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Objective: Leadership - Looking for a high level lead position.

Employment:

08/02~Current Dept. of Computer Science and Information Engineering, National Cheng Kung University, Tainan, Taiwan.

Position: Assistant professor and director of Robotics Laboratory.
<http://robotics.csie.ncku.edu.tw>

01/99~07/02 Visionics Corporation (Now called Identix (NASDAQ: IDNX). Jersey City, NJ, USA. <http://www.visionics.com>
It is an award-winning facial recognition software company.
Employees: Before 2000 – 21 employees, after 2002 – 550 employees.

Position: Senior Research Scientist/DARPA Project Manager. One of the employees started when the company just began.

(08/00) **Grant:** Received US\$ **4-Million** research grant from **DARPA's** (Defense Advanced Research Projects Agency) Surveillance Project BAA00-29: Human Identification at a Distance (**HID**). This project includes 13 research labs from those top Universities and 5 research labs from companies. Total US\$50 Millions for this project.

(01/02) **Grant:** Received additional research grant, US\$**1.0 Million**, from the same DARPA HID project for year 2002.

Award: 2000 FERET Face Recognition Competition: No. 1.

Projects and Released Products:

08/00: US\$4 Million research grant from DARPA HID:

12/01: Passed the first evaluation and received additional grant, US\$1.0 M, from DARPA HID project for year 2002.

01/01~07/02: DARPA HID: Real-time camera networks – **surveillance** using **stereo system** and multiple (pan-tilt-zoom) **active cameras** controlled via **internet**.

09/00~12/00: DARPA HID: Real-time stereo system for individual/subject segmentation/detection, face detection and depth estimation (**sub-pixel disparity estimation**) up to 200 feet (around 61 m).

05/00~08/00: **Augmented Reality** - Self-calibration from one single rectangle.

01/00~04/00: **Real-time camera calibration**.

09/99~12/99: **Surveillance – Real-time face detection and tracking**.

05/99~08/99: **Teleconferencing** for TRW.

01/99~04/99: **Real-time Image Quality Evaluation** (brightness, darkness, blur, glare, RGB, HSV evaluations, dynamic range analysis and eyeglasses detection) for Immigrant Agency, USA.

01/99~07/02: In cooperation with a group of scientists working in the field of **2D/3D face recognition**.

05/98~12/98 **Carnegie Mellon University, School of Computer Science (SCS), the Robotics Institute (RI), Vision Autonomous Systems Center (VASC).**

Position: Visiting Research Scientist

Project: Automated Face Analysis (at Face Group).

<http://www.cs.cmu.edu/afs/cs/project/face/www/Facial.htm>

http://www.ri.cmu.edu/labs/lab_51.html

01/93~08/93 Surface Systems, Inc. St. Louis, Missouri.

Position: R&D Engineer.

Project: **Hardware/circuit** design and simulation for weather forecast and **software** design for water pollution analysis by using C, FoxPro and Excel.

Job Offer: Job interview results in 1998

Offered by **IBM, Intel, Philips, Viisage and Visionics** and decided to go to Visionics.

Education:

08/93~04/98 **Ph.D. Electrical and Computer Engineering**, University of Pittsburgh.

Research Assistant: Research conducted at the **Carnegie Mellon University (CMU), School of Computer Science (SCS), the Robotics Institute (RI), Vision Autonomous Systems Center (VASC).**

Advisor: **Professor Takeo Kanade, Director of the RI, SCS, CMU.**

Advisor: **Professor Ching-Chung Li, ECE, U. of Pittsburgh (UPitt).**

Advisor: **Professor Jeffrey F. Cohn, Dept. of Psychology and Psychiatry, U. of Pittsburgh.**

(CMU, RI) **Dissertation Title: “Automatic Recognition of Facial Expressions Using Hidden Markov Models and Estimation of Expression Intensity”**

Available via <http://www.cs.cmu.edu/~jjlien> or
<http://robotics.csie.ncku.edu.tw>

(Contribution) *First complete system of automatic facial expression analysis.*

Based on the algorithms of my dissertation, we created a user interface for automatically analyzing facial expressions programming in C, Motif, X Toolkit & Xlib under UNIX environment and in MFC Visual C++ under Windows NT/98 environment.

(Media Reports) Has been reported several pages in the **Washington Post**, **Washington Times**, **Pittsburgh Post-Gazette**, **New York Newsday**, **the Times of London**, and on radio in the USA, Australia, England, Austria and Taiwan.

(Clinical

Applications) Has been successfully applied at **clinical psychology** – lie detection for **President Clinton’s** affair (see above news reports) and interaction between infants and parents, **plastic surgery** at University Pittsburgh Medical Center (UPMC), and **biometrics and speech therapy** – lip tracing.

(U. of Pitt) **Research Title: “Automatic Registration of Multi-Resolution Multi-Sensor Satellite Images Using Wavelet Decomposition”**

Advisor: Professor Ching-Chung Li, ECE, U. of Pittsburgh.

08/91~05/93 **M.S. Electrical and Computer Engineering**, Washington University, St. Louis, Missouri.

Research Title (in Biomedical Program, Computer Engineering): “Diagnosis of Ultrasonic Imaging System: Hardware and Software”

09/85~05/89 **B.S. Biomedical Engineering**, Chun Yuan University, Taiwan.

Project: Designed a **laser acupuncture** system with a diode laser.

Project: Created a user interface (using C & 8086/88 assembly languages) as technical assistance for **electrocardiogram (EKG)** analysis.

Military

Experience: Served at an electronic maintenance division, ARMY, Taiwan.

09/89~07/91 Leader of division responsible for maintenance of Hercules Missiles, RFTS (Radio Frequency Test Set) and ETS (Electronic Test Set).

Expertise: **System Integration** – Real-time DARPA system includes one stereo system and several pan-tilt-zoom active cameras, which are controlled by

3 PCs running Visual C++ at Windows 2000 and by 9 PCs running Java at Linux. All PCs communicate each other via hubs.

System-on-Chip (S.O.C.) – Embedded facial detection and recognition SDKs/applications into PDA and CMOS camera chipset (CPU: ARM 50M Hz).

Life, Internet, PDA and ATM Security, Surveillance and Biometrics – Real-time subject and face detection, tracking, verification and identification, facial pose estimation, skin color/naked person detection, signature/handwriting recognition, and hand geometry recognition.

Human-Computer Interface/Interaction (HCI) – Gesture and facial expression extraction, coding, tracking and recognition, pose estimation, eye gazing, lip-reading, audio-video integration and background modeling.

Pattern Recognition or Artificial Intelligence - Fuzzy logic, Bayes decision theory, neural network, hidden Markov model, support vector machine, Fisher's discriminant, and dynamic programming.

Robot Vision, 2D/3D Computer Vision and Geometric Computation – Real-time camera calibration, self-calibration, multi-baseline stereo, real-time background modeling, 3D segmentation, 3D reconstruction, structure from motion: modeling by video sequence, factorization applications, omni-directional camera applications, motion estimation (real-time optical flow and wavelet dense flows), and rigid and non-rigid motion separation.

Virtual Reality – Facial expression analysis and synthesis – connection between real world and virtual world, view morphing, augmented reality, animation, and panoramic mosaic.

Multimedia Communications and MPEG: XML, VRML, Content-based retrieval/digital library, videoconferencing or distance learning, video skimming, audio-visual integration, and face recognition/identification via internet.

Biomedical Applications – Geometric registration or alignment, facial muscle motion analysis for EMG (Electromyogram) and plastic surgery researches, ultrasound image analysis and speech therapy (lip reading) and clinical psychology (interaction between infants and parents).

Real-Time Video Analysis and Statistic Image Analysis: Motion line & edge linking & extraction, corner detection, geometric transformations, histogram analysis, segmentation, thinning, morphology (dilation & erosion), and connected component labeling.

Compression: Wavelets, Discrete Cosine Transform (DCT), automated facial action coding, Karhunen-Loeve expansion/principal component analysis, and vector quantization.

Image Quality Evaluation and Color Applications: Histogram analysis, brightness, darkness, blur, RGB, HSV (hue, saturation and value), glare evaluations, eyeglasses detection, dynamic range analysis and skin-color detection and tracking, and naked people detection for internet security.

Signal Processing, Time-Frequency Analysis, and Wavelets.

Probability & Stochastic Processes, Numerical Computing, Robust Estimation, Outlier Process, Linear and Nonlinear Optimization, and Maximum Likelihood Estimation.

Computer Architecture, Automata Theory & Formal Language Theory, Switching Theory and Fault Tolerance.

VLSI/Hardware Design:

System-on-Chip (S.O.C.): Embedded face detection and recognition SDK/applications into PDA and CMOS camera chipset (CPU: ARM 50M Hz).

Digital Integrated Circuit and System Design: M68000 microprocessor, TTL or CMOS logic, and A/D & D/A conversion.

CMOS VLSI Circuit Design and Architecture: Spice (simulation software) and Magic (layout software).

Solid-State Power Control Circuits and Applications.

Computer

Languages: XML, VRML, Object-Oriented design, (MFC) Visual C++, C++, C, Pascal, Fortran, assembly language (including Z-80, 80x86/88, M68000), Motif, X Toolkit & Xlib, and matlab.

Operating

Systems: Windows 95/98/NT/2000, LINUX, UNIX, MS-DOS, and Macintosh.

Reviewer: IEEE Signal Processing Society – IEEE Transactions on Image Processing, IEEE Transactions on Multimedia, and IEEE Signal Processing Magazine.

Membership: IEEE and Sigma Xi, the scientific Research Society.

Academic

Talks: (EE/CSIE) National Taiwan University, (CIS/CSIE) National Chiao Tung University, (CS) National Tsing Hua University, and Institute of Information Science Academia Sinica, Taiwan.

Industrial

Talks: Microsoft, IBM, Siemens, Philips and Kodak.

Demonstration

Experience: Demonstrated the user interface with my research results to visitors from both industry (ex. HP, ATR, NTT, Sharp, Sony, and Toshiba) and academy.

Conference**Activation:**

Invited Talks-**"Face Detection and Tracking in Real Time, and Facial Expression Extraction, Coding and Recognition,"** *IEEE Multimedia and Networking Technology*, Newark, NJ, Nov. 19-20, 1999.

1998 **"Facial Expression Coding, Extraction and Recognition,"** *International Symposium on Multimedia Information Processing*, Chung-Li, Taiwan, Dec. 14-16, 1998.

1998 **"Connection between Real and Virtual Facial Expressions,"** *Conference of Emerging Multimedia Technologies for Next Generation Internet*, Newark, NJ, Nov. 20-21, 1998.

Chair - *International Symposium on Multimedia Information Processing*, Chung-Li, Taiwan, Dec. 14-16, 1998. (Session Chair: Invited several speakers from IBM Research Lab, Princeton U., U. of Washington in U.S.A. and University in Singapore.)

Media: ABC, NBC, and CBS TV Channels and Discovery Channel in USA:
2001 **"Surveillance – Security via CCTV"**

2000 **Central Broadcasting System**, Taiwan on Jan. 11, 2000.
"Intelligent Computer Vs. Human Behavior," interviewed by Miss Liang, Hung-Yu.

1998~1999 **"Automated Face Analysis Using Computer,"** on radio in the USA, Australia, England, and Austria.

(Newspapers) *Washington Post*, *Washington Times*, and *Pittsburgh Post-Gazette* on
1998 Aug. 3, 1998 - "Look Closely: Computer program reads deep into our true feelings by analyzing our facial expressions."

1998 *New York Newsday* on Aug. 11, 1998. And *The Times of London*.

Book Chapter:

2000 *Automated Face Analysis*, Progress in Infancy Research, Vol. 1, Lawrence Erlbaum Associates, Inc. Jan. 2000.

Publications: Available via <http://robotics.csie.ncku.edu.tw> or <http://www.cs.cmu.edu/~jjlien>

1999~2002 Visionics does not allow me to publish any papers related to work. But you can see my works from the introductions of company products at <http://www.visionics.com> or <http://www.identix.com>.

2000 Jenn-Jier James Lien, Takeo Kanade, Ching-Chung Li and Jeffrey F. (Invited Paper)Cohn, "Detection, Tracking, and Classification of Action Units in Facial Expression," *IEEE Journal of Robotics and Autonomous Systems*, Special Issue: Face Expression in Human-Robot Interaction, Systems 31, pp. 131-146, 2000.

1999 Jenn-Jier James Lien, Takeo Kanade, Ching-Chung Li and Jeffrey F. (Invited Paper), Cohn, "Automatic Facial Expression Recognition via Hidden Markov Model Based on Eigenflow in Video Sequence," *Multimedia and Networking Technology*, 1999.

1999 J.F. Cohn, A.J. Zlochow, J.J. Lien, and T. Kanade, "Automated Face Analysis by Feature Point Tracking Has High Concurrent Validity With Manual FACS Coding," *Journal of Psychophysiology* 35(1), 1999.

1998 Jenn-Jier James Lien, Takeo Kanade, Ching-Chung Li and Jeffrey F. (Invited Paper)Cohn, "MPEG Application: Facial Expression Extraction, Coding and Recognition," *International Symposium on Multimedia Information Processing*, Chung-Li, Taiwan, Dec. 14-16, 1998.

1998 Jenn-Jier James Lien, Takeo Kanade, Ching-Chung Li and Jeffrey F. (Invited Paper)Cohn, "Connection between Real and Virtual Facial Expressions," *Conference of Emerging Multimedia Technologies for Next Generation Internet*, Newark, NJ, Nov. 20-21, 1998.

1998 J.F. Cohn, J.J. Lien, T. Kanade, W. Hua, and A. Zlochow, "Beyond (Invited Paper) Prototypic Expressions: Discriminating Subtle Changes in the Face," *Proceedings of the 7th IEEE Workshop on Robot and Human Communication (ROMAN'98)*, Takamatsu, Japan, Sept.30-Oct.2, 1998.

1998 Jenn-Jier James Lien, Takeo Kanade, Jeffrey F. Cohn, and Ching-Chung Li, "Subtly Different Facial Expression Recognition and Expression

- Intensity Estimation,” *IEEE Conference on Computer Vision and Pattern Recognition*, pp. 853-859, Santa Barbara, CA, June 23-25, 1998.
- 1998 Jenn-Jier James Lien, “Automatic Recognition of Facial Expressions Using Hidden Markov Models and Estimation of Expression Intensity,” Ph.D. Dissertation, Technical Report, Carnegie Mellon University, Robotics Institute, CMU-RI-TR-98-31, May, 1998.
- 1998 Jenn-Jier James Lien, Takeo Kanade, Jeffrey F. Cohn, and Ching-Chung Li, “Automated Facial Expression Recognition Based on FACS Action Units,” *Third IEEE International Conference on Automatic Face and Gesture Recognition*, pp. 390-395, Nara, Japan, April 14-16, 1998.
- 1998 J.F. Cohn, A.J. Zlochow, J.J. Lien, and T. Kanade, “Feature-Point Tracking by Optical Flow Discriminates Subtle Differences in Facial Expression,” *Third IEEE International Conference on Automatic Face and Gesture Recognition*, pp. 396-401, Nara, Japan, April 14-16, 1998.
- 1998 A.J. Zlochow, J.F. Cohn, J.J. Lien, and T. Kanade, “Automated Face Coding: A Computer Vision Based Method of Facial Expression Analysis in Parent-Infant Interaction,” *International Conference on Infant Studies*, Atlanta, Georgia, April 1998.
- 1997 Jenn-Jier James Lien, Takeo Kanade, Adena J. Zlochow, Jeffrey F. Cohn, and Ching-Chung Li, “Automatically Recognizing Facial Expressions in the Spatio-Temporal Domain Using Hidden Markov Models,” *IEEE Workshop on Perceptual User Interfaces*, pp. 94-97, Alberta, Canada, October 1997.
- 1997 J.F. Cohn, A.J. Zlochow, J.J. Lien, Y.T. Wu, and T. Kanade, “Automated Face Coding: A Computer-Vision Based Method of Facial Expression Analysis,” *7th European Conference on Facial Expression, Measurement, and Meaning*, Salzburg, Austria, July 1997.
- 1997 J.F. Cohn, A.J. Zlochow, J.J. Lien, Y.T. Wu, and T. Kanade, “Facial Expression Can Be Measured by Image Processing of Video Sequences,” *Biennial Meeting of the Society for Research in Child Development*, pp. 98, Washington, D.C., April 1997.
- 1996 J.F. Cohn, A.J. Zlochow, J.J. Lien, Y.T. Wu, and T. Kanade, “Facial Expression Analysis: Preliminary Results of a New Image-Processing Based Method,” *Proceedings of the 9th Conference of the International Society for Research on Emotions*, pp. 329-333, Toronto, Canada, August 1996.

References:

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Available upon request for more references