow, adjacent spectral bands. Hyperspectral, fluorescence, signals are measured using a laser excitation source, and an acousto-optic filter is used to capture individual spectral bands images. Support vector machines with polynomial kernel functions provide decision boundaries to classify

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malignant tumor and normal tissue.

Chapter 8: Spectral Screened Orthogonal Subspace Projection for Target Detection in Hyperspectral Imagery

Spectral screening is defined as reducing the hyperspectral data to a representative subset of spectra. The spectra selection step calculates the distances between one spectra and each presented in the subset. Two algorithms were presented: Max SS reduces the overlap among the similarity sets for the spectra in the subsets, and Min SS tries to identify spectra that will be as close as possible to the selected ones and yet remain dissimilar. These algorithms are adapted for target detection by choosing as the initial spectrum in the subset the target signature. A few classification procedures are applied (OSP approach, KOSP, SA and SID) that result in classification images for the targets.

Chapter 9: Face Recognition in Low-Light Environments Using Fusion of Thermal Infrared and Intensified Imagery

This chapter presents a slightly modified version of the CSU Face Identification Evaluation System. The aim is to test the effect of illumination level in the face recognition task when using intensified near infrared (I2) imagery in conjunction with thermal infrared imagery. The results show that performance for I2 imagery was much better than the visible counterpart at the lowest light levels. At the brightest levels, the performance difference between visible and I2 became quite small (by applying some preprocessing).

Chapter 10: Facial Expression Recognition in Non-visual Imagery

This chapter presents two different approaches for an artificial vision system that allows FER using images of signals beyond the visible spectrum. The first one uses automatic feature localization based on interest point clustering combined with a PCA-based classification approach using thermal imagery which are: face localization, facial feature estimation, eigenimage analysis, and classification (SVM). The second uses an evolutionary learning algorithm that searches for an optimal set of ROIs and a set of texture features (such as entropy, contrast, homogeneity, correlation,…).

Chapter 11: Runway Positioning and Moving Object Detection Prior to Landing

This chapter describes an enhanced vision system (EVS) approach to provide accurate positioning of a runway and detecting moving objects on it from an onboard infrared sensor. This is based on a two-step process. First, the sensor image is analyzed to identify and segment the runway coordinates. These estimates are used to locate the runway structure and detect moving obstacles. Fitting models are used to match a runaway template (from synthetic images) to the detected edges. The predicted coordinated and detected edges are correlated to determine the location of the actual runway coordinates and to perform the dynamic stabilization of the image sequence in the obstacle detection process. And, secondly, the stabilized sequence is normalized to compensate for the global intensity variations. A background model is created to get an appearance model of the runway in order to identify moving objects by comparing the image sequence with the background model.

Chapter 12: Moving object Localization in Thermal Imagery by Forward-Backward Motion History Images

This chapter proposes an MHI-based method able to detect localization and shape of moving objects. The approach consists of three main modules: preprocessing, where the previous frame is stabilized into the coordinate system of the current frame; MHI generation, where the motion image is computed by frame difference, the forward MHI is computed as a function of the previous forward MHI and the computed difference, and similarly the backward MHI; object localization module, where the forward MHI is combined with the backward MHI to determine the moving objects in

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the current image.

Chapter 13: Feature-Level Fusion for Object Segmentation Using Mutual information

This chapter presents fusion as a feature selection problem solved by utilizing a selection criterion based on mutual information. The method starts with the detection of object features in one sensor (IR) and uses the other sensor (Visible) information to improve the quality of the original detection. For this, a feature representation based on contour fragments to capture object shape is defined. Fusion is approached as a variation of the mutual information feature selection problem. Mutual information is computed between features extracted from both sensors. And finally, a heuristic selection scheme is proposed to identify the set of contour features having the highest mutual information. Fusion is made by comparing a set of features with high relevance (if provided both redundant and complementary information).

Chapter 14: Registering Multimodal Imagery with Occluding Objects Using Mutual Information: Application to Stereo Tracking of Humans

This chapter introduces an approach to registering multimodal imagery that is able to register occluding objects at different disparities in the scene. A disparity voting (DV) technique that uses the accumulation of disparity values from sliding correspondence windows gives reliable and robust registration results for initial segmentations. Mutual information is used to perform images fusion. This is computed from two images entropy and their joint entropy.

Chapter 15: Thermal-Visible Video Fusion for Moving Target Tracking and Pedestrian Motion Analysis and Classification

This chapter presents a system for pedestrian surveillance. The approach integrates a tracker with spatial-temporal motion information by fusing color and IR videos. The system first builds a background model from a multimodal distribution of colors and temperatures. A particle filter scheme is constructed to maximize the probability of the scene model. Observation likelihoods of moving objects account for their three-dimensional locations with respect to the camera and occlusions by other objects or obstacles. A classifier based on periodic gait analysis is used to detect a symmetrical pattern in human gait (to differentiate humans from other moving objects).

Chapter 16: Multi Stereo-Based Pedestrian Detection by Daylight and Far-Infrared Cameras

This chapter presents a tetravision system for the detection of pedestrians using two far infrared and visible camera stereo pairs. Different approaches are shown for pedestrians' detection in the two image domains: warm area detection, vertical edge detection, and an approach based on the simultaneous computation of disparity space images in the two domains. These detection methods output a list of bounding boxes that enclose potential pedestrians. Later, taking the assumption that a human shape is mostly symmetrical, a symmetry-based process is used to refine and further filter out the ROIs. After that, a number of validators are used to evaluate the presence of a human inside each bounding box by searching characteristics such as head position.

Chapter 17: Real-Time Detection and Tracking of Multiple People in Laser Scan Frames

This chapter presents a tracker to detect and track multiple people in a crowded and open area in real time. Raw data are obtained that measures two legs for each person with multiple scanners, and a stable feature is extracted using accumulated distribution of successive laser frames. A probabilistic tracking model with a sequential inference process using a Bayesian rule is described (independent tracking with Kalman Filters and Joint tracking with RBMC-DAF). The chapter also presents an approach for laser and visual information fusion to deal with broken trajectories. Eleven control points are set to associate laser readings with image information.

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(Continued from page 13)

Chapter 18: On Boosted and Adaptive Particle Filters for Affine-Invariant Target Tracking in Infrared Imagery

This chapter shows a generalization of the usual white noise acceleration target model by introducing an affine transformation to model the target aspects. This transformation is parameterized by scalar variables and obeys a first-order Markov chain. The first action is a boosting step, by which a local detector is defined based on the most recent tracker output to include additional high-quality boosting particles. The second action is an adaptation step in which the system model self-adjusts to enhance tracking performance.

Register early....

ICPR 2010 is the twentieth conference of the International Association for Pattern Recognition (IAPR).

ICPR 2010 will be an international forum for discussions on recent advances in the fields of Computer Vision; Pattern Recognition and Machine Learning; Signal, Speech, Image and Video Processing; Biometrics and Human Computer Interaction; Multimedia and Document Analysis, Processing and Retrieval; Bioinformatics and Biomedical Applications.

ICPR 2010 will be held during August 23-26, 2010 at the Istanbul Convention & Exhibition Centre (ICEC), Istanbul, Turkey.

Important Upcoming Dates:

Deadline for Early Registration
May 14, 2010

Free Books!

The *IAPR Newsletter* is looking for reviewers for the books listed below.

If you have interest and some knowledge in the topic, email us with your mailing address. We will send you a copy of the book—which you may keep—and will expect in return a review for the *Newsletter*.

Arjan Kuijper, IAPR Newsletter *Associate Editor for Book Reviews*

The following titles are available to be reviewed:

Handbook of Pattern Recognition and Computer Vision, 4th Ed.
C. H. Chen and P. S. P. Wang, eds.
World Scientific, 2005
www.worldscibooks.com/compsci/5711.html

Image Processing: The Fundamentals, 2nd Ed.
Maria Petrou and Costas Petrou
Wiley, 2010
www.wiley.com/WileyCDA/WileyTitle/productCd-047074586X.html

Plus the following titles in Springer's Series Advances in Pattern Recognition

Support Vector Machines for Pattern Classification, 2nd Ed.
Shgeo Abe
Springer, 2010
www.springer.com/computer/image+processing/book/978-1-84996-097-7

Fundamentals of Computerized Tomography Image Reconstruction from Projections, 2nd Ed.
Gabor T. Herman
Springer, 2009
www.springer.com/computer/image+processing/book/978-1-85233-617-2

Guide to OCR for Indic Scripts Document Recognition and Retrieval
Venu Govindaraju and Srirangaraj Setlur, eds.
Springer, 2009
www.springer.com/new+&+forthcoming+titles+%28default%29/book/978-1-84800-329-3

NOTE: Other titles in Springer's Series Advances in Pattern Recognition are also available for review. Please see the list of New & Forthcoming titles at by clicking here.

Call for Chapters for a Proposed Book

Springer and HEP together are planning to publish a book *Pattern Recognition, Machine Intelligence and Biometrics (PRMIB)*, in memory of late Prof. King-Sun Fu, ***IAPR Founding President and IEEE-PAMI Founding Editor-in-Chief***, for his 81 birthday.

You are cordially invited to contribute a chapter for this book. The book is scheduled to come out in mid 2011, and final draft is due December 1, 2010.

Your contribution is very essential and important to the success of the proposed book.

For more details please refer to the website at:

http://web.mit.edu/patwang/www/CFP_PRMIB_KSFu_Memorial_Book.html

Sincerely,

Patrick Wang, patwang@ieee.org

Prof. Patrick S.P. Wang, Ph. D., ***IAPR and ISIBM Fellow*** (USA)

Conference Planner

*NOTE: This is not an exhaustive list of conferences. It is a list of conferences sponsored or endorsed by IAPR plus additional conferences that have been brought to the attention of the editor (these non-IAPR events are denoted with an *). The IAPR web site has more up-to-date information about IAPR conferences and a link to USC's Institute for Robotics and Intelligent Systems list of Computer Vision Conferences (A. Branzan Albu, ed.)*

Highlighting indicates that paper submission deadline has not yet passed. An asterisk * denotes a non-IAPR event.			
2010			
CRV 2010	*Seventh Canadian Conference on Computer and Robot Vision*	Ottawa, Ontario, Canada	31 May-2 Jun 10
DAS 2010	*Ninth IAPR International Workshop on Document Analysis Systems*	Cambridge, MA, USA	9-11 Jun 10
CIP 2010	*2nd International Workshop on Cognitive Information Processing*	Elba Island (Tuscany), Italy	14-16 Jun 10
ICMB 2010	*International Conference on Medical Biometrics*	Hong Kong	28-30 Jun 10
PAR2010 *	*Workshop on Pattern Analysis and Recognition*	Caen, France	28 Jun-2 Jul 10
ICISP 2010	*International Conference on Image and Signal Processing 2010*	Trois-Rivieres, Quebec, Canada	30 Jun-2 Jul 10
S+SSPR 2010	*Joint IAPR International Workshops on Structural and Syntactic Pattern Recognition (SSPR2010) and Statistical Techniques in Pattern Recognition (SPR2010)*	Cesme, Izmir, Turkey	18-20 Aug 10
PRRS 2010	*6th IAPR Workshop on Pattern Recognition in Remote Sensing*	Istanbul, Turkey	22 Aug 10
ICPR 2010	*20th International Conference on Pattern Recognition*	Istanbul, Turkey	23-26 Aug 10
DAGM 2010 *	*32nd Annual Pattern Recognition Conference of the German Association for Pattern Recognition*	Darmstadt, Germany	22-24 Sep 10
MCPR 2010	*2nd Mexican Conference on Pattern Recognition*	Puebla, Mexico	27-29 Sep 10
IIH-MSP 2010 *	*6th International Conference on Intelligent Information Hiding and Multimedia Signal Processing*	Darmstadt, Germany	15-17 Oct 10
CIARP 2010	*15th Iberoamerican Congress on Pattern Recognition*	São Paulo, Brazil	8-11 Nov 10
ACCV2010 *	*10th Asian Conference on Computer Vision*	Queensland, New Zealand	8-12 Nov 10
IWCF 2010	*4th International Workshop on Computational Forensics*	Tokyo, Japan	11-12 Nov 10
ICFHR 2010	*12th International Conference on Frontiers in Handwriting Recognition*	Kolkata, India	16-18 Nov 10
2011			
MMM 2011 *	*17th International Conference on Multimedia Modeling*	Taipei, Taiwan	5-7 Jan 11
DRR 2011 *	*Document Recognition and Retrieval XVIII Part of the IAS&T/SPIE International Symposium on Electronic Imaging*	San Francisco, California, USA	23-27 Jan 11
GbR 2011	*TC-15 Workshop on Graph-based Representations in Pattern Recognition*	Münster, Germany	18-20 May 11
SCIA 2011	*17th Scandinavian Conference on Image Analysis*	Ystad Saltsjöbad, Sweden	23-27 May 11
MVA 2011	*12th IAPR Conference on Machine Vision Applications*	Nara City, Japan	6-8 Jun 11
ICDAR 2011	*11th International Conference on Document Analysis and Recognition*	Beijing, China	18-21 Sep 11