



Intelligent Pattern Recognition and Applications

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Intelligent Pattern Recognition and Applications

---Modeling and Simulation in HC Interactive Environment

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Abstract::

This talk deals with fundamental aspects of 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: Interactive Pattern Recognition Concept, 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.

Intended Audience:

Scientists and engineers, with some computer science, artificial intelligence, pattern recognition, and/or image processing background or working experience.

Why this topic would be of interest to a substantial part of the audience:

Attendees can learn basic concept of “biometrics”, which is of growing interest and importance in recent years, and its applications in many fields, including engineering, scientific experiments, bio-medical imaging, pattern recognition, and homeland national security.

Length of the talk: keynote or full day tutorial

Evidence of teaching experience and evidence of scholarship in the area:

Preliminary versions of this talk have been successfully presented in various international conferences, including IEEE-SMC07 (Montreal, Canada), IEEE-BIBE07 (**Harvard U, USA**), IEEE-IAS07(Manchester, UK), IEEE-WAPR07 (Beijing, China), IASTED-AIA07 (Innsbruck, Austria), WorldComp2007(Las Vegas, USA), ICST-eForesics2008, (Adelaide, Australia), INSTICC-VISAPP2009(Lisbon, Portugal), and IEEE-SMC2009 (San Antonio, USA), and have attracted wide attention and warm reception. Please refer to:

<http://www.neu.edu/home/pwang>

<http://www.smc2007.org/index.html> ,

<http://www.smc2007.org/tutorials.html> ,

<http://www.ias07.org/> , Manchester, UK

<http://www.ias07.org/keynote-and-tutorials.php> ,

<http://www.cs.gsu.edu/BIBE07/> , **Harvard U.**

<http://www.cs.gsu.edu/BIBE07/tutorials.php> ,

<http://www.world-academy-of-science.org/worldcomp07/ws/tutorials> ,
<http://cis2007.hit.edu.cn/program.htm> ,p13,
<http://isi2008.cpu.edu.tw/> , Speakers & Panelist
<http://www.e-forensics.eu/program.shtml> , (ICST 2008, Adelaide, Australia) ,
<http://broadcom.eng.uts.edu.au/broadcom08/> ,
<http://www.icmlc.com/> (2008, Kunming, China),
<http://www.icpcm.org/> (2008, Delhi, India)
Pervasive Computing
<http://visapp.visigrapp.org/VISAPP2009/> , (2009, Lisboa, Portugal)
<http://www.isibm.org/IJCBS/keynotes.html>, (2009, Shanghai, China) IEEE, USA-NSF
<http://www.smc2009.org/workshop.html>, (2009, San Antonio, Texas)

Brief Biography of the Presenter

Prof. Patrick S.P. Wang, PhD. IAPR Fellow and IEEE Outstanding Achievement Awardee, and is Tenured Full Professor, Northeastern University, USA, iCORE (Informatics Circle of Research Excellence) Visiting Professor, University of Calgary, Canada, Otto-Von-Guericke Distinguished Guest Professor, Magdeburg University, Germany, Zijiang Visiting Chair, ECNU, Shanghai, China, as well as honorary advisory professor of several key universities in China, including Sichuan University, Xiamen University, East China Normal University, Shanghai, and Guangxi Normal University, Guilin.

Prof. Wang received his BSEE from National Chiao Tung University (Jiaotong University), MSEE from National Taiwan University, MSICS from Georgia Institute of

Technology, and PhD, Computer Science from Oregon State University.

Dr. Wang has published over 23 books, 130 technical papers, 3 USA/European Patents, in PR/AI/TV/Cybernetics/Imaging, and is currently founding Editor-in-Chief of *IJPRAI (International Journal of Pattern Recognition and Artificial Intelligence)* , and Book Series of *MPAI*, WSP. In addition to his technical interests, Dr. Wang also published a prose book, “*Harvard Meditation Melody*” 《哈佛冥想曲》 and many articles and poems regarding Du Fu and Li Bai’s poems, Beethoven, Brahms, Mozart and Tchaikovsky’s symphonies, and Bizet, Verdi, Puccini and Rossini’s operas.

For further details, here is presenter’s contact information

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<http://ejournals.wspc.com.sg/ijprai/mkt/editorial.shtml>, **Founding Editor-in-Chief**
http://www.worldscibooks.com/series/smpai_series.shtml
<http://www.isibm.org/leadership.php>
<http://www.dcs.warwick.ac.uk/~ctli/IJDCF.html> *Advisory Board*

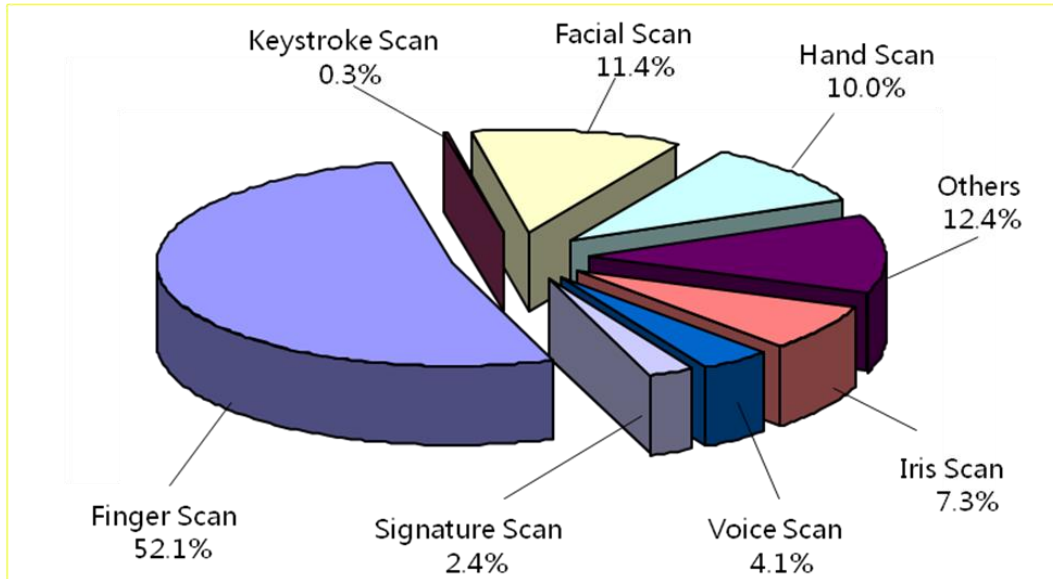
Bibliography (selected from over 2 dozens of technical papers and books)

- [1]Anil K. Jain, Arun A. Ross, Patrick Flynn, Handbook of Biometrics, Springer Verlag, 2007
- [2]P.S.P.Wang, [Pattern Recognition and Machine Vision](#), River Pub, Denmark, 2010
- [3]P.S.P.Wang, [Pattern Recognition and Artificial Intelligence in Biometrics - EDITORIAL](#), S.N. Yanushkevich, D. Hurley, and P.S.P. Wang, *IJPRAI*, Vol. 22, No. 3, 367-369 (2008)
- [4]P.S.P.Wang,, Object Recognition, <http://www.ccs.neu.edu/home/pwang/ObjectRecognition/> (2008)
- [5]P.S.P.Wang and S. Yanushkevich, "Biometrics Technologies and Applications", *Proc. IASTED AIA2007 (Artificial Intelligence Applications)*, Innsbruck, Austria, 2007, p226-231 (2007)
- [6]P.S.P.Wang, "Some Concerns on the Measurement for Biometrics Analysis and Applications",in “*Image Pattern Recognition - Synthesis and Analysis in Biometrics*” WSP, 2007 (co-ed S.N. Yanuskevich, P.S.P.Wang, S.N. Srihari, and Marina Gavrilova). P321-337 (2007)
USA DHS (Department of Homeland Security) uses [6] as reference for its CFP 2010
<https://www.sbir.dhs.gov/PastSolicitationDownload.asp#101005>

Appendix: **Some Highlighted Illustrations of the Presentation**

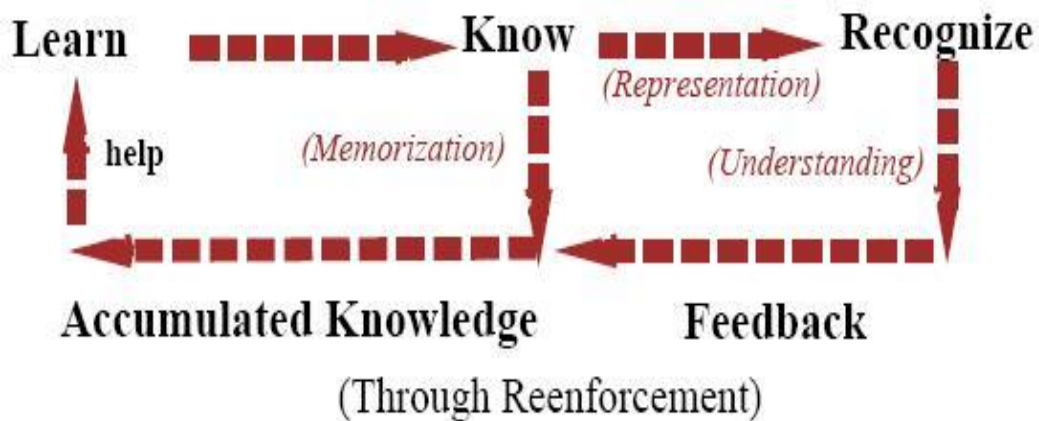
What are Biometrics?

Biometrics are automated methods of recognizing a person based on the acquired physiological or behavioral characteristics



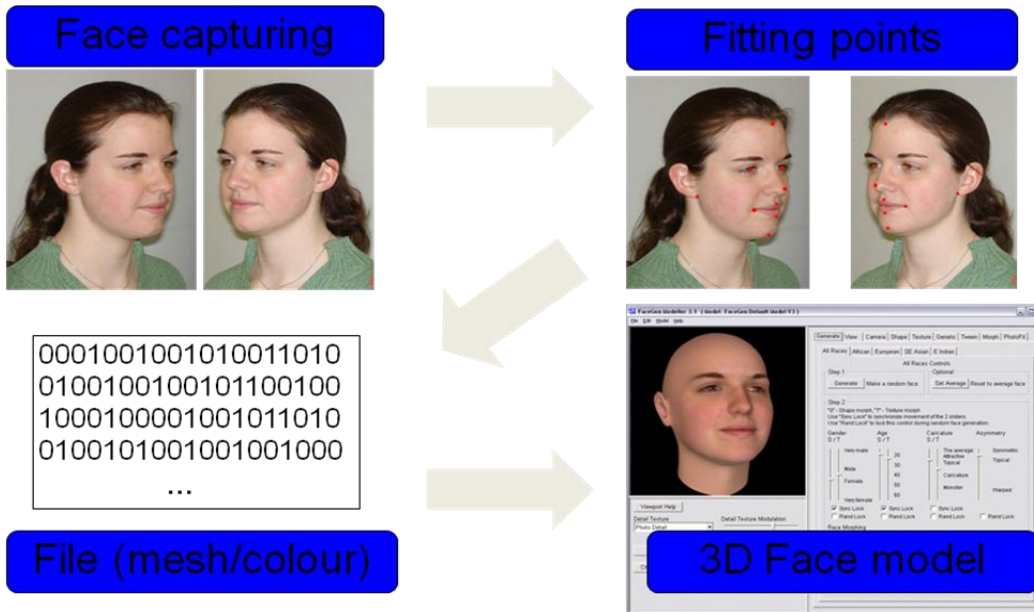
Percentage of usage (Source: International Biometrics Group)

Learning, Knowledge, and Recognition

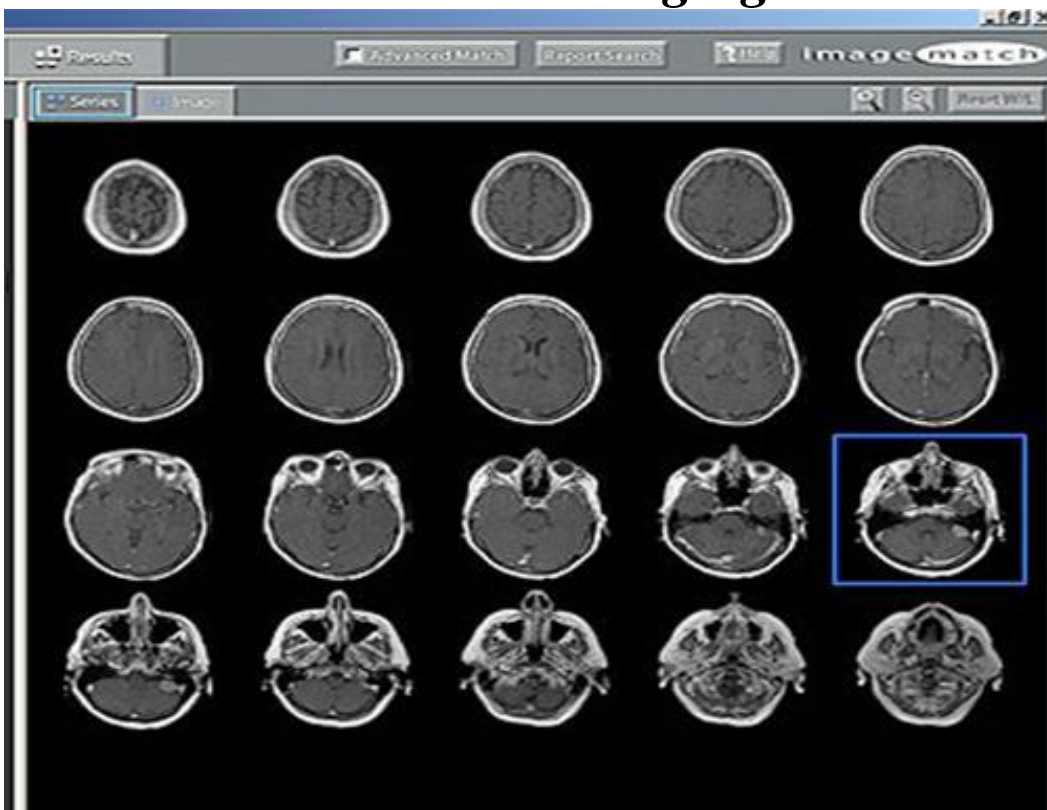


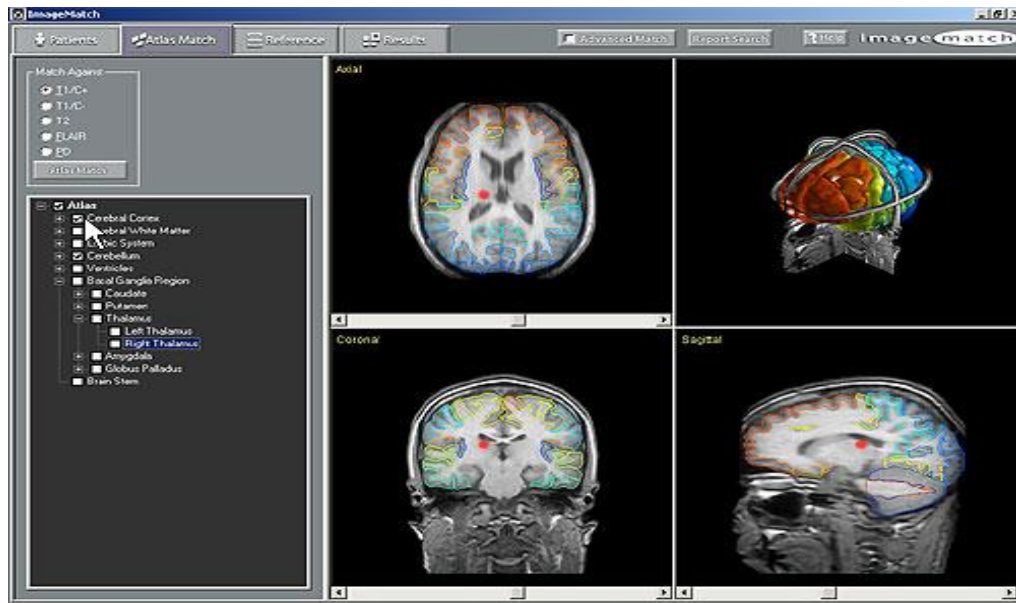
*Learning Cycle:
knowledge, recognition, understanding, representation*

Face Analysis, Comparison and Matching:

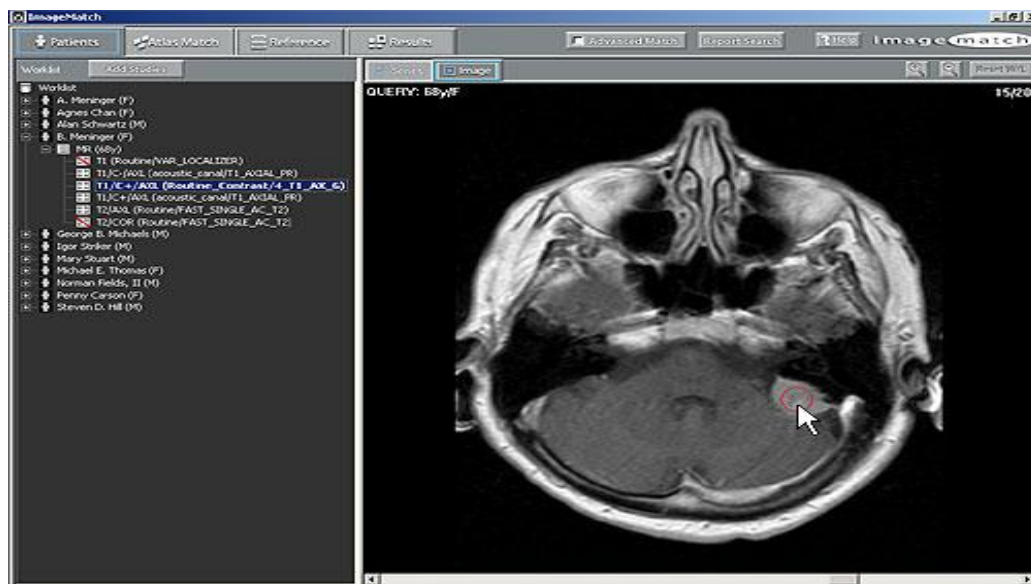


Biomedical Imaging



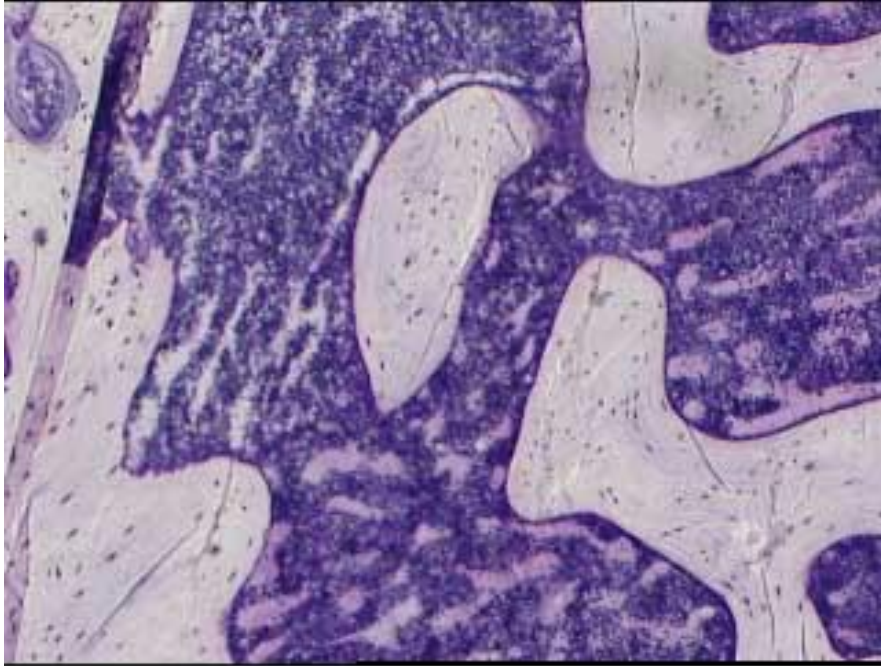


Marking the checkboxes displays the anatomy in the 3D rendering.



After choosing the image that best represents the pathology of the case, double-clicking on the region where pathology is shown will activate the Image Match search engine and automatically transfer you to the Results page.

***Color Image Segmentation - Experiment 1
Intensity Distinguishable***



***Color Image Segmentation - Experiment 2
Hue Distinguishable***

