

# ICDIP 2015

Los Angeles, USA

April 09-10, 2015

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## Welcome to ICDIP 2015

**Dear Professors and distinguished delegates,**

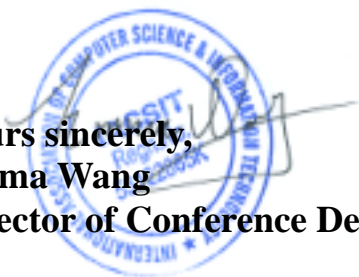
**Welcome to ICDIP 2015. On behalf of the conference organizing committees, I would like to thank all the conference Chairs, program chairs and the technical committees. Their high competence and professional advice enable us to prepare the high-quality program. We hope all of you have a wonderful time at the conference and also in Los Angeles.**

**We believe that by this excellent conference, you can get more opportunity for further communication with researchers and practitioners with the common interest in Digital Image Processing.**

**In order to hold more professional and significant international conferences, your suggestions are warmly welcomed. We look forward to meeting you again next time.**

**Best Regards!**

**Yours sincerely,  
Emma Wang  
Director of Conference Department, IACSIT**



# **Announcement**

- ✧ Accepted papers of ICDIP 2015, after presentation will be will be selected and published into the following Publications: Society of Photo-Optical Instrumentation Engineers (SPIE).

\*Attention:

One excellent presentation will be selected from each session and the author of excellent presentation will be awarded the certificate after the session is over.

**Organizing Committees**

## Conference Chairs & Keynote Speakers



**Prof. Charles M. Falco**  
**University of Arizona, USA**

Professor Charles M. Falco has joint appointments in Optical Sciences and Physics at the University of Arizona where he holds the UA Chair of Condensed Matter Physics. He is a Fellow of the American Physical Society (APS), the Institute of Electrical and Electronics Engineers (IEEE), the Optical Society of America (OSA), and the Society of Photo-optical Instrumentation Engineers (SPIE), has published more than 250 scientific manuscripts, co-edited two books, has seven U.S. patents, and given over 400 invited talks at conferences, research institutions, and cultural organizations in 30 countries. In addition to work on digital imaging and computerized image analysis, he conducts research on x-ray optics, magnetism, and the growth and structure of thin films.



**Dr. Haowei Liu**  
**Intel Corporation, Santa Clara, CA**

Dr. Haowei Liu received his Ph.D. from the University of Washington in 2011. He is currently a senior researcher in Intel, Santa Clara, researching and developing computer vision applications for personal computers. His research work has resulted in several advanced prototypes shown and demonstrated in the VP keynotes of the major industry conference - Consumer Electronics Show. He is also the author of dozens of invention disclosures, patents and technical publications. He serves as a program committee member for several international conferences and associate editor for two journals. He has been an IEEE senior member since June 2014.



**Prof. Patrick S. P. Wang**  
**Computer and Information Science at Northeastern University, USA**

Patrick S. P. Wang, Fellow of IAPR, ISIBM and WASE, is professor of Computer and Information Science at Northeastern University, USA, Shanghai East China Normal University Zi-Jiang Visiting Chair Professor, NSF Visiting Chair Professor at NTUST, Taipei, Taiwan, research consultant at MIT Sloan School, and adjunct faculty of computer science at Harvard University. He received PhD in C.S. from Oregon State University, M.S. in I.C.S. from Georgia Institute of Technology, M.S.E.E. from National Taiwan University and B.S.E.E. from National Chiao Tung University (Hsin-chu campus, Taiwan).

As IEEE and ISIBM Distinguished Achievement Awardee, Dr. Wang was on the faculty at University of Oregon and Boston University, and senior researcher at Southern Bell, GTE Labs and Wang Labs. Dr. Wang was Otto-Von-Guericke Distinguished Guest Professor of Magdeburg University, Germany, and iCORE (Informatics Circle of Research Excellence) visiting professor of University of Calgary, Canada, Honorary Advisor Professor for China's Sichuan University, Xiamen University, and Guangxi Normal University, Guilin, Guangxi. In addition to his research experience at MIT AI Lab, Dr. Wang has been visiting professor and invited to give lectures, do research and present papers in a number of countries from Europe, Asia and many universities and industries in the U.S.A. and Canada. Dr. Wang has published over 200 technical papers and 26 books in Pattern Recognition, A.I. Biometrics and Imaging Technologies and has 3 OCR patents by US and Europe Patent Bureaus. One of his books is so important and widely cited that

USA Department of Homeland Security (DHS) use it as reference for Call For Proposals 2010.

For details please refer to DHS website: Image Pattern Recognition – Synthesis and Analysis of Biometrics (WSP): <https://www.sbir.dhs.gov/PastSolicitationDownload.asp#101005>

As IEEE senior member, he has organized numerous international conferences and workshops including conference co-chair of the 18th IAPR ICPR (International Conference on Pattern Recognition) in 2006, Hong Kong, China, and served as reviewer for many journals and NSF grant proposals. Prof. Wang is currently founding Editor-in-Chief of IJPRAI (Int. J. of Pattern Recognition and A.I.), and Machine Perception and Artificial Intelligence Book Series by World Scientific Publishing Co. and Imperial College Press, London, UK, and elected chair of IAPR-SSPR (Int. Assoc. for P.R.). Dr. Wang has been invited to give talks in many International Conferences including AIA2007, Innsbruck, Austria, IAS2007, Manchester, UK, IEEE SMC2007, 2009, 2010, Montreal, San Antonio, Istanbul respectively, WorldComp2010, Las Vegas, USA, CIS2007, Harbin, China, eForensics2008, Adelaide, Australia, ISI2008, Taipei, Taiwan, BroadCom2008, Pretoria, South Africa, VISAPP2009, Lisboa, Portugal, UKSim2011,

Cambridge, UK, and IADIS2010, 2011, Freiburg, Germany, and Roma, Italy, respectively. Prof. Wang received IEEE Distinguished Achievement Award at IEEE-BIBE2007 at Harvard Medical, for Outstanding Contributions in Bioinformatics and Bioengineering. In addition to his technical achievements and contributions, Prof. Wang has been also very active in community services, and has written several articles on Du Fu, Li Bai's poems, Verdi, Puccini, Bizet, and Wagner's operas, and Mozart, Beethoven, Schubert and Tchaikovsky's symphonies. A collection of selected proses was published in his book "Harvard Meditation Melody" by Jian-Shing Pub. Co., Taipei, Taiwan, which won best publication award by Taiwan.

## Program Committee Chairs



**Dr. Krzysztof Koszela**  
**Poznan University of Life Sciences, Poland**



**Dr. Ismail Rakip Karas**  
**Karabük University, Turkey**



# **Instruction for Oral Presentation**

## **Devices Provided by the Conference Organizer:**

- ✧ Laptop (with MS-Office & Adobe Reader)
- ✧ Projector & Screen
- ✧ Laser Sticks

## **Materials Provided by the Presenters:**

- ✧ PowerPoint or PDF files

## **Duration of each Presentation (Tentatively):**

- ✧ Regular oral presentation: about 15 minutes (including Q&A)
- ✧ Keynote speech: about 40 minute (including Q&A)

## **Notice:**

**Please keep your belongings (laptop and camera etc) with you!**

# Technical Program at a Glance

<b>April. 09</b>	<i>Lobby</i>	<b>10:00-17:00</b>	<b>Registration</b>		
<b>April 10 9:00-12:30</b>	<i>Corinthian</i>	<b>9:00-9:10</b>	<b>Opening Remarks</b>	<b>Prof. Charles M. Falco</b>	
		<b>9:10-9:50</b>	<b>Plenary Speech I</b>	<b>Prof. Dr. Haowei Liu</b>	
		<b>9:50-10:30</b>	<b>Plenary Speech II</b>	<b>Prof. Patrick S. P. Wang</b>	
	<i>Grecian</i>	<b>10:30-10:50</b>	<i>Group Photo &amp; Coffee Break</i>		
	<i>Corinthian</i>	<b>10:50-11:30</b>	<b>Plenary Speech III</b>	<b>Prof. Charles M. Falco</b>	
		<b>11:30-12:30</b>	<b>Session I</b>	<b>4 presentations</b>	
<b>April 10 12:30-13:30</b>	<i>Lunch Buffet @ Restaurant</i>				
<b>April 10 13:30-18:50</b>	<i>Corinthian</i>	<b>13:30-16:00</b>	<b>Session I</b>	<b>12 presentations</b>	
	<i>Moroccan</i>	<b>13:30-16:00</b>	<b>Session I</b>	<b>12 presentations</b>	
	<i>Roman</i>	<b>13:30-16:00</b>	<b>Session II</b>	<b>10 presentations</b>	
	<i>Grecian</i>	<b>13:30-16:00</b>	<b>Session II</b>	<b>10 presentations</b>	
	<i>Grecian</i>	<b>16:00-16:20</b>	<i>Coffee Break</i>		
	<i>Corinthian</i>	<b>16:20-18:50</b>	<b>Session III</b>	<b>15 presentations</b>	
	<i>Moroccan</i>	<b>16:20-18:50</b>	<b>Session IV</b>	<b>13 presentations</b>	
	<i>Roman</i>	<b>16:20-18:50</b>	<b>Session IV</b>	<b>14 presentations</b>	
<b>April 10 9:00-18:50</b>	<b>Poster Presentations (13 presentations) Venue: <i>Corinthian, Moroccan, Roman,</i></b>				
<b>April 10 19:30-20:30</b>	<i>Dinner Banquet @ Restaurant</i>				

# Detailed Technical Program

## Schedule for April 9

### *Onsite registration*

#### Day 1

Time	10:00-17:00
Event	Arrival, registration and conference materials collection
Location	Venue: Millennium Biltmore Hotel Los Angeles
Address	506 South Grand Avenue, Los Angeles, CA, 90071
Telephone	Tel: (1) 213 624 1011 or (86)15208385669
Staff	Yoyo Yang

#### **Note:**

**(1) You can also register at any working time during the conference**

**(2) Certificate of Participation can be collected at the registration counter.**

**(3) The organizer won't provide accommodation, and we suggest you make an early reservation.**

**(4) Please get the notification for your paper printed out and it is required when you register on desk.**

# Schedule for April 10

## Plenary Speeches Corinthian

### Day 2

09:00-09:10	<p><b>Opening Remarks</b></p> <p><b>Prof. Charles M. Falco</b> <i>University of Arizona, USA</i></p>
<p>09:10-09:50 <i>Plenary Speech I</i></p>	<p><b>Topic: 3D Imaging and Its Applications: Intel's Next Road Map.</b></p> <p><b>Dr. Haowei Liu</b> <i>Intel Corporation, Santa Clara, CA</i></p> <p><b>Abstract:</b> Ever since the successful launch of Microsoft Kinect, different 3D sensing applications or technologies have been developed. Even with the success of Kinect, it is only suitable for mid-range to long range applications, not for regular PC usage. In Intel, we are attempting to reinvigorate the PC industry by bringing the 3D imaging technology and enable the applications to the PC users. In this talk, I will introduce what Intel is up to in this regard and demonstrates applications built on top the technology.</p>
<p>9:50-10:30 <i>Plenary Speech II</i></p>	<p><b>Topic: Similarity-Based IPR and e-Forensics ---Modeling and Simulation in HC Interactive Learning Environment</b></p> <p><b>Prof. Patrick S. P. Wang</b> <i>Professor of Computer and Information Science, Northeastern University, USA</i></p> <p><b>Abstract:</b> This seminar deals with fundamental aspects of Similarity, Semantics, Ambiguity, Intelligent Pattern Recognition (IPR) and applications. It basically includes the following: Overview of 3D Biometric Technology and Applications, Importance of Security: A Scenario of Terrorists Attack,, What are Biometric Technologies? Biometrics: Analysis vs Synthesis, Analysis: Concept of Syntax. Semantics, Ambiguity and Interactive Pattern Recognition, Importance of Measurement, How it works: Fingerprint Extraction and Matching, Iris, and Facial Analysis, Authentication Applications, Thermal Imaging: Emotion Recognition. Synthesis in Biometrics, Modeling and Simulation, and more Examples and Applications of 3D Biomedical Imaging in Interactive Web/Video Networking Fuzzy Learning Environment. Finally, some future research directions are discussed.</p>

<b>10:30-10:50</b>	<i>Group Photo &amp; Coffee Break</i>
<b>10:50-11:30</b> <i>Plenary Speech III</i>	<p><b>Topic: Computerized Image Analysis: Examples and Insights from 1000 Years of Optical Projections</b></p> <p><b>Prof. Charles M. Falco</b> <i>College of Optical Sciences and Department of Physics University of Arizona, Tucson USA</i></p> <p><b>Abstract:</b> The hands and mind of an artist are intimately involved in the creative process of image formation, intrinsically making paintings complex to analyze. In spite of this difficulty, several years ago the painter David Hockney and I identified optical evidence within a number of paintings that demonstrated artists including Jan van Eyck used optical projections as early as c1425 as aids for producing portions of their images. In the course of our work, Hockney and I developed insights that I have been applying to a new approach to computerized image analysis. One direct result has been to identify from Impressionist paintings by Monet, Pissarro, Renoir and others the precise locations the artists stood when making a number of their paintings. Indirect results have been the development of a high resolution infrared camera, and a project to produce filters for a multispectral camera presently scheduled to begin capturing images from Jupiter's moon Europa in 2026. Acknowledgments: I am grateful to David Hockney for the many invaluable insights into imaging gained from him in our collaboration, and to the support of ARO and DARPA.</p>

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**Session I - Image Processing Technology and Applications**

IP001, IP002, IP004, IP005

Corinthian

**Time: 11:30-12:30**

**Session Chair : Ismail Rakip Karas**

**Karabuk University, Turkey**

IP001	<p><b>Application of Multi-Scale Singular Vector Decomposition to Vessel Classification in Overhead Satellite Imagery</b>  <b>R.Izmailov</b>, D.Bassu, A.McIntosh, L.Ness, D.Shallcross  Applied Communication Sciences, 150 Mt Airy Road, Basking Ridge, NJ  USA 07920-2021</p> <p><b>Abstract.</b> Creation and selection of relevant features for image classification is a process requiring significant involvement of domain knowledge. It is thus desirable to cover at least part of that process with semi-automated techniques capable of discovering and visualizing those geometric characteristics of images that are potentially relevant to the classification objective. In this work, we propose utilizing the multi-scale singular value decomposition (MSVD), which can be efficiently run on large high-dimensional datasets. We apply this technique to create a multi-scale representation of overhead satellite images of various types of vessels, with the objective of identifying those types. We augment the original set of pixel data with features obtained by applying the MSVD to multi-scale patches of the images. The result is then processed using a linear Support Vector Machine (SVM) algorithm. The classification rule obtained is significantly better than the one based on the original pixel space. The generic nature of the MSVD mechanism and standard mechanisms used for classification (SVM) suggest a wider utility of the proposed approach.</p>
IP002	<p><b>An Image Stitching Method Based on Eigenvalues Search</b>  <b>Ran Yan</b>, Lichao Zhang, Yisheng Zhang, Zuye Zhao  State Key Laboratory of Materials Processing and Mold&amp;Die Technology,  Huazhong University of Science and Technology, Wuhan 430074, P.R.  China</p> <p><b>Abstract.</b> As the limit of the number of pixels and the size of the sensor, the accuracy of a single pixel cannot satisfy the demands on the machining precision while we capture only one picture of a large component. In this</p>

	<p>paper, we propose a new rapid image stitching method to solve this problem which is based on the positions of the images and the eigenvalues search method. This method divides the images to a series of grid points at the same step length, and stitches the images into a composite image. The experiment results show that the precision of the stitching process is <math>\pm 5</math> microns which can meet the requirements of manufacturing.</p>
IP004	<p><b>A Moving Foreground Objects Extraction Method under Camouflage Effect</b>  <b>Zhu Zhen-zhen</b>, Li Jing-yue, Yang Si-si, Zhou Hong          Dept. of Instrument Science and Engineering, Zhejiang University, Hangzhou 310027, China</p> <p><b>Abstract.</b> This paper discusses the problem of segmenting foreground objects with apertures or discontinuities under camouflage effect and the optical physics model is introduced into foreground detection. A moving foreground objects extraction method based on color invariants is proposed in which color invariants are used as descriptors to model the background and do the foreground segmentation. It makes full use of the color spectral information and spatial configuration. Experimental results demonstrate that the proposed method performs well in various situations of color similarity and meets the demand of real-time performance.</p>
IP005	<p><b>A Passive Technique for Detecting Copy-Move Forgery with Rotation based on Polar Complex Exponential Transform</b>  <b>Mahmoud Emama</b>, Qi Hana , Liyang Yua, Ye Zhangb and Xiamu Niua          School of Computer Science and Technology, Harbin Institute of Technology, Harbin, China</p> <p><b>Abstract.</b> Copy-move is one of the most common methods for image manipulation. Several methods have been proposed to detect and locate the tampered regions, while many methods failed when the copied regions are rotated before being pasted. A rotational invariant detecting method using Polar Complex Exponential Transform (PCET) is proposed in this paper. Firstly, the original image is divided into overlapping circular blocks, and PCET is employed to each block to extract the rotation-invariant robust features. Secondly, the Approximate Nearest Neighbors (ANN) of each feature vector are collected by Locality Sensitive Hashing (LSH). Experimental results show that the proposed technique is robust to rotation.</p>

<b>12:30-13:30</b>	<b><i>Lunch @ Restaurant</i></b>
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**Session I - Image Processing Technology**

IP003, IP006, IP007, IP008, IP010, IP012, IP017, IP019, IP021, IP022, IP029, IP034

**Corinthian****Time: 13:30-16:00**

**Session Chair: Chyi-Wen Hwang**  
**Hsiuping University of Science and Technology, Taiwan**

IP003	<p><b>A Moving Foreground Objects Extraction Method under Camouflage Effect</b>  <b>Zhu Zhen-zhen</b>, Li Jing-yueb, Yang Si-sia and Zhou Honga  Dept. of Instrument Science and Engineering, Zhejiang University, Hangzhou, China</p> <p><b>Abstract.</b> This paper discusses the problem of segmenting foreground objects with apertures or discontinuities under camouflage effect and the optical physics model is introduced into foreground detection. A moving foreground objects extraction method based on color invariants is proposed in which color invariants are used as descriptors to model the background and do the foreground segmentation. It makes full use of the color spectral information and spatial configuration. Experimental results demonstrate that the proposed method performs well in various situations of color similarity and meets the demand of real-time performance.</p>
IP006	<p><b>An improved peer group method to filter impulsive noise for color images</b>  Yuhong Zhu, Huageng Jiang and <b>Jinting Feng</b>  Jilin University Jilin University Jilin University</p> <p><b>Abstract.</b> This paper presents an improved filter method based on the lately proposed method of IFPGF[1] which is peer group-based. The IFPGF method improves the trade-off between computational efficiency and filtering quality of previous peer group-based methods and gains a good filtering quality at relatively low density of noisy pixels. But when the noisy density goes high(<math>\geq 20\%</math>), the IFPGF method cannot work well. So in this paper, we propose an improved method to fix the drawbacks on filtering the salt-and-pepper impulsive noise. Experimental results suggest that the proposed method is able to outperform the classical vector filters and the recent proposed peer group-based filters, including IFPGF.</p>



IP007	<p><b>An Improved Sparse LS-SVR For Estimating Illumination</b>  <b>Zhenmin zhu</b>, zhaokang lv , baifen liu  School of Electrical and Electronic Engineering Science and Engineering,East China Jiao Tong University, NanChan, China</p> <p><b>Abstract.</b> Support Vector Regression performs well on estimating illumination chromaticity in a scene.Then the concept of Least Squares Support Vector Regression has been put forward as an effective,statistical and learning prediction model.Although it is successful to solve some problems of estimation,it also has obvious defects.Due to a large amount of support vectors which are chosen in the process of training LS-SVR , the calculation become very complex and it lost the sparsity of SVR.In this paper,we get inspiration from WLS-SVM(Weighted Least Squares Support Vector Machines) and a new method for sparse model.A Density Weighted Pruning algorithm is used to improve the sparsity of LS-SVR and named SLS-SVR(Sparse Least Squares Support Vector Regression).The simulation indicates that only need to select 30 percent of support vectors,the prediction can reach to 75 percent of the original one.</p>
IP008	<p><b>Novel Iterative Algorithm to Text Segmentation for Web Born-digital Images</b>  Zhigang Xu, <b>Yuesheng Zhu</b>, Ziqiang Sun, and Zhen Liu  Communication &amp; Information Security Lab Institute of Big Data Technologies, Shenzhen Graduate School, Peking University, Shenzhen, China</p> <p><b>Abstract.</b> Since web born-digital images have low resolution and dense text atoms, text region over-merging and miss detection are still two open issues to be addressed. In this paper a novel iterative algorithm is proposed to locate and segment text regions. In each iteration, the candidate text regions are generated by detecting Maximally Stable Extremal Region (MSER) with diminishing thresholds, and categorized into different groups based on a new similarity graph, and the texted region groups are identified by applying several features and rules. With our proposed overlap checking method the final well-segmented text regions are selected from these groups in all iterations. Experiments have been carried out on the web born-digital image datasets used for robust reading competition in ICDAR 2011 and 2013, and the results demonstrate that our proposed scheme can significantly reduce both the number of over-merge regions and the lost rate of target atoms, and the overall performance outperforms the best compared with the methods shown in the two competitions in term of recall rate and f-score atthe cost of slightly higher computational complexity.</p>
IP010	<p><b>Detect Ships Using Saliency in Infrared Images with Sea-sky Background</b>  <b>Fang Wu</b>, Chengfei Zhu, Wenfang Xue  The Integrated Information System Research Center, Institute of Automation,</p>

	<p>Chinese Academy of Sciences, Beijing, 100190, China</p> <p><b>Abstract.</b> Nowadays, ship detection in sea-sky background is not only useful in maritime visual surveillance, but also helpful in maritime search and rescue. Since ships are salient objects in infrared images with sea-sky background, we present a novel and effective algorithm based on saliency for ship detection in this situation. Our algorithm adopts global saliency, local saliency and background prior to generate saliency maps. Ships are finally segmented in saliency maps. Our algorithm is compared with four classic salient object detection algorithms. And experimental results show our algorithm outperforms the other four algorithms in qualitative and quantitative terms.</p>
IP012	<p><b>Efficient Threshold for Volumetric Segmentation</b>  <b>Dumitru Dan BURDESCU</b>, Marius BREZOVAN, Liana STANESCU, Cosmin STOICA SPAHIU, Daniel EBANCA  Computers and information Technology Department, Faculty of Automatics, Computers and Electronics, University of Craiova, Craiova, Dolj, Romania</p> <p><b>Abstract.</b> Image segmentation plays a crucial role in effective understanding of digital images. However, the research on the existence of general purpose segmentation algorithm that suits for variety of applications is still very much active. Among the many approaches in performing image segmentation, graph based approach is gaining popularity primarily due to its ability in reflecting global image properties. Volumetric image segmentation can simply result an image partition composed by relevant regions, but the most fundamental challenge in segmentation algorithm is to precisely define the volumetric extent of some object, which may be represented by the union of multiple regions. The aim in this paper is to present a new method to detect visual objects from color volumetric images and efficient threshold. We present a unified framework for volumetric image segmentation and contour extraction that uses a virtual tree-hexagonal structure defined on the set of the image voxels. The advantage of using a virtual tree-hexagonal network superposed over the initial image voxels is that it reduces the execution time and the memory space used, without losing the initial resolution of the image.</p>
IP017	<p><b>Image Processing and Applications - Based on visualizing Navigation Service</b>  <b>Chyi-Wen Hwang</b>  Hsiuping University of Science and Technology, Taiwan</p> <p><b>Abstract.</b> When facing the "overabundant" of semantic web information, in this paper, the researcher proposes the hierarchical classification and visualizing RIA (Rich Internet Application) navigation system: Concept Map (CM) + Semantic Structure (SS) + the Knowledge on Demand (KOD) service. The aim of the Multimedia processing and empirical applications testing, was to investigating the utility and usability of this visualizing navigation strategy</p>

	<p>in web communication design, into whether it enables the user to retrieve and construct their personal knowledge or not.</p> <p>Furthermore, based on the segment markets theory in the Marketing model, to propose a User Interface (UI) classification strategy and formulate a set of hypermedia design principles for further UI strategy &amp; e-learning resources in semantic web communication.</p> <p>These research findings:</p> <p>(1) Irrespective of whether the simple declarative knowledge or the complex declarative knowledge model is used, the “CM + SS + KOD navigation system” has a better cognition effect than the “Non CM + SS + KOD navigation system”. However, for the” No web design experience user”, the navigation system does not have an obvious cognition effect.</p> <p>(2) The essential of classification in semantic web communication design: Different groups of user have a diversity of preference needs and different cognitive styles in the CM + SS + KOD navigation system.</p>
IP019	<p><b>Image compression based on GPU encoding</b>  <b>Zhaofeng Bai</b><sup>1</sup>, Yuehong Qiu  Xi'an Institute of Optics and Precision Mechanics, Xi' an, 710119, University of Chinese Academy of Sciences, Beijing, 100049, China</p> <p><b>Abstract.</b> With the rapid development of digital technology, the data increased greatly in both static image and dynamic video image. It is noticeable how to decrease the redundant data in order to save or transmit information more efficiently. So the research on image compression becomes more and more important. Using GPU to achieve higher compression ratio has superiority in interactive remote visualization. Contrast to CPU, GPU may be a good way to accelerate the image compression. Currently, GPU of NIVIDIA has evolved into the eighth generation, which increasingly dominates the high-powered general purpose computer field. This paper explains the way of GPU encoding image. Some experiment results are also presented.</p>
IP021	<p><b>Saliency Detection Based on Multi-instance Images Learning</b>  <b>Wan Shouhong</b>, Jin Peiquan, Yue Lihua, Huang Qian  Institute of Compute Science and Technology, University of Science and Technology of China Key Laboratory of Electromagnetic Space Information, Chinese Academy of Sciences, Hefei, Anhui, China</p> <p><b>Abstract.</b> Existing visual saliency detection methods are usually based on single image, however, without priori knowledge, the contents of single image are ambiguous, so visual saliency detection based on single image can't extract region of interest. To solve it, we propose a novel saliency detection based on multi-instance images. Our method considers human's visual psychological factors and measures visual saliency based on global contrast, local contrast and sparsity. It firstly uses multi-instance learning to get the center of</p>

	<p>clustering, and then computes feature relative dispersion. By fusing different weighted feature saliency map, the final synthesized saliency map is generated. Comparing with other saliency detection methods, our method increases the rate of hit.</p>
IP022	<p><b>Detecting of Copy-Move Forgery in Digital Images Using Fractional Fourier Transform</b>  Renqing Yang, Zhengyao Bai<sup>1</sup>, Liguo Yin and <b>Hao Gao</b>  School of Information Science and Engineering, Yunnan University, Kunming, 650091, China</p> <p><b>Abstract.</b> Copy-move forgery is one of the most simple and commonly used forging methods, where a part of image itself is copied and pasted on another part of the same image. This paper presents a new approach for copy-move forgery detection where fractional Fourier transform (FRFT) is used. First, the 1-level discrete wavelet transform (DWT) of the forged image is to reduce its dimension. Next, the low frequency sub-band is divided into overlapped blocks of equal size. The fractional Fourier transform of each block is calculated and the vector of the coefficients is constructed. All feature vectors are sorted using lexicographical order. Finally, the difference of adjacent feature vectors is evaluated and employed to locate the duplicated regions which have the same feature vectors. Experimental results show that the proposed method is effective in detection of the copy-move forgery regions.</p>
IP029	<p><b>IR Radiative Properties Modeling and Feature Extraction Method on Ballistic Target</b>  <b>Liang Huang</b>, Xin Li, Junliang Liu  Science and Technology on Automatic Target Recognition Laboratory, National University of Defense Technology, Changsha 410073, China.</p> <p><b>Abstract.</b> Due to physical structures and motion attitudes, the IR radiative properties of ballistic targets are different during their flights. However, such differences cannot be easily detected by high-speed observing platform under the influence of detector noise, consequently causing difficulties with the classification and recognition of targets. This paper presents a modeling and simulation of the IR radiative properties of ballistic targets, provides a discussion on the variations in the IR radiative properties among different targets, and proposes a method for a parametric expression of the grayscale time series of the targets under noise. The experimental result indicates that by constructing a hybrid model of tendency, period and noise, an effective feature of the time series can be extracted using de-noising, curve-fitting, and frequency transformation, which ultimately contributes to the classification of targets.</p>
IP034	<p><b>Image Thresholding based on Adjusted Rand Index</b>  Lulu Fang, <b>Yaobin Zou</b>, Fangmin Dong, Bangjun Lei, Shuifa Sun</p>

Hubei Key Laboratory of Intelligent Vision Based Monitoring for Hydroelectric Engineering, China Three Gorges University, Yichang, Hubei 443002, China

**Abstract.** This paper proposes a new image thresholding method by integrating Multi-scale Gradient Multiplication (MGM) transformation and Adjusted Rand Index (ARI). The proposed method evaluates the optimal threshold by computing the accumulation similarity between two image collections from the perspective of global spatial attributes of images. One of the image collections are obtained by binarizing the original gray level image with each possible gray level. The others are the reference images, produced by binarizing MGM image. The MGM image is the result of applying MGM transformation to the original image. ARI is a similarity measurement in statistics, particularly in data clustering, which can be readily computed based on two image matrices. To be more accurate, the optimal threshold is determined by maximizing the accumulation similarity of ARI. Comparisons with three well established thresholding methods are depicted for numbers of real-world images. Experiment results demonstrate the effectiveness and robustness of the proposed method.

### Session I - Image Processing Technology and Applications

IP037, IP042, IP045, IP051, IP053, IP068, IP101, IP109, IP215, IP302, IP313

**Venue: Moroccan**

**13:30-16:00**

**Session Chair: Dr. Krzysztof Koszela**  
**Poznan University of Life Sciences, Poland**

IP037

#### **Local Surface Curvature Analysis based on Reflection Estimation**

Qinglin Lu, **Olivier Laligant**, Eric Fauveta and Anastasia Zakharovab  
**INSA Rouen LMI EA3226, France**

**Abstract.** In this paper, we propose a novel reflection based method to estimate the profile of specular surface. For a calibrated scene with a fixed straight line light source, the line is reflected by the surface to image plane of a camera. Then the local geometry between the surface and reflected line is estimated. Firstly, in order to end relationship among the object position, object surface curvature and line reflection

	<p>curvature, we study the fundamental theory of the geometry between a hemisphere and a line source. Then we extend our approach to the surface with arbitrary curvature. Experiments are conducted with spherical surface and paraboloid surface. Results show that our method is able to obtain surface curvature and reection position on the surface merely by measuring the curvature of the reected line.</p>
IP042	<p><b>Research of Image Matching Algorithm Based on Local Features</b>  <b>Sun Wei</b>  The Department of Mechanical Engineering, College of Nuclear Technology &amp; Automation Engineering, Chengdu University of Technology ,Chengdu 610059,China</p> <p><b>Abstract.</b> For the problem of low efficiency in SIFT algorithm while using exhaustive method to search the nearest neighbor and next nearest neighbor of feature points, this paper introduces K-D tree algorithm, to index the feature points extracted in database images according to the tree structure, at the same time, using the concept of a weighted priority, further improves the algorithm, to further enhance the efficiency of feature matching.</p>
IP045	<p><b>Pattern Characterization and Connectivity Analysis for Edge Feature Extraction</b>  <b>Bo Jiang</b>  Division of Applied Stem Cell Automation, Guangzhou Institutes of Biomedicine and Health, Chinese Academy of Sciences, 190 Kai Yuan Avenue, Science Park, Guangzhou, Guangdong, China</p> <p><b>Abstract.</b> The purpose of detecting sharp changes in image brightness is to capture important events and changes in properties of the world. The accuracy of edge detection methods in image processing determines the eventual success or failure of computerized analysis procedures which follow the initial edge detection determinations such as object recognition. Generally, edge detectors have been designed to capture simple ideal step functions in image data, but real image signal discontinuities deviate from this ideal form. Another three types of deviations from the step function which relate to real distortions occurring in natural images are examined according to their characteristics. These types are impulse, ramp, and sigmoid functions which respectively represent narrow line signals, simplified blur effects, and more accurate blur modeling. General rules for edge pattern characterization based upon the classification of edge types into four categoriesramp, impulse, step, and sigmoid (RISS) are developed from this analysis. Additionally, the proposed algorithm performs connectivity analysis on edge map to ensure that small, disconnected edges are removed. The performance analysis on experiments supports that the proposed edge detection algorithm with edge pattern analysis and characterization does lead to more effective edge detection and localization with improved accuracies. To expand the proposed algorithm into real-time applications, a parallel implementation on a graphics</p>

	<p>processing unit (GPU) is presented in this paper. For the various configurations in our test, the GPU implementation shows a scalable speedup as the resolution of an image increases. We also achieved 14 frames per second in real-time processing (1280×720).</p>
IP051	<p><b>Research on non rigid registration algorithm of DCE-MRI based on mutual information and optical flow</b>  <b>Shihua Yua</b>, Rui Wangb, Kaiyu Wangc, Mengmeng Xic, Jiashuo Zhengc, Hui Liuc  School of computer science and technology, Hulunbuir College, Hulun Buir 021008, PR China</p> <p><b>Abstract.</b> Image matching plays a very important role in the field of medical image, while the two image registration methods based on the mutual information and the optical flow are very effective. The experimental results show that the two methods have their prominent advantages. The method based on mutual information is good for the overall displacement, while the method based on optical flow is very sensitive to small deformation. In the breast DCE-MRI images studied in this paper, there is not only overall deformation caused by the patient, but also non rigid small deformation caused by respiratory deformation. In view of the above situation, the single-image registration algorithms cannot meet the actual needs of complex situations. After a comprehensive analysis to the advantages and disadvantages of these two methods, this paper proposes a registration algorithm of combining mutual information with optical flow field, and applies subtraction images of the reference image and the floating image as the main criterion to evaluate the registration effect, at the same time, applies the mutual information between image sequence values as auxiliary criterion. With the test of the example, this algorithm has obtained a better accuracy and reliability in breast DCE-MRI image sequences.</p>
IP053	<p><b>Infrared and Visible Image Fusion Based on Shearlet Transform and Image Enhancement</b>  <b>Zhang Xiuqiong</b>, Yu Li and Huang Guo  Laboratory of Intelligent Information Processing and Application, Computer Science College, Leshan Normal University, Leshan 614000, China</p> <p><b>Abstract.</b> In order to fuse the visible and infrared images captured in low visibility conditions, a method based on shearlet transform (ST) and image enhancement is proposed in this paper. Shearlets are equipped with a simple mathematical structure similar to wavelets, which are associated to a multi-scale analysis. An image could be decomposed by ST in any scale and any direction, in which shearlets show a greater ability to fully capture the intrinsic geometrical features of multidimensional phenomena. Firstly, the infrared and visible images are decomposed by ST respectively; meanwhile all the sub-images of R, G and B channels of visible image are enhanced. Secondly, the statistical character of the directional coefficients decomposed by ST meet the generalized Gaussian</p>

	<p>distribution (GGD). So, the coefficients are estimated using absolute moment estimation in local neighbor in directional coefficients. The estimated scale parameter is used to measure the saliency and compute the weight. The fused coefficients are obtained by the weighted average and are reconstructed the final fused image. The results of experiment show that the fused image has the maximum value of entropy and is more accord with the human visual system.</p>
IP068	<p><b>Improvement and Implementation for Canny Edge Detection Algorithm</b>  <b>Yang Tao, Qiu Yue-hong</b>  Xi'an Institute of Optics and Precision Mechanics, Xi'an, 710119, 2University of Chinese Academy of Sciences, Beijing, 100049, China</p> <p><b>Abstract.</b> Edge detection is necessary for image segmentation and pattern recognition. In this paper, an improved Canny edge detection approach is proposed due to the defect of traditional algorithm. A modified bilateral filter with a compensation function based on pixel intensity similarity judgment was used to smooth image instead of Gaussian filter, which could preserve edge feature and remove noise effectively. In order to solve the problems of sensitivity to the noise in gradient calculating, the algorithm used 4 directions gradient templates. Finally, Otsu algorithm adaptively obtain the dual-threshold. All of the algorithm simulated with OpenCV 2.4.0 library in the environments of vs2010, and through the experimental analysis, the improved algorithm has been proved to detect edge details more effectively and with more adaptability.</p>
IP101	<p><b>The Trigonometric Interpolation Spline Surface and Its Application in Image Zooming</b>  <b>Juncheng Li a, Lian Yang</b>  Department of Mathematics, Hunan University of Humanities, Science and Technology, Loudi, China</p> <p><b>Abstract.</b> The trigonometric polynomial spline surface generated over the space <math>\{1, \sin t, \cos t, \sin 2t, \cos 2t\}</math> is presented in this work. The proposed surface can automatically interpolate all the given data points and satisfy <math>C^2</math> continuous without solving equation systems. Then, image zooming making use of the proposed surface is investigated. Experimental results show that the proposed surface is effective for dealing with image zooming problems.</p>
IP109	<p><b>Multi-view object co-segmentation based on the mixture of links model</b>  <b>Dongting Hu, Yugang Li , Xiabi Liu</b></p> <p><b>Abstract.</b> We present a novel mixture of links model to segment an object observed from multiple viewpoints. Each component in this mixture represents a temporal linkage between superpixels from all the viewpoints, hence expressing the inter-view consistency. The principle goal is to find the maximum a posterior estimate of appearance models and the exact boundingbox of object in each view. To this end, the segmentation is casted as finding more comprehensive and</p>



	<p>accurate samples using the mixture of links model. In contrast to most existing multi-view co-segmentation methods that rely on timeconsuming 3D information, our method only uses 2D cues to achieve faster speed without decreasing the accuracy. The experimental results confirm the effectiveness of our approach.</p>
IP215	<p><b>A Robust Global Linear Method for Structure From Motion</b>  <b>Jia Lin</b>  Department of Electronic Engineering and Computer Science, Peking University, China</p> <p><b>Abstract.</b> A technique for building consistent 3D reconstructions from unordered large image sets based on a global linear method is presented. When views are treated incrementally, this external calibration can be subjected to drift, contrary to global methods that distribute residual errors evenly. We propose a combined global linear method based on computing consistent measurements in three views. First, all global camera rotations are computed from relative rotation estimates of pairwise image matches. Second, we minimize an approximate geometric error and projection error of feature points to find a linear relationship in camera triplets. This step can efficiently remove incorrect triplets which is very important for global reconstruction. Third, these triplets can be directly scaled up to register multiple cameras which can serve as a good initialization for final bundle adjustment. The performance of the proposed method is tested on several well-known image sets and the result is accurate and robust.</p>
IP302	<p><b>Unsupervised Segmentation of Soil X-ray Microtomography Images</b>  Ajay K. Mandava, Emma E. Regentova, <b>Markus Berli</b>  <b>Desert Research Institute, Las Vegas, Nevada, USA</b></p> <p><b>Abstract.</b> Advances in X-ray microtomography (XMT) are opening new opportunities for examining soil structural properties and fluid distribution around living roots in-situ. The low contrast between moist soil, root and air-filled pores in XMT images presents a problem with respect to image segmentation. In this paper, we develop an unsupervised method for segmenting XMT images to pores (air and water), soil, and root regions. A feature-based segmentation method is provided to isolate regions that consist of similar texture patterns from an image based on the normalized inverse difference moment of gray-level co-occurrence matrix. The results obtained show that the combination of features, clustering, and post-processing techniques has advantageous over other advanced segmentation methods.</p>
IP313	<p><b>Weighted Bilateral Filtering using Relative Difference between Pixels</b>  <b>Li Ma, Yu-qi Zhang, Bin-bin Hu, Ming-yang Zheng</b>  School of Information, Liaoning University, No.66 Chongshan Middle Road, Huanggu District, Shenyang, Liaoning Province, P.R.C.110036</p> <p><b>Abstract.</b> The similarity measurement of the bilateral filtering can't indicate the difference between pixels accurately in the dense texture region. It causes the</p>

smoothing effect seriously, thereby reducing the edge preserving properties of the bilateral filtering. This paper presents a new weighted function of the bilateral filtering. It involves an additional range kernel using the relative difference between pixels. The range kernel operates differently by acting on the pixel gray intensities or colors. And it uses the reciprocal kernel for the approximation of the standard Gaussian weight value. Experimental results suggest that it significantly preserves more details than the classical bilateral filtering in edge or dense texture regions.

## Session II - Image Analysis and Application

IP316, IP317, IP318, IP 319, IP013, IP311, IP212, IP206, IP304, IP208

**Venue: Roman**

**13:30-16:00**

**Session Chair: Noriko Tomuro**  
**DePaul University, USA**

IP316	<p><b>Color Constancy Technology based on Detail Description</b>  <b>Guo Huinan</b>, Cao Jianzhong, Zhang Hui, Zhou Zuofeng  Xi'an Institute of Optics and Precision Mechanics, Chinese Academy of Sciences, China</p> <p><b>Abstract.</b> Color constancy is an important problem in machine vision and image processing fields. We propose a new method in this paper that is based on detail information description to estimate the chromaticity of the light source and restore the real color property of captured images. The main idea of the proposed approach is that according to human vision characteristics use the interest information in an image to estimate the lighting condition of real scene. To approve the proposed method, two well-known algorithms are selected and their contrast results are also presented. It is shown in this paper that the proposed approach performs better than other traditional methods for color constancy most of the time.</p>
IP318	<p><b>Hyperspectral Redundancy Diminution for Source Abstraction and Classification</b>  <b>Muhammad Ahmad</b>  Shenzhen University, China</p> <p><b>Abstract.</b> Hyperspectral data consists of hundreds of images, thus high redundancy occurs among the images, which reduce the detection probability. Huge data also require enormous time for processing and transmission. To handle the aforementioned issues, this paper presents an algorithm, termed MLLE-ELM</p>

	<p>for source abstraction and classification. While updating MLE parameter, a regularizer SMR that enforces the spatial related rationality and similarity within the image to make the algorithm more effective. ELM provides a learning platform with a general feature mapping to multiclass classification directly; it also approximate target continuous function and classify any disjoint regions. The abundance fraction is modeled as a mixture of probability density function with respect to Levesque measure on metric based Euclidean space. Experimental results on both synthetic and real data demonstrate the effectiveness of the proposed algorithm. The proposed algorithm is tested on both cuprite and synthetic data, which produces high precision and low reckonings.</p>
IP319	<p><b>Change Detection In Forest Land Cover Type Using Aster and Landsat Data</b>  <b>Wafa Mohamed Tahir Nori</b></p> <p>Faculty of Natural Resources &amp; Environmental Studies, University of Kordofan</p> <p><b>Abstract.</b> The objective of this study was to evaluate the potential for monitoring forest change using Landsat ETM data and Aster data for two periods (2000 - 2003 and 2003 - 2006). This was accomplished by performing three widely used vegetation indices: Normalized Difference Vegetation Index (NDVI), Soil Adjusted Vegetation Index (SAVI), and Transformed Difference Vegetation Index (TDVI). An RGB-NDVI change detection strategy to detect major decreases or increases in forest vegetation was developed as well. These indices were applied to a case study in El Rawashda forest reserve, Gedaref State, Sudan, and their results and accuracy were discussed.</p> <p>Results showed that the vegetation index maps obtained by NDVI and SAVI transformations within each computational group were similar in terms of spatial distribution pattern and statistical characteristics. As far as the degree of greenness of vegetation was concerned, the TDVI appeared to be the most sensitive. For the first period, the highest accuracy was obtained by SAVI (62.5%); however, the poorest accuracy was achieved by TDVI (59.5%). For the second period, TDVI revealed the highest accuracy (60.1%), whereas both NDVI and SAVI counted accuracy of 59.2%. Generally, the study proved that all vegetation indices produced reasonable approaches to map land cover changes over time and help to pinpoint deforestation and regrowth in the study area.</p>
IP013	<p><b>Genre-based Image Classification Using Ensemble Learning for Online Flyers</b>  Payam Pourashraf, <b>Noriko Tomuro</b>, Emilia Apostolova  DePaul University, USA</p> <p><b>Abstract.</b> This paper presents an image classification model developed to classify images embedded in commercial real estate flyers. It is a component in a larger, multimodal system which uses texts as well as images in the flyers to automatically classify them by the property types. The role of the image classifier in the system is to provide the genres of the embedded images (map, schematic</p>

	<p>drawing, aerial photo, etc.), which to be combined with the texts in the flyer to do the overall classification. In this work, we used an ensemble learning approach and developed a model where the outputs of an ensemble of support vector machines (SVMs) are combined by a k-nearest neighbor (KNN) classifier. In this model, the classifiers in the ensemble are strong classifiers, each of which is trained to predict a given/assigned genre. Not only is our model intuitive by taking advantage of the mutual distinctness of the image genres, it is also scalable. We tested the model using over 3000 images extracted from online real estate flyers. The result showed that our model outperformed the baseline classifiers by a large margin.</p>
IP311	<p><b>Design and Implementation of Semantics-Based Image Retrieval System</b>  <b>Chundi Nia</b>, Shenkui Liua, Ligong Pana, Xiaowei Yin          Northeast Forestry University, China</p> <p><b>Abstract.</b> Through the study of the existing image retrieval technology, in this paper, a new design scheme of semantics-based image retrieval system is presented. Based on the establishment of mapping relationship between the low-level image features and the low layer of semantic image, this scheme associates the low layer of semantic image with high-level semantics, thus realizing hierarchical semantics description structure, to improve the high-level semantic image recognition accuracy rate.</p>
IP212	<p>Design of a Multifunction Astronomical CCD Camera  <b>Dalei Yao, Desheng Wen</b>, Jianru Xue, Zhi Chen, Yan Wen<sup>2</sup>, Baotan Jiang,          Jiangbo, Xi          Xi'an Jiaotong University, China</p> <p><b>Abstract.</b> To satisfy the requirement of the astronomical observation, a novel timing sequence of frame transfer CCD is proposed. The multiple functions such as the adjustments of work pattern, exposure time and frame frequency are achieved. There are four work patterns: normal, standby, zero exposure and test. The adjustment of exposure time can set multiple exposure time according to the astronomical observation. The fame frequency can be adjusted when dark target is imaged and the maximum exposure time cannot satisfy the requirement. On the design of the video processing, offset correction and adjustment of multiple gains are proposed. Offset correction is used for eliminating the fixed pattern noise of CCD. Three gains pattern can improve the signal to noise ratio of astronomical observation. Finally, the images in differentsituations are collected and the system readout noise is calculated. The calculation results show that the designs in this paper are practicable.</p>
IP206	<p>Computer Image Analysis in Caryopses Quality Evaluation as Exemplified by Malting Barley  <b>Koszela K.</b>, Raba B., Zaborowicz M., Przybył K., Wojcieszak D., Czekala W., Ludwiczak A., Przybylak A., Boniecki P., Przybył J.          Poznan University of Life Sciences, Faculty of Agronomy and Bioengineering,</p>

	<p>Poland</p> <p><b>Abstract.</b> One of the purposes to employ modern technologies in agricultural and food industry is to increase the efficiency and automation of production processes, which helps improve productive effectiveness of business enterprises, thus making them more competitive. Nowadays, a challenge presents itself for this branch of economy, to produce agricultural and food products characterized by the best parameters in terms of quality, while maintaining optimum production and distribution costs of the processed biological material. Thus, several scientific centers seek to devise new and improved methods and technologies in this field, which will allow to meet the expectations. A new solution, under constant development, is to employ the so-called machine vision which is to replace human work in both quality and quantity evaluation processes. An indisputable advantage of employing the method is keeping the evaluation unbiased while improving its rate and, what is important, eliminating the fatigue factor of the expert. This paper elaborates on the topic of quality evaluation by marking the contamination in malting barley grains using computer image analysis and selected methods of artificial intelligence [4-5].</p>
IP304	<p><b>Different Methods of Image Segmentation in the Process of Meat Marbling Evaluation</b>  Ludwiczak A., Ślósarz P., Lisiak D., Przybylak A., Boniecki P., Stanisław M., <b>Koszela K.</b>, Zaborowicz M., Przybył K., Wojcieszak D., Janczak D., Bykowska M.  Poznan University of Life Sciences, Faculty of Animal Breeding and Biology, Poland</p> <p><b>Abstract.</b> The level of marbling in meat assessment based on digital images is very popular, as computer vision tools are becoming more and more advanced. However considering muscle cross sections as the data source for marbling level evaluation, there are still a few problems to cope with. There is a need for an accurate method which would facilitate this evaluation procedure and increase its accuracy. The presented research was conducted in order to compare the effect of different image segmentation tools considering their usefulness in meat marbling evaluation on the muscle anatomical cross – sections. However this study is considered to be an initial trial in the presented field of research and an introduction to ultrasonic images processing and analysis.</p>
IP208	<p><b>Identification of column edges of DNA fragments by using K-means clustering and mean algorithm on lane histograms of DNA agarose gel electrophoresis images</b>  Muhammed Kamil Turan, Eftal Sehirli, Abdullah Elen, <b>Ismail Rakip Karas</b>  Karabuk University (Turkey)</p> <p><b>Abstract.</b> Gel electrophoresis (GE) is one of the most used method to separate</p>

	<p>DNA, RNA, protein molecules according to size, weight and quantity parameters in many areas such as genetics, molecular biology, biochemistry, microbiology. The main way to separate each molecule is to find borders of each molecule fragment. This paper presents a software application that show columns edges of DNA fragments in 3 steps. In the first step the application obtains lane histograms of agarose gel electrophoresis images by doing projection based on x-axis. In the second step, it utilizes kmeans clustering algorithm to classify point values of lane histogram such as left side values, right side values and undesired values. In the third step, column edges of DNA fragments is shown by using mean algorithm and mathematical processes to separate DNA fragments from the background in a fully automated way. In addition to this, the application presents locations of DNA fragments and how many DNA fragments exist on images captured by a scientific camera.</p>
IP333	<p><b>Light Source Design for Double Reflection Transmission-type Visibility Meter</b>  <b>Xiaoqiong Zhen</b>, Ling Yang, Zhiqiang Niu, Qiangyu Zeng  Chengdu University of Information Technology, Chengdu, China</p> <p><b>Abstract.</b> In this paper, a novel transmission-type visibility meter which is also named double reflection transmission-type visibility meter is introduced and developed. The novel visibility meter uses a charge coupled device (CCD) as an image acquiring unit, the CCD acquires light spot images which generated by a light source, an air extinction coefficient is calculated, and then the meteorology visibility is obtained. The light source is an important unit in this novel visibility meter, and influences the meteorology visibility calculation results. In this paper, several light source design schemes are proposed and researched. Each light source scheme is tested and the experimental results are analyzed. Finally the novel visibility meter which employs a determined light source design scheme finished a measurement result comparison experiment and the reliability and accuracy of the visibility meter are proved.</p>

## Session II - Image Analysis and Application

IP114, IP026, IP015, IP030, IP057, IP058, IP201, IP315, IP401, IP403

**Venue: Grecian**

**13:30-16:00**

**Session Chair: Zhi-Ting Wu**

**Department of Management Information System, Takming University of Science and Technology, Taiwan**

IP114	<p>Marbling Classification of Lamb Carcasses with the Artificial Neural Image Analysis  Przybylak A, Ślósarz P., Boniecki P., <b>Koszela K.</b>, Zaborowicz M., Przybył K., Wojcieszak D., Szulc R., Ludwiczak A., Górna K.  Poznan University of Life Sciences, Faculty of Agronomy and Bioengineering, Poland</p> <p><b>Abstract.</b> This paper describes a part of research, whose goal was to develop an effective method to determine marbling classes of lamb carcasses, with the neural image analysis techniques. Current methods for identifying the degree of intramuscular fat level content are time consuming, require specialized expertise and often rely on subjective assessment based on predefined patterns. In this paper, authors proposes the use of neural model developed as a tool to assist evaluation of marbling.</p>
IP026	<p><b>Image Acquisitions, Processing and Analysis in the Process of Obtaining Characteristics of Horse Navicular Bone</b>  Zaborowicz M., Włodarek J., Przybylak A., Przybył K., Wojcieszak D., Czekala W. Ludwiczak A., Boniecki P., <b>Koszela K.</b>, Przybył J., Skwarcz J.  Poznan University of Life Sciences, Faculty of Agronomy and Bioengineering, Poland</p> <p><b>Abstract.</b> The aim of this study was investigate the possibility of using methods of computer image analysis for the assessment and classification of morphological variability and the state of health of horse navicular bone. Assumption was that the classification based on information contained in the graphical form two-dimensional digital images of navicular bone and information of horse health. The first step in the research was define the classes of analyzed bones, and then using methods of computer image analysis for obtaining characteristics from these images. This characteristics were correlated with data concerning the animal, such as: side of hooves, number of navicular syndrome (scale 0-3), type, sex, age, weight information about lace, information about heel. This paper shows the introduction to the study of use the neural image analysis in the diagnosis of navicular bone syndrome. Prepared method can provide an introduction to the study of non-invasive way to assess the condition of the horse navicular bone.</p>
IP015	<p>Minimalist Identification System based on Venous Map for Security Applications  Edwar Jacinto G., <b>Fredy Martínez S.</b>, Fernando Martínez S.  Technological Faculty, District University of Bogotá (Colombia)</p> <p><b>Abstract.</b> This paper proposes a technique and an algorithm used to build a device for people identification through the processing of a low resolution camera image. The infrared channel is the only information needed, sensing the blood reaction with the proper wave length, and getting a preliminary snapshot</p>

	<p>of the vascular map of the back side of the hand. The software uses this information to extract the characteristics of the user in a limited area (region of interest, ROI), unique for each user, which applicable to biometric access control devices. This kind of recognition prototypes functions are expensive, but in this case (minimalist design), the biometric equipment only used a low cost camera and the matrix of IR emitters adaptation to construct an economic and versatile prototype, without neglecting the high level of effectiveness that characterizes this kind of identification method.</p>
IP030	<p><b>Neural Classifier in the Estimation Process of Maturity of Selected Varieties of Apples</b>          Boniecki P., Piekarska-Boniecka H., <b>Koszela K.</b>, Zaborowicz M., Przybył K., Wojcieszak D., Zbytek Z., Ludwiczak A., Przybylak A., Lewicki A.          Poznan University of Life Sciences, Faculty of Agronomy and Bioengineering, Poland</p> <p><b>Abstract.</b> This paper seeks to present methods of neural image analysis aimed at estimating the maturity state of selected varieties of apples which are popular in Poland. An identification of the degree of maturity of selected varieties of apples has been conducted on the basis of information encoded in graphical form, presented in the digital photos. The above process involves the application of the BBCH scale, used to determine the maturity of apples. The aforementioned scale is widely used in the EU and has been developed for many species of monocotyledonous plants and dicotyledonous plants. It is also worth noticing that the given scale enables detailed determinations of development stage of a given plant. The purpose of this work is to identify maturity level of selected varieties of apples, which is supported by the use of image analysis methods and classification techniques represented by artificial neural networks. The analysis of graphical representative features based on image analysis method enabled the assessment of the maturity of apples. For the utilitarian purpose the "JabVis 1.1" neural IT system was created, in accordance with requirements of the software engineering dedicated to support the decision-making processes occurring in broadly understood production process and processing of apples.</p>
IP057	<p><b>The Recognition of Potato Varieties using Neural Image Analysis Method</b>          Przybył K., Górna K., Wojcieszak D., Czekala W., Ludwiczak A., Przybylak A., Boniecki P., <b>Koszela K.</b>, Zaborowicz M., Janczak D., Lewicki A.          Poznan University of Life Sciences, Faculty of Agronomy and Bioengineering, Poland</p> <p><b>Abstract.</b> The aim of this paper was to extract the representative features and generate an appropriate neural model for classification of varieties of edible potato. Potatoes of variety the Vineta and the Denar were the empirical object of this thesis. The main concept of the project was to develop and prepare an image database using the computer image analysis software. The choice of</p>



	<p>appropriate neural model the one which will have the greatest abilities to identify the selected variety. The aim of this project is ultimately to conduct assistance and accelerate work of the expert, who classifies and keeps different varieties of potatoes in heaps.</p>
IP058	<p><b>The Use of Image Analysis to Investigate C: N Ratio in the Mixture of Chicken Manure and Straw</b>  Czekala W., Dach J., Ludwiczak A., Przybylak A., Boniecki P., <b>Koszela K.</b>, Zaborowicz M., Przybył K., Wojcieszak D., Witaszek K.  Poznan University of Life Sciences, Faculty of Agronomy and Bioengineering, Poland</p> <p><b>Abstract.</b> The aim of the study was to determine the possibility of analysis of C:N ratio in the chicken manure and wheat straw mixture. This paper presents preliminary assumptions and parameters of extraction characteristics process. It also presents an introduction of digital image analysis of chicken manure and wheat straw mixture. This work is an introduction to the study on develop computer system that could replace chemical analysis. Good understanding the value of dependence C: N on the basis of image analysis will help in selection of optimal conditions for biological waste treatment.</p>
IP201	<p><b>Use of Neural Image Analysis Methods in the Process to determine the Dry Matter Content in the Compost</b>  Wojcieszak D., Przybył J., Lewicki A., Ludwiczak A., Przybylak A., Boniecki P., <b>Koszela K.</b>, Zaborowicz M., Przybył K., Witaszek K.  Poznan University of Life Sciences, Faculty of Agronomy and Bioengineering, Poland</p> <p><b>Abstract.</b> The aim of this research was investigate the possibility of using methods of computer image analysis and artificial neural networks for to assess the amount of dry matter in the tested compost samples. The research lead to the conclusion that the neural image analysis may be a useful tool in determining the quantity of dry matter in the compost. Generated neural model may be the beginning of research into the use of neural image analysis assess the content of dry matter and other constituents of compost. The presented model RBF 19:19-2-1:1 characterized by test error 0.092189 may be more efficient.</p>
IP315	<p><b>Use of the Self-organizing Feature Map to Diagnose Abnormal Engineering Change</b>  Ruei-Shan Lu, <b>Zhi-Ting Wu</b>  Department of Management Information System, Takming University of Science and Technology, Taiwan</p> <p><b>Abstract.</b> This study established identification manners with self-organizing feature map (SOM) to achieve the goal of monitoring Engineering Change (EC) based on historical data of a company that specializes in computers and</p>

	<p>peripherals. The product life cycle of this company is 3–6 months. The historical data were divided into three parts, each covering four months. The first part, comprising 2,343 records from January to April (the training period), comprise the Control Group. The second and third parts comprise Experimental Groups (EG) 1 and 2, respectively. For EG 1 and 2, the successful rate of recognizing information on abnormal ECs was approximately 96% and 95% respectively. This paper shows the importance and screening procedures of abnormal engineering change for a particular company specializing in computers and peripherals.</p>
IP401	<p><b>SPIDAR-if: A Joint User Interface Approach for Hapticed Web Content and Augment Reality Enhancement</b></p> <p><b>Wei-Yu Chen</b>, Makoto Sato, Yen-Ming Chu and Teruki Honma Tokyo Institute of Technology, Japan</p> <p><b>Abstract.</b> The paper presents a prototyped jointed control interface approach for understanding hapticed web content and augmented reality (AR) on a work-in-progress instructive platform of haptics (IPOH) over the unreliable network. Our works, in this context, are comprised by two parts. Firstly, we propose a joint user interface SPIDAR-if empowering finger tracking and physical force sense. SPIDAR-if includes a recently notable pocket-sized 3D sensor named “Leap Motion” as an input device and incorporates with another passive 2-degree-of-freedom (DOF) tactile device “SPIDAR” with upturned manipulations in order to truly represent the sense of touch interactions on IPOH system, such as tactile feedbacks derived from in-progressive verbs, HTML components and moving 3D spheres. On the other side, we study the eligibility of SPIDAR-if and its aids with regard to AR world and web content intelligibility in IPOH system which offers the Internet users a bridge to embrace virtual reality by virtue of assisted user interface, wrapping up haptic and web graphical rendering techniques as well as provided virtual environments (VE). Examples of hapticed web content and a 3D AR scenario approaching SPIDAR-if on IPOH with the fingertip are also presented along with preliminary findings.</p>
IP403	<p><b>Enhancing User Experience in Points of Interest with Augmented Reality</b></p> <p><b>Fernando Vera</b>, J. Alfredo Sánchez, Ofelia Cervantes Universidad de las Américas Puebla, Mexico</p> <p><b>Abstract.</b> This paper presents an approach to designing the user experience for interactive systems in open scenarios that involve augmented reality and mobile devices. We discuss the methodology we have used, which is a variation of contextual design, and resulting prototypes for a platform that will provide functionality for users to interact with augmented reality features in cultural and historical places, which are referred to as points of interest. Also, we report on</p>

preliminary results of the evaluation of our prototypes with potential users.
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### Session III - Machine Vision and Pattern Recognition

IP217, IP309, IP112, IP110, IP062, IP067, IP052, IP061, IP119, IP213, IP217, IP309,  
IP112, IP110, IP062

**Venue: Corinthian**

**16:20-18:50**

**Session Chair: Yuri Rzhanov**

**Center for Coastal and Ocean Mapping, University of New Hampshire, USA**

IP217	<p><b>3D Face Recognition Algorithm of Alignment and Fitting</b>  <b>Yifei Wu, Yao Cheng, Nan Yang</b>  Dalian Air Force Communication NCOAcademy, Dalian Liaoning, China</p> <p><b>Abstract.</b> For 3D face recognition area, Design a algorithm follows a morphable model approach. To align the scan with a model, ICP and spin-images are used also referred to as registration. Deformation is done by a nonrigid ICP algorithm to fit the model with the scan. From the fitted model a geometry image and a normal image is generated. The developed algorithm is tested by several measurements. From the results of these measurements, it could be concluded that the algorithm is robust and reliable.</p>
IP309	<p><b>Method of Face Detection with Deep Models for Patrol Videos</b>  <b>Baozhi Jia, Ming Zhu</b>  University of Science and Technology of China, China.</p> <p><b>Abstract.</b> Common face detection methods may fail in videos captured by patrol cars for the low resolution and uncooperative situation. We proposed a method to handle this problem with a parts-based deep model. Different parts of human bodies are detected for improving the accuracy of face detection in this method. A deep neural network is used for combining the detections of different parts. Experiments were conducted on two different datasets. The results demonstrate that the proposed method outperforms existing common face detection methods.</p>
IP112	<p><b>A Spatiotemporal Feature-based Approach for Facial Expression Recognition from Depth Video</b>  <b>Md. Zia Uddin</b>  Department of Computer Education, Sungkyunkwan University, Republic of</p>

	<p>Korea</p> <p><b>Abstract.</b> In this paper, a novel spatiotemporal feature-based method is proposed to recognize facial expressions from depth video. Independent Component Analysis (ICA) spatial features of the depth faces of facial expressions are first augmented with the optical flow motion features. Then, the augmented features are enhanced by Fisher Linear Discriminant Analysis (FLDA) to make them robust. The features are then combined with on Hidden Markov Models (HMMs) to model different facial expressions that are later used to recognize appropriate expression from a test expression depth video. The experimental results show superior performance of the proposed approach over the conventional methods.</p>
IP110	<p><b>Binary Adaptive Semi-Global Matching based on Image Edges</b>  Han Hu, Yuri Rzhanov, Philip J. Hatcher, R. Daniel Bergeron  Center for Coastal and Ocean Mapping, University of New Hampshire, USA</p> <p><b>Abstract.</b> Image-based modeling and rendering is currently one of the most challenging topics in Computer Vision and Photogrammetry. The key issue here is building a set of dense correspondence points between two images, namely dense matching or stereo matching. Among all dense matching algorithms, Semi-Global Matching (SGM) is arguably one of the most promising algorithms for real-time stereo vision. Compared with global matching algorithms, SGM aggregates matching cost from several (eight or sixteen) directions rather than only the epipolar line using Dynamic Programming (DP). Thus, SGM eliminates the classical “streaking problem” and greatly improves its accuracy and efficiency. In this paper, we aim at further improvement of SGM accuracy without increasing the computational cost. We propose setting the penalty parameters adaptively according to image edges extracted by edge detectors. We have carried out experiments on the standard Middlebury stereo dataset and evaluated the performance of our modified method with the ground truth. The results have shown a noticeable accuracy improvement compared with the results using fixed penalty parameters while the runtime computational cost was not increased.</p>
IP062	<p>Design and Implementation of Face Recognition System Based on Windows  Zhang Min, Liu Ting and Li Ailan.  Information department, Beijing City University, China</p> <p><b>Abstract.</b> In view of the basic Windows login password input way lacking of safety and convenient operation, we will introduce the biometrics technology, face recognition, into the computer to login system. Not only can it encrypt the computer system, also according to the level to identify administrators at all levels. With the enhancement of the system security, user input can neither be a</p>

	cumbersome nor worry about being stolen password confidential.
IP067	<p><b>Enhancing the Performance of Cooperative Face Detector by NFGS</b>  <b>Snehal Yesugade</b>, Palak Dave , Srinikhala Srivastava , and Apurba Das  Embedded Innovation Lab., EIS, Tata Consultancy Services, Bangalore, India</p> <p><b>Abstract.</b> Computerized human face detection is an important task of deformable pattern recognition in today's world. Especially in cooperative authentication scenarios like ATM fraud detection, attendance recording, video tracking and video surveillance, the accuracy of the face detection engine in terms of accuracy, memory utilization and speed have been active areas of research for the last decade. The Haar based face detection or SIFT and EBGM based face recognition systems are fairly reliable in this regard. But, there the features are extracted in terms of gray textures. When the input is a high resolution online video with a fairly large viewing area, Haar needs to search for face everywhere (say 352×250 pixels) and every time (e.g., 30 FPS capture all the time). In the current paper we have proposed to address both the aforementioned scenarios by a neuro-visually inspired method of figure-ground segregation (NFGS) [5] to result in a two-dimensional binary array from gray face image. The NFGS would identify the reference video frame in a low sampling rate and updates the same with significant change of environment like illumination. The proposed algorithm would trigger the face detector only when appearance of a new entity is encountered into the viewing area. To address the detection accuracy, classical face detector would be enabled only in a narrowed down region of interest (RoI) as fed by the NFGS. The act of updating the RoI would be done in each frame online with respect to the moving entity which in turn would improve both FR (False Rejection) and FA (False Acceptance) of the face detection system.</p>
IP052	<p><b>Human Action Recognition based on GMM-UBM supervector using SVM with non-linear GMM KL and GUMI</b>  <b>Nam N. Bui</b> and Young J. Kim  Dept. of Electronics and Computer Engineering, Chonnam National University,  500-757 Yongbongdong,  Buk-gu, Gwangju, Korea</p> <p><b>Abstract.</b> In recent years, Human Action Recognition (HAR) has attracted much attention from the research community due to its challenges as well as wide applications. In this paper, we investigate GMM supervector based Universal Background Model (UBM) and Support Vector Machine (SVM) with dense trajectories and motion bound features for HAR system. A GMM supervector is obtained by adapting with UBM and cascading all the mean vector components. After that, supervectors are applied as input features to SVM classifier. Moreover, we also adopted two modified GMM KL and GUMI kernels in this research. Then we make a comparison and critical analysis of our method with previous systems. Experimental results demonstrate that the</p>

	proposed approach performs more efficient than current systems.
IP061	<p><b>Human Action Recognition by Extracting Motion Trajectories</b>  Yuwen Fu and <b>Shangpeng Yang</b>  Sun Yat-sen University, P. R. China</p> <p><b>Abstract.</b> This paper proposes a novel human action recognition framework named Hidden Markov Model (HMM) based Hybrid Event Probability Sequence (HEPS), which can recognize unlabeled actions from videos. First, motion trajectories are effectively extracted using the centers of moving objects. Secondly, the HEPS is constructed using the trajectories and represents different human actions. Finally, the improved Particle Swarm Optimization (PSO) with inertia weight is introduced to recognize human actions using HMM. The proposed methods are evaluated on UCF Human Action Dataset and achieve 76.67% accurate rate. The comparative experiments results demonstrate that the HMM got superior results with HEPS and PSO.</p>
IP119	<p><b>KD-tree Based Clustering Algorithm for Fast Face Recognition on Large-scale Data</b>  Yuanyuan Wang, <b>Yaping Lin</b>, Junfeng Yang  College of Information Science and Engineering, Hunan University, China</p> <p><b>Abstract.</b> This paper proposes an acceleration method for large-scale face recognition system. When dealing with a large-scale database, face recognition is time-consuming. In order to tackle this problem, we employ the k-means clustering algorithm to classify face data. Specifically, the data in each cluster are stored in the form of the kd-tree, and face feature matching is conducted with the kd-tree based nearest neighborhood search. Experiments on CAS-PEAL and self-collected database show the effectiveness of our proposed method.</p>
IP213	<p>Play Estimation with Motions and Textures with Automatic Generation of Template Space-Time Map  <b>Kyota Aoki</b>, Ryo Aita and Takuro Fukiba  Graduate school of Engineering, Utsunomiya University, JAPAN</p> <p><b>Abstract.</b> It is easy to retrieve the small size parts from small videos. It is also easy to retrieve the middle size part from large videos. However, we have difficulties to retrieve the small size parts from large videos. We have large needs for estimating plays in sport videos. Plays in sports are described as the motions of players. This paper proposes the play retrieving method based on both motion compensation vectors and normal color frames in MPEG sports videos. This work uses the 1-dimensional degenerated descriptions of each motion image between two adjacent frames. Connecting the 1-dimensional degenerated descriptions on time direction, we have the space-time map. This space time map describes a sequence of frames as a 2-dimensional image. Using this space-time map on motion compensation vector frames and normal</p>

	<p>color frames, this work shows the method to create a new better template from a single template for retrieving a small number of plays in a huge number of frames. In an experiment, the resulting F-measure marks 0.955.</p>
IP217	<p><b>The Analysis of Frequency Domain Characteristics of Emotional Images in Eye-tracking Experiment</b>  <b>Boqiang Fan</b>, Huimin Ma* and Xiang Wang  Department of Electronic Engineering, Tsinghua University, Beijing, China</p> <p><b>Abstract.</b> Although recently eye-tracking method has been introduced into behavioral experiments based on dot-probe paradigm, some characteristics in eye-tracking data do not draw as much attention as traditional characteristics like reaction time. It is also necessary to associate eye-tracking data to characteristics of images shown in experiments. In this research, new variables, such as fixation length, times of fixation and times of eye movement, in eye-tracking data were extracted from a behavioral experiment based on dot probe paradigm. They were analyzed and compared to traditional reaction time. After the analysis of positive and negative scenery images, parameters such as hue frequency spectrum PAR (Peak to Average Ratio) were extracted and showed difference between negative and positive images. These parameters of emotional images could discriminate scenery images according to their emotions in an SVM classifier well. Besides, it was found that images' hue frequency spectrum PAR is obviously relevant to eye-tracking statistics. When the dot was on the negative side, negative images' hue frequency spectrum PAR and horizontal eye-jumps confirmed to hyperbolic distribution, while that of positive images was linear with horizontal eye-jumps. The result could help to explain the mechanism of human's attention and boost the study in computer vision.</p>
IP309	<p><b>Path planning for mobile robots based on Visibility Graphs and A* algorithm</b>  Juan D. Contreras, <b>Fernando Martínez S.</b>, Fredy H. Martínez S.  Technological Faculty, District University FJC of Bogotá (Colombia)</p> <p><b>Abstract.</b> One of most worked issues in the last years in robotics has been the study of strategies to path planning for mobile robots in static and observable conditions. This is an open problem without pre-defined rules (non-heuristic), which needs to measure the state of the environment, finds useful information, and uses an algorithm to select the best path. This paper proposes a simple and efficient geometric path planning strategy supported in digital image processing. The image of the environment is processed in order to identify obstacles, and thus the free space for navigation. Then, using visibility graphs, the possible navigation paths guided by the vertices of obstacles are produced. Finally the A* algorithm is used to find a best possible path. The alternative proposed is evaluated by simulation on a large set of test environments, showing in all cases its ability to find a free collision plausible path.</p>

IP112	<p><b>Fast and Scale-Adaptive Target Tracking Via Keypoint Matching</b>  <b>Yawen Wang</b>, Hongchang Chen, Shaomei Li, and Chao Gao  China National Digital Switching System Engineering and Technological R&amp;D Center, China</p> <p><b>Abstract.</b> As the main challenge for target tracking is accounting for target scale change and real-time, we combine Mean-Shift and PCA-SIFT algorithm together to solve the problem. We introduce similarity comparison method to determine how the target scale changes, and taking different strategies according to different situation. For target scale getting larger will cause location error, we employ backward tracking to reduce the error. Mean-Shift algorithm has poor performance when tracking scale-changing target due to the fixed bandwidth of its kernel function. In order to overcome this problem, we introduce PCA-SIFT matching. Through keypoint matching between target and template that adjusting the scale of tracking window adaptively can be achieved. Because this algorithm is sensitive to wrong match, we introduce RANSAC to reduce mismatch as far as possible. Furthermore target relocating will trigger when number of match is too small. In addition we take comprehensive consideration about target deformation and error accumulation to put forward a new template update method. Experiments on five image sequences and comparison with 6 kinds of other algorithm demonstrate favorable performance of the proposed tracking algorithm.</p>
IP110	<p><b>Maneuvering Target Tracking Algorithm based on Current Statistical Model in Three Dimensional Space</b>  <b>Ligang Huang</b>, Kang Yan and Xiangdong Wang  Shenyang University of Technology, Shenyang, China</p> <p><b>Abstract.</b> This paper is mainly to solve the problems associated with maneuvering target tracking based current statistical model in three dimensional spaces. Firstly, a three-dimensional model of the nine state variables is presented. Then adaptive Kalman filtering algorithm is designed with the motor acceleration data mean and variance. Finally, A simulation about the adaptive Kalman filtering put forward by this thesis and the direct calculation method is given, which aim at the maneuvering target in three-dimension. The results show the good performances such as better target position, velocity and acceleration estimates brought by the proposed approach by presenting and discussing the simulation results.</p>
IP062	<p><b>Research on Fingerprint Identification Algorithm based on Embedded System</b>  Tongtong Lou, <b>Xue Du</b>, Shanglin Yang and Peng Yu  Northeast Forestry University, China</p> <p><b>Abstract.</b> Through the in-depth study on the existing fingerprint identification</p>



	technologies, combined with the actual characteristics of the embedded system, this paper improves the existing fingerprint identification algorithm, reducing the time complexity of the matching algorithm. The experimental results show that the fingerprint identification algorithm proposed in this paper can perfectly meet the requirements of embedded system, therefore has high practical value.
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### Session IV - Computers and Signal Processing Technology

IP405, IP406, IP408, IP410, IP411, IP412, IP413, IP417, IP419, IP420, IP601, IP606,  
IP610

**Venue: Moroccan**

**16:20-18:50**

**Session Chair: Yi Wang**

**University of Alabama in Huntsville, Huntsville, USA**

IP405	<p><b>A framework for extracting and representing project knowledge contexts using topic models and dynamic knowledge maps</b>  <b>Jin Xu</b> , Zheng Li , Shuliang Li, Yanyan Zhang          Southwest Jiaotong University, China</p> <p><b>Abstract.</b> There is still a lack of effective paradigms and tools for analysing and discovering the contents and relationships of project knowledge contexts in the field of project management. In this paper, a new framework for extracting and representing project knowledge contexts using topic models and dynamic knowledge maps under big data environments is proposed and developed. The conceptual paradigm, theoretical underpinning, extended topic model, and illustration examples of the ontology model for project knowledge maps are presented, with further research work envisaged.</p>
IP406	<p><b>A new machine learning algorithm for removal of salt and pepper noise</b>  <b>Yi Wang</b>, Reza Adhami, Jian Fu          University of Alabama in Huntsville, Huntsville, USA</p> <p><b>Abstract.</b> Supervised machine learning algorithm has been extensively studied and applied to different fields of image processing in past decades. This paper proposes a new machine learning algorithm, called margin setting (MS), for restoring images that are corrupted by salt and pepper impulse noise. Margin setting generates decision surface to classify the noise pixels and non-noise pixels. After the noise pixels are detected, a modified ranked order mean</p>

	<p>(ROM) filter is used to replace the corrupted pixels for images reconstruction. Margin setting algorithm is tested with grayscale and color images for different noise densities. The experimental results are compared with those of the support vector machine (SVM) and standard median filter (SMF). The results show that margin setting outperforms these methods with higher Peak Signal-to-Noise Ratio (PSNR), lower mean square error (MSE), higher image enhancement factor (IEF) and higher Structural Similarity Index (SSIM).</p>
IP408	<p><b>A Multi-stage Noise Adaptive Switching Filter for Extremely Corrupted Images</b>  <b>Hai Dinh, Reza Adhami, and Yi Wang</b>  University of Alabama in Huntsville, Huntsville, USA</p> <p><b>Abstract.</b> A multi-stage noise adaptive switching filter (MSNASF) is proposed for the restoration of images extremely corrupted by impulse and impulse-like noise. The filter consists of two steps: noise detection and noise removal. The proposed extrema-based noise detection scheme utilizes the false contouring effect to get better over detection rate at low noise density. It is adaptive and will detect not only impulse but also impulse-like noise. In the noise removal step, a novel multi-stage filtering scheme is proposed. It replaces corrupted pixel with the nearest uncorrupted median to preserve details. When compared with other methods, MSNASF provides better peak signal to noise ratio (PSNR) and structure similarity index (SSIM). A subjective evaluation carried out online also demonstrates that MSNASF yields higher fidelity.</p>
IP410	<p><b>A Novel Murmur-based Heart Sound Feature Extraction Technique using Envelope-Morphological Analysis</b>  <b>Hao-Dong Yao, Jia-Li Ma, Bin-Bin Fu, Hai-Yang Wang, and Ming-Chui Dong</b>  Faculty of Science and Technology, University of Macau, China</p> <p><b>Abstract.</b> Auscultation of heart sound (HS) signals serves as an important primary approach to diagnose cardiovascular diseases (CVDs) for centuries. Confronting the intrinsic drawbacks of traditional HS auscultation, computer-aided automatic HS auscultation based on feature extraction technique has witnessed explosive development. Yet, most existing HS feature extraction methods adopt acoustic or time-frequency features which exhibit poor relationship with diagnostic information, thus restricting the performance of further interpretation and analysis. Tackling such a bottleneck problem, this paper innovatively proposes a novel murmur-based HS feature extraction method since murmurs contain massive pathological information and are regarded as the first indications of pathological occurrences of heart valves. Adapting discrete wavelet transform (DWT) and Shannon envelope, the envelope-morphological characteristics of murmurs are obtained and three features are extracted accordingly. Validated by discriminating normal HS and 5 various abnormal HS signals with extracted features, the proposed method</p>

	provides an attractive candidate in automatic HS auscultation.
IP411	<p><b>A Steady Tracking Technology Adopted to Fast FH/BPSK Signal under Satellite Channel</b>  <b>Guo SuLi</b>, Lou ZhiGang, Wang XiDuo, Xia ShuangZhi  The 54th Research Institute of China Electronics Technology Group Corporation, China</p> <p><b>Abstract.</b> In order to survive under the conditions with great jamming and interference, fast frequency hopped signal are employed in satellite communication system. This paper discusses the nonlinear phases induced by the equipment and atmosphere, and their influence on the FFH/BPSK tracking loop. Two methods are developed including compensating phase which is based on channel estimation and compensating Doppler frequency based on velocity normalization. Simulation results for a real circuit with proper parameters shows that the degradation due to the demodulation of frequency-hopped is only a fraction of one dB in an AWGN environment under satellite channel.</p>
IP412	<p><b>A Maximally Stable Extremal Region Based Scene Text Localization Method</b>  <b>Chengqiu Xiao</b>, Lixin Ji, Chao Gao, Shaomei Li  China National Digital Switching System Engineering and Technological R&amp;D Research Center China.</p> <p><b>Abstract.</b> Text localization in natural scene images is an important prerequisite for many content-based image analysis tasks. This paper proposes a novel text localization algorithm. Firstly, a fast pruning algorithm is designed to extract Maximally Stable Extremal Regions (MSER) as basic character candidates. Secondly, these candidates are filtered by using the properties of fitting ellipse and the distribution properties of characters to exclude most non-characters. Finally, a new extremal regions projection merging algorithm is designed to group character candidates into words. Experimental results show that the proposed method has an advantage in speed and achieve relatively high precision and recall rates than the latest published algorithms.</p>
IP413	<p><b>Real-time Camera Calibration System Based On OpenCV</b>  <b>Zhang Hui</b>, Wang Hua, Guo Huinan, Ren Long, Zhou Zuofeng  Xi'an Institute of Optics and Precision Mechanics, Chinese Academy of Sciences, China</p> <p><b>Abstract.</b> Camera calibration is one of the essential steps in the computer vision research. This paper describes a real-time OpenCV based camera calibration system, and developed and implemented in the VS2008 environment. Experimental results prove that the system to achieve a simple and fast camera calibration, compared with MATLAB, higher precision and does not need manual intervention, and can be widely used in various computer vision system.</p>

IP417	<p><b>A review of contrast pattern based data mining</b>  Shiwei Zhu, Meilong Ju, <b>Junfeng Yu</b>, Binlei Cai, Aiping Wang  Information Research Institute, Shandong Academy of Sciences, China</p> <p><b>Abstract.</b> Contrast pattern based data mining is concerned with the mining of patterns and models that contrast two or more datasets. Contrast patterns can describe similarities or differences between the datasets. They represent strong contrast knowledge and have been shown to be very successful for constructing accurate and robust clusters and classifiers. The increasing use of contrast pattern data mining has initiated a great deal of research and development attempts in the field of data mining. A comprehensive revision on the existing contrast pattern based data mining research is given in this paper. They are generally categorized into background and representation, definitions and mining algorithms, contrast pattern based classification, clustering, and other applications, the research trends in future. The primary of this paper is to server as a glossary for interested researchers to have an overall picture on the current contrast based data mining development and identify their potential research direction to future investigation.</p>
IP419	<p><b>An Adaptive Method to Detect Weak Signal Utilizing Duffing Oscillator</b>  <b>Shuo Shi</b>, Tenghu Guo, Xuemai Gu  School of Electronics and information Engineering, Harbin Institute of Technology, China</p> <p><b>Abstract.</b> At present, most of the researches set amplitude of driving force fixed when detecting weak signal buried in noise utilizing Duffing oscillator. In this paper, we find the critical value of driving force corresponding to critical state varies with noise power. Taken this into consideration, a new adaptive method to detect weak signal is proposed. In this method, the amplitude of driving force is determined by input power. The simulation results indicate that lowes threshold of SNR can be acquired in this method is lower than that in the methods proposed in most papers.</p>
IP420	<p><b>An energy saving mechanism of EPON networks for real time video transmission</b>  <b>Chien-Ping Liu</b>, Ho-Ting Wu, Yun-Ting Chiang, Shieh-Chieh Chien, Kai-Wei Ke  National Taipei University of Technology, Taiwan</p> <p><b>Abstract.</b> Modern access networks are constructed widely by passive optical networks (PONs) to meet the growing bandwidth demand. However, higher bandwidth means more energy consumption. To save energy, a few research works propose the dual-mode energy saving mechanism that allows the ONU to operate between active and sleep modes periodically. However, such dual-mode energy saving design may induce unnecessary power consumption or packet delay increase in the case where only downstream data</p>

	<p>exist for most of the time. In this paper, we propose a new tri-mode energy saving scheme for Ethernet PON (EPON). The new tri-mode energy saving design, combining the dual-mode saving mechanism with the doze mode, allows the ONU to switch among these three modes alternatively. In the doze mode, the ONU may receive downstream data while keeping its transmitter close. Such scenario is often observed for real time video downstream transmission. Furthermore, the low packet delay of high priority upstream data can be attained through the use of early wake-up mechanism employed in both energy saving modes. The energy saving and system efficiency can thus be achieved jointly while maintaining the differentiated QoS for data with various priorities. Performance results via simulation have demonstrated the effectiveness of such mechanism.</p>
IP601	<p><b>Delineation of Groundwater Potential Zones in Nuweiba Area (Egypt) Using Remote Sensing and GIS Techniques</b>  <b>Sara Abuzied, May Yuan, Samia Ibrahim, Mona Kaiser and Tarek Seleem</b></p> <p><b>Abstract.</b> The exploration of new locations for possible groundwater discharge is required to support the needs of urban and agricultural activities in arid regions, such as the Nuweiba area. The aim of this study is to locate new groundwater wells in the Nuweiba area to alleviate water shortage. We identified several essential factors contributing to groundwater discharge. These factors include textural classification of alluvial deposits, lithological units, surface and subsurface structures, topographic parameters, geomorphological features and land use land cover. We developed a hydrogeological model incorporating these factors. Input data to the model include SPOT5, SRTM, Radarsat-1, ALOS PalSAR, GPR, and geologic and topographic maps. The model <b>ingested these data as rasters and determines weights to integrate</b> the contributing factors spatially. The groundwater potential map was classified to five classes from very poor to very good potential. The classes of groundwater potential map were checked against the distribution of the groundwater wells in Bedouin communities and agriculture areas, which present a general knowledge of groundwater potential in the study area.</p>
IP606	<p><b>Application of Remote Sensing and Spatial Data Integrations for Mapping Porphyry Copper Zones in Nuweiba Area, Egypt</b>  <b>Sara Abuzied, Samia Ibrahim, Mona Kaiser and Tarek Seleem</b>  Center for Spatial Analysis, the University of Oklahoma</p> <p><b>Abstract.</b> Many diverse criteria should be considered to select the potential zones for mineral exploration. The study aims to provide potential map for porphyry copper zones in the Nuweiba area based on the criteria derived from geologic, geochemical, and remote sensing data. Field investigations, remote sensing and GIS techniques were applied jointly to prepare and integrate several factors contributing to mineralization occurrences. The remote sensing techniques such as Band Ratio (BR), Relative Absorption Band Depth (RBD),</p>

	<p>Principal Component Analysis (PCA), Minimum Noise Fraction (MNF), and Linear Spectral Unmixing (LSU) were used to define the geological characteristics of the study area including lithological units, structural features and hydrothermal alteration zones. Weight Linear Combination (WLC) was adopted as suitable GIS technique to integrate spatially several criteria having different weights of importance for mineralization occurrences. These criteria involve the lithological units, lineaments, major fault, alteration zones, and stream sediments anomaly. The weight of each criterion was evaluated using Analytical Hierarchy Process (AHP). The results of applications in this study provide acceptable map defining the zones of porphyry copper deposits in the Nuweiba area.</p>
IP610	<p><b>A Decade of Changing Net Radiation over a Large Lake: Remote Sensing Approach for Water - Atmosphere Parameterizations</b>  <b>Pakorn Petchprayoon</b>, Peter D. Blanken, Khalid Hussein, Waleed Abdalati  Geo-Informatics and Space Technology Development Agency, Bangkok, Thailand</p> <p><b>Abstract.</b> This study uses eleven years (2002-2012) of daily remotely-sensed data with multi-spatial resolution of 1 km to 5 km to examine the spatiotemporal distribution of net radiation (<math>Q^*</math>) and its four components: incoming shortwave (<math>K_{\downarrow}</math>), outgoing shortwave (<math>K_{\uparrow}</math>), incoming long-wave (<math>L_{\downarrow}</math>), and outgoing long-wave (<math>L_{\uparrow}</math>) under all sky conditions across Lake Huron. Good agreement was found between the in-situ measurements of net radiation components and instantaneous estimates made from the satellite data with correlation coefficients between 0.95 and 0.60 for outgoing long-wave radiation and incoming shortwave radiation, respectively. Results showed that <math>Q^*</math> and all of its components significantly changed over the study period. Trend analysis revealed a significant decrease in <math>Q^*</math> at the rate of 0.003 <math>Wm^{-2}</math> day<sup>-1</sup> with a significant decrease in shortwave (<math>K_{\downarrow}</math> and <math>K_{\uparrow}</math>), and a significant increase in long-wave (<math>L_{\downarrow}</math> and <math>L_{\uparrow}</math>). The positive trend of outgoing long-wave radiation was a result of the increase of surface water temperature. The possible reason of reducing surface incoming shortwave radiation was mainly due to the increase of energy absorption by water vapor in the atmosphere.</p>

#### Session IV - Computers and Signal Processing Technology

IP510, IP512, IP508, IP509, IP503, IP517, IP518, IP523, IP520, IP522, IP530, IP534, IP543, IP555

**Venue: Roman**

**16:20-18:50**

**Session Chair: Prof. Charles M. Falco**  
**University of Arizona, USA**

IP510	<p><b>Application of Clustering for Customer Segmentation in Private Banking</b>  Xuan Yang, Jin Chen, Pengpeng Hao, <b>Yanbo J. Wang</b>  University of International Business and Economics, China</p> <p><b>Abstract.</b> With fierce competition in banking industry, more and more banks have realised that accurate customer segmentation is of fundamental importance, especially for the identification of those high-value customers. In order to solve this problem, we collected real data about private banking customers of a commercial bank in China, conducted empirical analysis by applying K-means clustering technique. When determine the K value, we propose a mechanism that meet both academic requirements and practical needs. Through K-means clustering, we successfully segmented the customer into three categories, and features of each group have been illustrated in details.</p>
IP512	<p><b>Application of text mining for customer evaluations in commercial banking</b>  Jing Tan, Xiaojiang Du, Pengpeng Hao, and <b>Yanbo J. Wang</b>  University of International Business and Economics, China</p> <p><b>Abstract.</b> Nowadays customer attrition is increasingly serious in commercial banks. To combat this problem roundly, mining customer evaluation texts is as important as mining customer structured data. In order to extract hidden information from customer evaluations, Textual Feature Selection, Classification and Association Rule Mining are necessary techniques. This paper presents all three techniques by using Chinese Word Segmentation, C5.0 and Apriori, and a set of experiments were run based on a collection of real textual data that includes 823 customer evaluations taken from a Chinese commercial bank. Results, consequent solutions, some advice for the commercial bank are given in this paper.</p>
IP508	<p><b>Continuous Speech Recognition based on Convolutional Neural Network</b>  <b>Qing-qing Zhang</b>, Yong Liu, Jie-lin Pan, Yong-hong Yan  Key Laboratory of Speech Acoustics and Content Understanding, Chinese Academy of Sciences, China</p> <p><b>Abstract.</b> Convolutional Neural Networks (CNNs), which showed success in achieving translation invariance for many image processing tasks, are investigated for continuous speech recognitions in the paper. Compared to Deep Neural Networks (DNNs), which have been proven to be successful in many speech recognition tasks nowadays, CNNs can reduce the NN model sizes significantly, and at the same time achieve even better recognition accuracies. Experiments on standard speech corpus TIMIT showed that CNNs outperformed DNNs in the term of the accuracy when CNNs had even smallermodel size.</p>

IP509	<p><b>Design and Realization of a Weak Signal Acquisition System for Optical Spectrum Analysis</b>  <b>Yu Ming</b>, Lin Hu, and Wei Xin  Chinese Academy of Sciences, Shenzhen, China</p> <p><b>Abstract.</b> A weak signal processing system for spectrum analyzing using low-noise isolation &amp; amplification and low-pass Filter (LPF) methods is developed. In order to extract the spectrum signals from the external disturbance as well as regenerate the detected results dynamically, a method of synchronized isolation &amp; amplification is used to amplify the weak signals exponentially as well as to isolate the noise of random frequency by electromagnetic induction technology, and a LPF is designed to keep the output signals stable. What's more, an interface based on MFC single document view is programmed to display and save the scanned spectrum diagram. As a result, more than 1.5 million times of amplification, less than 9nA of current drift and a cut-off frequency of 10Hz is equipped for the system.</p>
IP503	<p><b>Emitter Frequency Refinement based on Maximum Likelihood</b>  <b>Xin Xu</b>, Huijuan Wang  Science and Technology on Information System Engineering Laboratory, China</p> <p><b>Abstract.</b> Frequency estimation via signal sorting is widely recognized as one of the most practical technologies in signal processing. However, the estimated frequencies via signal sorting may be inaccurate and biased due to signal fluctuation under different emitter working modes, problems of transmitter circuit, environmental noises or certain unknown interference sources. Therefore, it has become an important issue to further analyze and refine signal frequencies after signal sorting. To address the above problem, we have brought forward an iterative frequency refinement method based on maximum likelihood. Iteratively, the initial estimated signal frequency values are refined. Experimental result indicate that the refined signal frequencies are more informative than the initial ones. As another advantage of our method, noises and interference sources could be filtered out simultaneously. The efficiency and flexibility enables our method to apply in a wide application area, i.e., communication, electronic reconnaissance and radar intelligence analysis.</p>
IP517	<p><b>Filter Ensemble Regularized Common Spatial Pattern for EEG Classification</b>  <b>Yuxi Su</b>, Yali Li, Shengjin Wang  Tsinghua University, China</p> <p><b>Abstract.</b> Common Spatial Pattern (CSP) is one of the most effective feature extraction algorithm for Brain-Computer Interfaces (BCI). Despite its advantages of wide versatility and high efficiency, CSP is shown to be non-robust to noise and prone to over fitting when training sample number is</p>



	<p>limited. In order to overcome these problems, Regularized Common Spatial Pattern (RCSP) is further proposed. RCSP regularized covariance matrix estimation by two parameters, which reduces the estimation difference and improves the stationarity under small sample condition. However, RCSP does not make full use of the frequency information. In this paper, we presents a filter ensemble technique for RCSP (FERCSP) to further extract frequency information and aggregate all the RCSPs efficiently to get an ensemble-based solution. The performance of the proposed algorithm is evaluated on data set IVa of BCI Competition III against other five RCSPbased algorithms. The experimental results show that FERCSP significantly outperforms those of the existing methods in classification accuracy. The FERCSP outperforms the CSP algorithm and R-CSP-A algorithm in all five subjects with an average improvement of 6% in accuracy.</p>
IP518	<p><b>Implementation of Weighted Summation Type Fractional Fourier Transform on FPGA</b>  <b>Qiming Zou</b>, Longlong Li, Qian Huang, Fei Wang  Department of Electronics and Information Engineering, Harbin Institute of Technology, China</p> <p><b>Abstract.</b> Recently Fractional Fourier transform (FrFT) has got a variety of applications in digital signal and image processing. This paper presents a novel hardware architecture for real-time computation of Discrete Fractional Fourier Transform (DFrFT), which can easily be extended to other fractional transforms. The proposed architecture has been verified on Xilinx FPGA (XC6VLX240T), which can run at a frequency up to 291MHz while with high accuracy.</p>
IP523	<p><b>Improving MAP Arithmetic Decoding of H.264 Intra Modes using Residual Redundancy</b>  <b>Hossein Kourkchi</b>, William E. Lynch, and M. Omair Ahmad  Concordia University, Canada</p> <p><b>Abstract.</b> This paper presents an improved MAP decoder to be used for joint source-channel arithmetic decoding for H.264 symbols. The proposed decoder uses not only the intentional redundancy inserted via a forbidden symbol but also exploits residual redundancy by a syntax checker. A breadth-first suboptimal sequential MAP decoder is employed. The decoder eliminates paths in the decoding tree that result in invalid syntax or that decode a forbidden symbol. In contrast to previous methods, this is done as each channel bit is decoded. Simulations using intra prediction modes show improvements in error rates, for example, syntax element error rate reduction by an order of magnitude for channel SNR of 7.33dB. The cost of this improvement is more computational complexity spent on the syntax checking.</p>
IP520	<p><b>Improving ontology matching with propagation strategy and user feedback</b>  Chunhua Li, Zhiming Cui, <b>Pengpeng Zhao</b>, Jian Wu, Jie xin, Tianxu He</p>

	<p>The Institute of Intelligent Information Processing and Application, Soochow University, China</p> <p><b>Abstract.</b> Markov logic networks which unify probabilistic graphical model and first-order logic provide an excellent framework for ontology matching. The existing approach requires a threshold to produce matching candidates and use a small set of constraints acting as filter to select the final alignments. We introduce novel match propagation strategy to model the influences between potential entity mappings across ontologies, which can help to identify the correct correspondences and produce missed correspondences. The estimation of appropriate threshold is a difficult task. We propose an interactive method for threshold selection through which we obtain an additional measurable improvement. Running experiments on a public dataset has demonstrated the effectiveness of proposed approach in terms of the quality of result alignment.</p>
IP522	<p><b>Introduction to Fast Indexing Method for Images in Database</b>  <b>PRATIK SEN and S.VADIVEL</b>        Dept. of Computer Science, BITS Pilani Dubai Campus, UAE</p> <p><b>Abstract.</b> Implementation of a novel indexing model for images with verified facial data is presented in this paper. This indexer uses histogram based clustering to select the skin color of the subject of the image, and then classify the image as such. Fuzzy based classification techniques are used to detect the skin tone of the images.</p>
IP530	<p><b>Exploring Students' Collaborative Activities and Interactions in Second Life</b>  <b>Dr Gbolahan Olasina</b>        University of South Africa</p> <p><b>Abstract.</b> The purpose of the study is to analyze any evidence of collaboration using the lens of activities in Second Life (SL) in the context of student users of SL environment in South Africa. The research uses the Symbolic Interaction Theory (SIT) as the theoretical framework that underpins the study. In order to address the research questions of the study a survey research design is chosen. In addition, the population of the study is made up of matriculation students of high schools with a sample size of ten with common features such as economic backgrounds, age and hands-on use of virtual worlds (VWs). The methods of analysis involve reading of interview and focus group transcripts, developing own codes, coding the data, examining of patterns and themes using thematic analysis. The students' activities in virtual environment suggest possibilities for collaboration. The research is significant with regard to theory as it improves the understanding of symbolic interaction theory in the context of virtual environment. The research acknowledges existing potentials for collaborative interactions in the realms of gaming, entertainment and socializing.</p>

IP534	<p><b>Dynamic Sensor Selection Based On Joint Data Quality in the Context of a multi-Kinect Module inside the CAVE “Le SAS”</b>  <b>S. Salous, J Newton, L LEROY, S. Chendeb</b>  Paris 8 university/ France</p> <p><b>Abstract.</b> In order to create interaction, immersive VR rooms can receive various types of inputs from a user. One of these input types are the gestures and movements of the user in the CAVE, which can be captured with sensors such as the Microsoft Kinect. However, the large scale of an immersive room implies the use of multiple Kinects to provide optimal coverage. This multi-Kinect set-up requires an effective selection method to determine the most accurate Kinects depending on the user’s position. The example of VR environment described in this paper is a CAVE named “Le SAS” that currently supports 4 Kinects. This paper describes the SAS’s features as well as the constraints the implemented solution had to take into account. It will justify the technical <b>choices and provide experiment results.</b></p>
IP543	<p><b>Lessons learned and Experience from Land Collapse Accidents Using Remote Sensing and GIS (Case Study Of Continuous Land Collapse in East Cairo Area, Egypt)</b>  <b>Mohamed Nagib Hegazy</b>  National Authority for Remote Sensing and Space Sciences</p> <p><b>Abstract.</b> Early warning and Late or no response was the tradition behavior of the local authority in Egypt for the last decades. In the area East of Cairo where a huge body of slum community named Manshiyyat Naser and El Deweiqa was studied for land collapse geo- hazard. Different environmental factors have their impacts on the deterioration of the physical environment parameters. These parameters can be classified into manmade and natural ones. The man made include heavy trucks movement, misuse of water in garden irrigation, extreme use of explosives in mining activity nearby the area, and overall the uncontrolled sewage system. The physical parameters include country rock type as hard fractured limestone, shale, etc. as these different types of rocks have different hardness and durability and resistivity to physical weathering and erosion. Stratigraphy parameter as the layers has different hardness and sometimes hard rocks are overlying soft detrital sediments. Faults and cracks have a magnificent impact as structure density affect the durability of such rocks. Different geochemical characteristics of the rocks like clay minerals that have swelling mechanism or dissolving salts plays an important role in the deterioration of these rocks. Presence of scarps and steep slopes is one of these factors. This research is concerned with assessment of one of the land collapse accidents that occurred and lessons learned from that case to overcome the bad impact of the absence of monitoring and documentation of recent expected ones. Multi-temporal multi-sensors imageries were used to monitor the scarp and areas for fractures developments and change of rock properties due to</p>

	<p>sewage water seepage and dumping different types of trashes. Scarp area that was subjected to collapse was outlined and a database for it was constructed before collapse happened. Another image of the same area after collapse was used also to make the necessary comparisons regarding damage identification. An inventory for the number of buildings that was damaged due to land collapse was done. Using multi-temporal satellite images was the only way to assess the damage in area and number of buildings due to lack of any type of information or maps for such slum area.</p> <p>The research was concluded to the decision makers to develop a monitoring mechanism using remotely sensed data and establishment of a database for the area including cadastral maps. Another important recommendation was to open a corridor way for emergency and rescue purposes as the area lacks such way for emergency, rescue and accessibility.</p>
<p>IP555</p>	<p><b>Application of Multiple Source Satellite Data to Detecting Changes of Land Cover and Ecosystem Services Value</b>  <b>Shunbao Liao</b>, Pengmin Hou, Yanlin Yue, Guangxing Ji and Xu Yang                  Henan University, China</p> <p><b>Abstract.</b> Firstly, two sets of land cover map in China at scale of 1 to 250000 in 1980s and 2005 were produced based on Landsat TM data, CBERS data, MODIS vegetation index products as well as other auxiliary data. Secondly, changes of land cover between the two periods were detected and analyzed with Henan province of central China as a study case. And then changes of ecosystem services value in the province were further analyzed. The following conclusions were drawn: (a) during the period of twenty years from 1980s to 2005, the area of all kinds of land cover has changed. The types of land cover, area of which reduced obviously, included desert, bare soil, swamps and meadows. The area of them was reduced by 80.17%, 82.81%, 73.61% and 62.62% respectively. By contrast, area of urban settlement increased most with an increasing rate of 103.77%; (b) In the 20 years, the total value of ecosystem services in the province decreased 2.256 billion yuan. The decreasing rate was 1.24%.</p>
<p>IP226</p>	<p><b>Introduction to Fast Indexing Method for Images in Database</b>  <b>PRATIK SEN and S.VADIVEL</b>                  Dept. of Computer Science, BITS Pilani Dubai Campus, Dubai, UAE</p> <p><b>Abstract.</b> Implementation of a novel indexing model for images with verified facial data is presented in this paper. This indexer uses histogram based clustering to select the skin color of the subject of the image, and then classify the image as such. Fuzzy based classification techniques are used to detect the skin tone of the images.</p>
<p>IP224</p>	<p><b>Method and Simulation for Spacecraft Clock Correction Based on X-ray</b></p>

	<p><b>Pulsars Signal</b>  <b>GUI Xianzhou</b>, SUN Chen, HUANG Senlin  National University of Defense Technology, China</p> <p><b>Abstract.</b> X-ray pulsar-based spacecraft navigation comes to be a new kind of autonomous navigation technology with high potential, for the advantages of high reliability, good autonomy, high precision and wide applicability. Timing, determination of position and attitude are main prospects of using X-ray pulsars [1,2]. To realize the pulse signal timing, in this paper, a Phase-Locked Loop circuit for tracking pulsar signal frequency is designed; PLL is built in the Simulink environment and tested by using simple pulse signal to get circuit parameters with good track effect. The Crab Nebula pulse profile, which is used as the simulation signal source, is modelled by using the mathematical method [3]. The simulation results show that the PLL circuit designed in the paper can track the frequency of pulse signal precisely and can be used for spacecraft clock correction.</p>
IP327	<p><b>Moiré Fringe Center Determination Using Artificial Neural Network</b>  <b>W.H. Woo</b>, K.S. Yen  School of Mechanical Engineering, Engineering Campus, Universiti Sains Malaysia, Malaysia</p> <p><b>Abstract.</b> Moiré methods are commonly used in various engineering metrological practices such as deformation measurements and surface topography. In the past, most of the applications required human intervention in fringe pattern analysis and image processing development to analyze the moiré patterns. In a recent application of using circular gratings moiré pattern, researchers developed graphical analysis method to determine the in-plane (2-D) displacement change between the two circular gratings by analyzing the moiré pattern change. In this work, an artificial neural network approach was proposed to detect and locate moiré fringe centers of circular gratings without image preprocessing and curve fitting. The intensity values in columns of the transformed circular moiré pattern were extracted as the input to the neural network. Moiré fringe centers extracted using graphical analysis method were used as the target for the neural network training. The neural network produced reasonably accurate output with an average mean error of an average mean error of less than 1 unit pixel with standard deviation of less than 4 unit pixels in determining the location of the moiré fringe centers. The result showed that the neural network approach is applicable in moiré fringe centers determination and its feasibility in automating moiré pattern analysis with further improvement</p>
IP131	<p><b>Nonlinear Estimation of Coherent Phase Vibrations for Statistical Signals through Multivariable Analyses</b>  <b>Linhua Deng</b>  Yunnan Observatories, Chinese Academy of Sciences, China</p>

	<p><b>Abstract.</b> Three nonlinear analysis techniques, including cross-recurrence plot, line of synchronization, and cross-wavelet transform, are proposed to estimate the coherent phase vibrations of nonlinear and non-stationary time series. The case study utilizes the monthly averages of sunspot areas during the time interval from May 1874 to August 2014. The following prominent results are found: (1) the phase-leading hemisphere of long-term sunspot areas has changed twice in the past 140 years, indicating that the hemispheric imbalances and apparent phase differences on both hemispheres are a prevalent behavior and are not anomalous; (2) the alternating regularity of hemispheric asynchronism exhibits a cyclical pattern of 4.5+3.5 cycles, and the magnetic flux excess in a certain hemisphere during the ascending branch of a cycle can be taken as an indication of the phase-leading hemisphere in this cycle. We firmly believe that powerful nonlinear approaches are more advanced than classical linear methods when they are combined to determine the dynamic complexity of nonlinear physical systems.</p>
IP335	<p><b>NoSQL: Collection Document and Cloud by Using a Dynamic Web Query Form</b>  Hemn B.Abdalla, <b>Jinzhao Lin</b>, Guoquan Li  School of Communication and Information Engineering  Chongqing University of Posts and Telecommunications, China</p> <p><b>Abstract.</b> Mongo-DB (from “humongous”) is an open-source document database and the leading NoSQL database. A NoSQL (Not Only SQL, next generation databases, being non-relational, deal, open-source and horizontally scalable) presenting a mechanism for storage and retrieval of documents. Previously, we stored and retrieved the data using the SQL queries. Here, we use the MonogoDB that means we are not utilizing the MySQL and SQL queries. Directly importing the documents into our Drives, retrieving the documents on that drive by not applying the SQL queries, using the IO BufferedReader and Writer, BufferedReader for importing our type of document files to my folder (Drive). For retrieving the document files, the usage is BufferWriter from the particular folder (or) Drive.</p> <p>In this sense, providing the security for those storing files for what purpose means if we store the documents in our local folder means all or views that file and modified that file. So preventing that file, we are furnishing the security. The original document files will be changed to another format like in this paper; Binary format is used. Our documents will be converting to the binary format after that direct storing in one of our folder, that time the storage space will provide the private key for accessing that file. Wherever any user tries to discover the Document files means that file data are in the binary format, the document's file owner simply views that original format using that personal key from receive the secret key from the cloud.</p>
IP229	<p><b>Panel Labels Extraction from Multi-panel Figures for Facilitating</b></p>

	<p><b>Multi-modal Information Retrieval</b> Mushtaq Ali, <b>Le Dong</b>, Yan Liang, Ling He and Ning Feng School of Computer Science and Engineering, University of Electronic Science and Technology of China, China</p> <p><b>Abstract.</b> The association of subfigures in the multi-panel figure with related text in the accompanying caption and research article is necessary for the implementation of multi-modal information retrieval system. The panel labels in the multipanel figure are used as a source for making this kind of association. In this paper, we propose a novel method for the detection of panel labels in the multi-panel figures. The proposed method uses segmentation of multi-panel figure and its accompanying caption into subfigures and sub captions, respectively, as a preprocessing step. Next, the features of panel label, i.e., area and its distance from the borders in the upper left most subfigure of the multi panel figure are computed. These features are then used for detecting panel labels located in the rest of subfigures of the same multi-panel figure. Experiments on multi-panel figures selected from imageCLEF2013 dataset show promising results.</p>
IP330	<p><b>Research on Micro-blog character analysis based on Naïve Bayes</b> Yun Liu, <b>Tong Liu</b>, Yanbo J. Wang New Media Institute, Communication University of China, Beijing, 100024, China</p> <p><b>Abstract.</b> With the development of Information Technology, people have entered the era of Big Data, and the demand for intelligent information is more intense. How to make computer provide more personalized and efficient service for all walks of life, is something worth exploring. In this paper, we aim to predict user's character by analyzing the textual content of his/her micro-blog, which is the foundation of Personalized Service. Our study describes the method of creating a prediction model about user's character by using Bayesian algorithms. Experimental results show that the Naïve Bayes approach is a valid and promoted analytic method in micro-blog character analysis.</p>
IP227	<p><b>Robust hand tracking with on-line and off-line learning</b> Jiangyue Wei, Yong Zhao, <b>Hao Liang</b>, Ruzhong Cheng, and Yiqun Wei School of Electronic and Computer Engineering, Peking University Shenzhen Graduate School, China</p> <p><b>Abstract.</b> Hand tracking is becoming more and more popular in the field of human-computer interaction (HCI). A lot of studies in this area have made good progress. However, robust hand tracking is still difficult in long-term. On-line learning technology has great potential in terms of tracking for its strong adaptive learning ability. To address the problem we combined an on-line learning technology called on-line boosting with an off-line trained detector to track the hand. The contributions of this paper are: 1) we propose a learning method with</p>

	<p>an off-line model to solve the drift of on-line learning; 2) we build a framework for hand tracking based on the learning method. The experiments show that compared with other three methods, the proposed tracker is more robust in the strain case.</p>
IP134	<p><b>SAR Raw Data Compression Based on Geometric Characteristic of Gaussian Curve</b>  <b>Juan-ni Liu, Quan Zhou</b>  Xi'an Institute of Space Radio Technology, China</p> <p><b>Abstract.</b> Because of simple and good performance, the block adaptive quantization (BAQ) algorithm becomes a popular method for spaceborne synthetic aperture radar (SAR) raw data compression. As the distribution of SAR data can be accurately modeled as Gaussian, the algorithm adaptively quantizes the SAR data using Lloyd-Max quantizer, which is optimal for standard Gaussian signal. However, due to the complexity of the imaging target features, the probability distribution function of some SAR data deviates from the Gaussian distribution, so the BAQ compression performance declined. In view of this situation, this paper proposes a method to judge whether the data satisfies Gaussian distribution by using the geometrical relationship between standard Gaussian curve and a triangle whose area is equal to that of the Gaussian curve, then getting the coordinates of the intersection of two curves, and comparing the integral value within each node to form three judgment conditions. Finally, the data satisfying these conditions is compressed by BAQ, otherwise compressed by DPCM. Experimental results indicate that the proposed scheme improves the performance compared with BAQ method.</p>
IP123	<p><b>Signal recognition and parameter estimation of BPSK-LFM combined modulation</b>  <b>Long Chao, Zhang Lin, Liu Yu</b>  Technical Department, 28th Research, China</p> <p><b>Abstract.</b> Intra-pulse analysis plays an important role in electronic warfare. Intra-pulse feature abstraction focuses on primary parameters such as instantaneous frequency, modulation, and symbol rate. In this paper, automatic modulation recognition and feature extraction for combined BPSK-LFM modulation signals based on decision theoretic approach is studied. The simulation results show good recognition effect and high estimation precision, and the system is easy to be realized.</p>
IP612	<p><b>Statistical Process Control Based Chart for Information Systems Security</b>  <b>Mansoor Shaukat Khan and Lirong Cui</b>  School of Management and Economics, Beijing Institute of Technology</p> <p><b>Abstract.</b> Intrusion detection systems have a highly significant role in securing</p>



	<p>computer networks and information systems. To assure the reliability and quality of computer networks and information systems, it is highly desirable to develop techniques that detect intrusions into information systems. We put forward the concept of statistical process control (SPC) in computer networks and information systems intrusions. In this article we propose exponentially weighted moving average (EWMA) type quality monitoring scheme. Our proposed scheme has only one parameter which differentiates it from the past versions. We construct the control limits for the proposed scheme and investigate their effectiveness. We provide an industrial example for the sake of clarity for practitioner. We give comparison of the proposed scheme with EWMA schemes and p chart; finally we provide some recommendations for the future work.</p>
IP613	<p><b>Stock Price Forecasting Using Secondary Self-regression Model and Wavelet Neural Networks</b>  <b>Chi-I Yang, Kai-Cheng Wang, and Kuei-Fang Chang</b>  Feng-Chia University, Taiwan</p> <p><b>Abstract.</b> We have established a DWT-based secondary self-regression model (AR(2)) to forecast stock value. This method requires the user to decide upon the trend of the stock prices. We later used WNN to forecast stock prices which does not require the user to decide upon the trend. When comparing these two methods, we could see that AR(2) does not perform as well if there are no trends for the stock prices. On the other hand, WNN would not be influenced by the presence of trends.</p>
IP617	<p><b>Multitaper Spectral Estimator Based on a Cost Minimization Approach</b>  <b>Bo Yan, Haifen Yang, Liang Zhou</b>  University of Electronic Science and Technology of China, China</p> <p><b>Abstract.</b> A multitaper spectral analysis approach is built based on the minimization of cost function. The performance analysis indicates that this approach has comparative bias and variance as the approach of discrete prolate spheroidal sequence estimator. Compared with the DPSS, instead of solving the problem of matrix eigenvalues, the multitaper here needs less calculation with analytical expression of tapers. The validity of the estimator is verified by the computer simulation of an AR progress discrete as well as a white noise sequence</p>

<b>19:30-20:30</b>	<b><i>Dinner Banquet @ Restaurant</i></b>
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## Location and Access



### Millennium Biltmore Hotel Los Angeles

#### Guideline:

**Located in downtown Los Angeles, this luxurious design hotel is just a 4-minute walk from Pershing Square Subway Station. Millennium Biltmore Hotel provides on-site dining and rooms with satellite TV.**

**Dining options include Sai Sai Restaurant, offering Asian cuisine and a sushi bar, and Smeraldi's Restaurant, serving Italian cuisine. Gallery Bar and Cognac Room features live entertainment on Friday and Saturday nights.**



**Decorated in rich, warm colors, the guest rooms provide a safe and a work desk. Each room has a coffee maker as well. The marble bathrooms include a hairdryer.**

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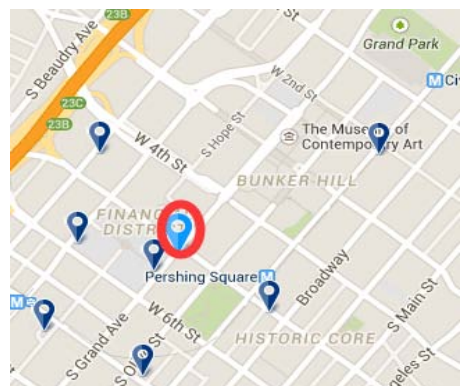
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## Upcoming Conferences:

### To Be Added

Date	Conference		Submission Before/Through
Sep 15 -16, 2015 Singapore	ICPRE 2015 <a href="http://www.icpre.org">http://www.icpre.org</a>	2015 International Conference on Power and Renewable Energy	Apr 30,2015 <a href="mailto:icpre@iacsit.org">icpre @iacsit.org</a>
Oct 12-13,2015, Paris, France	ICDLE 2015 <a href="http://www.icdle.org">http://www.icdle.org</a>	2015 6th International Conference on Distance Learning and Education	Jun 05,2015 <a href="mailto:icdle@iacsit.org">icdle @iacsit.org</a>
Nov 12-13,2015 Dubai, UAE	ICMENS 2015 <a href="http://www.icmens.org">http://www.icmens.org</a>	2015 11th International Conference on MEMS NANO, and Smart Systems	Jun 25,2015 <a href="mailto:icmens@iacsit.org">icmens @iacsit.org</a>





