

# Matthew N. Dailey

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**Current Position** Assistant Professor, Computer Science and Information Management, Asian Institute of Technology, Thailand.

**Research Interests** Machine learning and computer vision, especially applied to robotics and video surveillance.

**Education** **University of California, San Diego**  
Ph.D., Computer Science and Cognitive Science, 2002.  
*Thesis:* Computational models of high-level visual perception and recognition.

**North Carolina State University**  
M.S., Computer Science, 1995; B.S., Computer Science, 1992.  
*Thesis:* Intelligent interfaces and complex analysis tasks: A knowledge-based interface for biological sequence analysis.

**Honors, Awards, Grants**  
Best Reviewer Award, MIWAI 2009  
Royal Thai Government Joint Research Grant, 2009–2010  
Royal Thai Government Joint Research Grant, 2007–2008  
Thailand Research Fund post-doctoral research grant, 2004–2006  
Top-10 most-downloaded article in *Neural Networks* for 2003  
Powell Fellowship, UCSD, 2001  
ARCS Fellowship, UCSD, 1999  
Computer Science Teaching Excellence Award, UCSD, 1998  
Powell Fellowship, UCSD, 1996  
Graduated Magna Cum Laude, NC State University  
Upsilon Pi Epsilon Computer Science Honor Society, NC State University

## Publications

Dailey, M.N., Joyce, C., Lyons, M.J., Kamachi, M., Ishi, H., Gyoba, J., and Cottrell, G.W. (2010), Evidence and a computational explanation of cultural differences in facial expression recognition. In press, *Emotion*.

Ziauddin, S. and Dailey, M.N. (2010), Robust iris verification for key management. In press, *Pattern Recognition Letters*.

Abbasi, A.R., Dailey, M.N., Afzulpurkar, N.V., and Uno, T. (2010), Student mental state inference from unintentional body gestures using dynamic Bayesian networks. *Journal on Multimodal User Interfaces* 3(1):21–31.

Sopharak, A., Dailey, M.N., Uyyanonvara, B., Barman, S., Williamson, T., Nwe, K.T., and Moe, Y.A. (2010), Machine learning approach to automatic exudate detection in retinal images from diabetic patients. *Journal of Modern Optics* 57(2):124–135.

Ahmed, M.T., Dailey, M.N., Landabaso, J.L., and Herrero, N. (2010), Robust key frame extraction for 3D reconstruction from video streams. To appear, *International Conference on Computer Vision Theory and Applications (VISAPP 2010)*.

Chaivivatrakul, S., Moonrinta, J., and Dailey, M.N. (2010), Towards automated crop yield estimation: Detection and 3D reconstruction of pineapples in video sequences. To appear, *International Conference on Computer Vision Theory and Applications (VISAPP 2010)*.

Iqbal, W., Dailey, M.N., Carrera, D., and Janecek, P. (2010), SLA-driven automatic bottleneck detection and resolution for read intensive multi-tier applications hosted on a cloud. To appear, *International Conference on Grid and Pervasive Computing (GPC 2010)*, Lecture Notes in Computer Science.

Bo Bo, N., Dailey, M.N., and Uyyanonvara, B. (2009), Natural-pose hand detection in low-resolution images. *Songklanakarin Journal of Science and Technology* 31(2): 157–165.

Iqbal, W., Dailey, M.N., and Carrera, D. (2009), SLA-driven adaptive resource management for Web applications on a heterogeneous compute cloud. In *International Conference on Cloud Computing*, Lecture Notes in Computer Science vol. 5931, Springer, pp. 243–253.

Limsoonthrakul, S., Dailey, M.N., and Parnichkun, M. (2009), Intelligent vehicle localization using GPS, compass, and machine vision. In *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, pp. 3981–3986.

Ali, I., and Dailey, M.N. (2009), Multiple human tracking in high-density crowds. In *Advanced Concepts in Intelligent Vision Systems (ACIVS)*. Lecture Notes in Computer Science vol. 5807, Springer, pp. 540–549.

Tongphu, S., Thongsak, N., and Dailey, M.N. (2009), Rapid detection of many object instances. In *Advanced Concepts in Intelligent Vision Systems (ACIVS)*. Lecture Notes in Computer Science vol. 5807, Springer, pp. 434–444.

**Publications  
(cont.)**

Zask, R. and Dailey, M.N. (2009), Rapid 3D visualization of indoor scenes using 3D occupancy grid isosurfaces. In *Proceedings of ECTI-CON 2009*, pp. 672–675.

Ziauddin, S. and Dailey, M.N. (2009), A robust hybrid iris localization technique. In *Proceedings of ECTI-CON 2009*, pp. 1058–1061.

Rhienmora, P., Haddawy, P., Suebnukarn, S., and Dailey, M.N. (2009), A VR environment for assessing dental surgical expertise. *International Conference on Artificial Intelligence in Education*, pp. 746–748.

Rhienmora, P., Haddawy, P., Suebnukarn, S., and Dailey, M.N. (2009), Providing objective feedback on skill assessment in a dental surgical training simulator. In *Proceedings of the Conference on Artificial Intelligence in Medicine*. Lecture Notes in Computer Science vol. 5651, Springer, pp. 305–314.

Waranusast, R., Haddawy, P., and Dailey, M.N. (2009), Segmentation of text and non-text in on-line handwritten patient record based on spatio-temporal analysis. In *Proceedings of the Conference on Artificial Intelligence in Medicine*. Lecture Notes in Computer Science, vol. 5651, Springer, pp. 345–354.

Limsoonthrakul, S., Dailey, M.N., Srisupundit, M., Tongphu, S., and Parnichkun, M. (2008), A modular system architecture for autonomous robots based on blackboard and publish-subscribe mechanisms. In *IEEE International Conference on Robotics and Biomimetics (ROBIO 2008)*, pp. 633–638.

Ziauddin, S., and Dailey, M.N. (2008), Iris recognition performance enhancement using weighted majority voting. In *International Conference on Image Processing (ICIP)*, pp. 277–280.

Abbasi, A.R., Dailey, M.N., Afzulpurkar, N.V., and Uno, T. (2008), Probabilistic prediction of student affect from hand gestures. In *International Conference on Automation, Robotics and Control Systems (ARCS)*, pp. 58–63.

Abbasi, A.R., Dailey, M.N., Afzulpurkar, N.V., and Uno, T. (2008), Obtaining self-reports for affective system design. In *NordiCHI2008 Workshop on Research Goals and Strategies for Studying User Experience and Emotion*.

Samphaiboon, N. and Dailey, M.N. (2008), Steganography in Thai text. In *Proceedings of ECTI-CON 2008*, pp. 133–136.

Rittammanart, N., Wongyued, W., and Dailey, M.N. (2008), ERP application development frameworks: Case study and evaluation. In *Proceedings of ECTI-CON 2008*, pp. 173–176.

Kaitrungrit, D., Dailey, M.N., and Wutiwiwatchai, C. (2008), Thai voice application gateway. In *Proceedings of ECTI-CON 2008*, pp. 101–104.

Haruechaiyasak, C., Kongyoung, S., and Dailey, M.N. (2008), A comparative study on Thai word segmentation approaches. In *Proceedings of ECTI-CON 2008*, pp. 125–128.

**Publications  
(cont.)**

Sopharak, A., Thet Nwe, K., Moe, Y.A., Dailey, M.N., and Uyyanonvara, B. (2008), Automatic exudate detection with a naive Bayes classifier. In *Proceedings of the International Conference on Embedded Systems and Intelligent Technology (ICESIT)*, pp. 139–142.

Suebnuakarn, S., Haddawy, P., Dailey, M.N., and Cao, D.N. (2008), Interactive segmentation and three-dimensional reconstruction for cone-beam computed-tomography images. *NECTEC Technical Journal*, 8(20): 154–161.

Rhienmora, P., Haddawy, P., Dailey, M.N., Khanal, P., and Suebnukarn, S. (2008), Development of a dental skills training simulator using virtual reality and haptic device. *NECTEC Technical Journal*, 8(20): 140–147.

Haddawy, P., Dailey, M.N., Kaewruen, P., Sarakhetta, N., and Hai, L.H. (2007), Anatomical sketch understanding: Recognizing explicit and implicit structure. *Artificial Intelligence in Medicine*, 39(2): 165–177.

Namprempre, C. and Dailey, M.N. (2007), Mitigating dictionary attacks with text-graphics character CAPTCHAs. *IEICE Transactions on Fundamentals of Electronics, Communications and Computer Sciences*, E90-A(1): 179–186.

Marikhu, R., Dailey, M.N., Makhanov, S.S., and Honda, K. (2007), A family of quadratic snakes for road extraction. In *Proceedings of the Eighth Asian Conference on Computer Vision (ACCV 2007)*, Lecture Notes in Computer Science (LNCS) vol. 4843, Springer, pp. 85–94.

Abbasi, A.R., Uno, T., Dailey, M.N., and Afzulpurkar, N.V. (2007), Towards knowledge-based affective interaction: Situational interpretation of affect. In *Proceedings of the Second International Conference on Affective Computing and Intelligent Interaction (ACII 2007)*, Lecture Notes in Computer Science (LNCS) vol. 4738, Springer, pp. 455–466.

Bo Bo, N., Dailey, M.N., and Uyyanonvara, B. (2007), Robust hand tracking in low-resolution video sequences. In *Proceedings of the 3rd International Conference on Advances in Computer Science and Technology (ACST 2007)*.

Nakaguro, Y., Dailey, M.N., and Makhanov, S. (2007), SLAM with KLT point features. In *Proceedings of the International Workshop on Advanced Imaging Technology (IWAIT 2007)*.

Dailey, M.N. and Parnichkun, M. (2006), Simultaneous localization and mapping with stereo vision. In *Proceedings of the International Conference on Automation, Robotics, and Computer Vision (ICARCV 2006)*.

Anuyouthapong, P., Luckboonjuang, O., Nawaeamwilai, S., and Dailey, M.N. (2006), Face detection for improved security at parking lot checkpoints. In *Proceedings of ECTI-CON 2006*.

**Publications  
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Amin, M.A., Afzulpurkar, N.V., Dailey, M.N., Esichaikul, V.E., and Batanov, D.N. (2005), Fuzzy-C-Mean determines the principle component pairs to estimate the degree of emotion from facial expressions. In *Fuzzy Systems and Knowledge Discovery*, Lecture Notes in Artificial Intelligence vol. 3613, Springer, pp. 484–493.

Haddawy, P., Dailey, M.N., Kaewruen, P., and Sarakhette, N. (2005), Anatomical sketch understanding: Recognizing explicit and implicit structure. In *Proceedings of the 10th Conference on Artificial Intelligence in Medicine (AIME '05)*, Lecture Notes in Artificial Intelligence vol. 3581, Springer, pp. 343–352.

Dailey, M.N. and Parnichkun, M. (2005), Landmark-based simultaneous localization and mapping with stereo vision. In *Proceedings of the 2005 Asian Conference on Industrial Automation and Robotics (ACIAR '05)*, F-15. Reprinted in *International Journal for Manufacturing Science & Technology*, 8(2), 17–22, 2006.

Dailey, M.N. and Bo Bo, N. (2005), Towards real-time hand tracking in crowded scenes. In *Proceedings of the 2005 Asian Conference on Industrial Automation and Robotics (ACIAR '05)*, F-70.

Dailey, M.N., and Namprempre, C. (2004), A text-graphics character CAPTCHA for password authentication. In *TENCON 2004 Conference Proceedings*, IEEE, pp. B045–B048.

Dailey, M.N., Cottrell, G.W., Padgett, C., and Adolphs, R. (2002), EMPATH: A neural network that categorizes facial expressions. *Journal of Cognitive Neuroscience*, 14(8):1158–1173.

Dailey, M.N., Cottrell, G.W., and Adolphs, R. (2000). A six-unit network is all you need to discover happiness. In *Proceedings of the Twenty-Second Annual Conference of the Cognitive Science Society*, Erlbaum, Mahwah NJ, pp. 101–106.

Cottrell, G.W., Dailey, M.N., Padgett, C., and Adolphs, R. (2000). Is all face processing holistic? The view from UCSD. In Wenger, M. and Townsend, J. (Eds.) *Computational, Geometric, and Process Perspectives on Facial Cognition: Contexts and Challenges*. Erlbaum, Mahwah NJ, pp. 347–395.

Dailey, M.N. and Cottrell, G.W. (1999), Organization of Face and Object Recognition in Modular Neural Networks. *Neural Networks* 12(7–8):1053–1074.

Dailey, M.N., Cottrell, G.W., and Busey, T.A. (1999), Facial memory is kernel density estimation (almost). In *Advances in Neural Information Processing Systems 11*, MIT Press, Cambridge MA, pp. 24–30.

Dailey, M.N. and Cottrell, G.W. (1999), Prosopagnosia in modular neural network models. In Reggia, J., Ruppin, E., and Glanzman, D., Eds., *Disorders of Brain, Behavior, and Cognition: The Neurocomputational Perspective*, Progress in Brain Research series vol. 121. Elsevier, Amsterdam, pp. 165–184.

**Publications  
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Dailey, M.N., Cottrell, G.W., and Busey, T.A. (1998), Eigenfaces for familiarity. In *Proceedings of the Twentieth Annual Conference of the Cognitive Science Society*, Erlbaum, Mahwah NJ, pp. 273–278.

Dailey, M.N. and Cottrell, G.W. (1998), Task and spatial frequency effects on face specialization. In *Advances In Neural Information Processing Systems 10*, MIT Press, Cambridge MA, pp. 17–23.

Dailey, M.N., Cottrell, G.W., and Padgett, C. (1997), A mixture of experts model exhibiting prosopagnosia, In *Proceedings of the Nineteenth Annual Conference of the Cognitive Science Society*, Erlbaum, Hillsdale NJ, pp. 155–160.

Dailey, M.N., Miller, G.S., and Lester, J.C. (1996), Exploiting stereotypes to eliminate strategic bias, In *Fifth International Conference on User Modeling*, pp. 201–203.

**Patents**

Dailey, M.N., Pathria, A.K., Laffoon, M.A., and Crooks, T.J. (2005), Application-specific method and apparatus for assessing similarity between two data objects, US Patent 6,917,952.

Dailey, M.N., Freitag, D.B., Hathaidharm, C., and Pathria, A.K. (2005), Method for improving results in an HMM-based segmentation system by incorporating external knowledge, US Patent 6,965,861.

**Talks and  
Posters**

Dailey, M.N. “Machine Vision for Mobile Robots.” Invited lecture at the Mahasarakham International Workshop on Artificial Intelligence (MIWAI '08), Mahasarakham, Thailand, Dec 2008.

Dailey, M.N. “Fundamental Techniques in Machine Learning and Image Processing.” Invited lecture at the Asian Applied Natural Language Processing School (ADD-3), Bangkok, Thailand, Feb 2008.

Dailey, M.N. and Parnichkun, M. “Simultaneous Localization and Mapping with Stereo Vision.” Oral presentation at the Thailand Research Fund annual retreat, Cha-Am, Thailand, Oct 2006.

Dailey, M.N. and Parnichkun, M. “Simultaneous Localization and Mapping with Stereo Vision.” Poster presentation at the Thailand Research Fund annual retreat, Cha-Am, Thailand, Oct 2005.

Dailey, M.N. “Simultaneous Localization and Mapping with Stereo Vision.” Invited lecture in the Ravensburg-Weingarten University of Applied Sciences Mechatronics program, Germany, Oct 2004.

Dailey, M.N. “Introduction to AI Robotics.” Series of 3 lectures presented at Thammasat University Faculty of Engineering, Klong Luang, Thailand, March 2003.

**Talks and  
Posters  
(cont.)**

Dailey, M.N., Lyons, M.J., Kamachi, M., Ishi, H., Gyoba, J., and Cottrell, G.W. "Cultural Differences in Facial Expression Classification." Poster presented at the Ninth Annual Meeting of the Cognitive Neuroscience Society, San Francisco, CA, April 2002.

Dailey, M.N., and Cottrell, G.W. "Classifying Static Facial Expressions." Invited talk at the Neural Information Processing Systems (NIPS) 2000 Workshop on Affective Computing, Breckenridge, CO, December 2000.

Dailey, M.N., Cottrell, G.W., and Adolphs, R. "Computational Modeling of Human Perception of Emotional Facial Expressions." Poster presented at the Seventh Annual Meeting of the Cognitive Neuroscience Society, San Francisco, CA, April 2000.

Dailey, M.N., and Cottrell, G.W. "A Neural Network Model for Human Facial Expression Recognition." Invited talk at the International Joint Conference on Neural Networks (IJCNN) '99, Washington, D.C., July 1999.

Dailey, M.N. "A Neural Network Model for Human Facial Expression Recognition." Invited talk at University of California, Irvine, Irvine, CA, February 2000.

Dailey, M.N., Cottrell, G.W., and Busey, T.A. "Facial Memory is Kernel Density Estimation (Almost)." Invited talk at the Fifth Joint Symposium on Neural Computation, University of California, San Diego (UCSD), La Jolla, CA, May 1998.

Dailey, M.N., and Cottrell, G.W. "Task and Spatial Frequency Effects on Face Specialization." Poster presented at the Fifth Annual Meeting of the Cognitive Neuroscience Society, San Francisco, April 1998.

Dailey, M.N. "How are Faces Special?" Invited talk at the Twenty-Third Annual Interdisciplinary Conference, Jackson Hole, WY, February 1998.

Dailey, M.N. and Cottrell, G.W., "Learning a Specialization for Face Recognition: The Effect of Spatial Frequency." Poster presented at the Fourth Joint Symposium on Neural Computation, University of Southern California (USC), Los Angeles, CA, May 1997.

**Professional History**      **Assistant Professor**      April 2006–Present  
Computer Science and Information Management, Asian Institute of Technology, Thailand.  
Teaching and research position. Main courses: Machine Vision for Robotics and HCI, Web Application Engineering, Software Architecture Design. Short courses: Linux for Real-Time Control, Object Oriented Analysis and Design, IT for Non-Specialists. Coordinator of the Professional Master's in Software Engineering program.

**Lecturer**      January 2004–March 2006  
Computer Science and Information Technology, SIIT, Thammasat University, Thailand.  
Teaching and research position. Courses: Operating Systems, Programming Languages, Artificial Intelligence, Compiler Construction, Networking Laboratory, Computer Architecture. Advisor to the SIIT Createch robotics student club and the SIIT RoboCup (robot football) team.

**Adjunct Lecturer**      January 2005–April 2005  
CSIM Program, Asian Institute of Technology, Thailand.

**Adjunct Lecturer**      June 2004–October 2004  
MSIT Program, Shinawatra University, Thailand.

**Research Scientist**      November 2001–November 2003  
Vision Robotics Corp., San Diego, CA USA.  
Performed research and development for autonomous mobile robotics software. Designed and empirically evaluated algorithms for vision-based robot localization, navigation, and environment mapping.

**Scientist**      March 2000–October 2001  
Burning Glass Technologies, San Diego, CA USA.  
Performed research on statistical modeling and machine learning techniques for large databases of resumes and job postings. Designed and empirically evaluated natural language processing and information extraction algorithms.

**Graduate Student Researcher**      June 1998–June 2001  
Computer Science and Engineering Department, UCSD.  
Performed research on machine vision, facial identity recognition, and facial expression recognition.

**Professional History (cont.)**

**Consultant** September 1998–February 2000  
Netrologic, Inc., San Diego, CA USA.  
Developed image processing, computer vision, and machine learning algorithms for machine identification of the leaves of flowering plants.

**Graduate Teaching Assistant** September 1995–June 1998  
Computer Science and Engineering Department, UCSD.  
Prepared course materials, gave supplementary lectures, graded work, and tutored students in Theory of Computation, Compiler Construction, Operating Systems Principles, Multimedia Systems, Java Seminar, and Comparative Programming Languages. Won the department’s Teaching Excellence Award in 1998.

**Consultant** June 1997–September 1997  
HNC Software, San Diego, CA, USA.  
Performed research on statistical modeling and machine learning techniques for financial fraud detection.

**Consultant** June 1996–September 1996  
Encyclopædia Britannica, La Jolla, CA USA.  
Employed user interface design and web programming techniques to improve the encyclopedia’s online interface.

**Graduate Research Assistant** August 1993–September 1995  
**Graduate Teaching Assistant**  
Computer Science Department, North Carolina State University.  
Researched knowledge-based user interfaces and intelligent customization of World Wide Web content to user needs. Assisted courses in Artificial Intelligence, Computational Linguistics, Networking Projects, and Automata Theory.

**Software Designer** August 1989–August 1994  
BNR, Inc., Research Triangle Park, NC USA.  
Seasonal internships during undergraduate study and full-time work after graduation. Designed, maintained, and re-engineered software components in a large telecommunications system.

## Professional Activities

Program committee, 2009 International Conference on Information and Automation (ICIA 2009).

Program committee, ECTI-CON 2009, 2010.

Technical Program Committee Co-Chair, 2008 and 2009 IEEE International Symposium on Intelligent Signal Processing and Communication Systems (ISPACS 2008, ISPACS 2009).

Program committee, 2008 IEEE International Conference on Robotics and Biomimetics (ROBIO 2008).

Program committee, 2008 International Conference on Automation, Robotics, and Control Systems (ARCS 2008).

Program committee, 2008 Mahasarakham International Workshop on Artificial Intelligence (MIWAI 2008).

Technical committee, 2008 International Joint Conference on Neural Networks (IJCNN 2008).

Program committee, 2007 International Conference on Database Systems for Advanced Applications (DASFAA 2007).

Technical committee, 2005 Asian Conference on Industrial Automation and Robotics (ACIAR '05).

Fulbright scholarship committee, Thailand-U.S. Educational Foundation, 2005.

Reviewer for *Neural Networks*; *IEEE Transactions on Neural Networks*; *Neurocomputing*; *Journal of Intelligent and Robotic Systems*; *Journal of Modern Optics*; *International Journal of Pattern Recognition and Artificial Intelligence*; *EURASIP Journal on Advances in Signal Processing*; *Engineering Applications of Artificial Intelligence*; *Cognition*; *Cognitive Science*; *Journal of Nonverbal Behavior*; *Emotion*; *Thammasat International Journal of Science and Technology*; *ECTI Transactions on Electrical Engineering, Electronics, and Communications*; the Advances in Neural Information Processing Systems (NIPS) conference; the Cognitive Science Society conference; *The Handbook of Brain Theory and Neural Networks*; the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS); the International Conference on Robotics and Automation (ICRA); the Advanced Concepts for Intelligent Vision Systems (ACIVS) conference; the International Conference on Control, Automation, Robotics, and Vision (ICARCV); the International Conference on Computer Vision Theory and Applications (VISAPP); the International Conference on Information Security and Cryptology; the International Conference on Asian Digital Libraries; numerous technical conferences in Thailand.

Senior Member of IEEE. Member of the IEEE Computer Society, the IEEE Robotics and Automation Society (RAS), the American Association for Artificial Intelligence (AAAI), and the Thai Robotics Society (TRS).

## References

Garrison W. Cottrell  
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