# Pradeep Buddharaju

---


**CONTACT INFORMATION**

Assistant Professor
University of Houston – Clear Lake
Computer Science and Computer Information Systems
2700 Bay Area Blvd
Houston, TX 77058
*Office:* Delta Building, Room 173
*Telephone:* (281) 283-3881
*Email:* Buddharaju@UHCL.edu
*Web:* http://sce.uhcl.edu/buddharaju/


---

**RESEARCH INTERESTS**

I am broadly and equally interested in all aspects of:

- Mobile computing, pervasive gaming, and human computer interaction
- Computational physiology, biomedical image processing and analysis
- Biometrics, machine learning, and computer vision

---

**EDUCATION**

**University of Houston, Houston, TX**

**Research Assistant Professor** *(Jan 2008 – August 2011)*
*Advisor:* Prof. Ioannis Pavlidis

**PhD. in Computer Science** *(Dec 2007)*
*Thesis:* Physiology-based Face Recognition
Winner of the **Best PhD Award**, Dept of Computer Science
*Advisor:* Prof. Ioannis Pavlidis

**M.S. in Computer Science** *(Dec 2005)*
*Thesis:* Face Recognition in the Thermal Infrared Spectrum
*Advisor:* Prof. Ioannis Pavlidis

**J.N.T.U, Hyderabad, India**

B.Tech in Computer Science *(May 2002)*
*Aggregate:* 80.66%, First Class with Distinction

---

**REFEREED PUBLICATIONS**

**JOURNALS**

1. Y. Fujiki, K. Kazakos, C. Puri, **P. Buddharaju**, I. Pavlidis, and J. Levine "NEAT-o-Games: Blending physical activity and fun in the daily routine", *ACM Computers in Entertainment*, vol. 6, no. 2, April/June 2008
2. **P. Buddharaju**, I.T. Pavlidis, P. Tsiamyrtzis, and M. Bazakos "Physiology-based face recognition in the thermal infrared spectrum", in *IEEE Transactions on Pattern Analysis and Machine Intelligence*, vol. 29, no. 4, pp. 613-26, April 2007 **[Journal Impact Factor: 3.810]**

**BOOK CONTRIBUTIONS**

1. **P. Buddharaju**, and I. Pavlidis, "Face Recognition Under the Skin", in *Multibiometrics for Human Identification*, B. Bhanu and V. Govindaraju, editors, Cambridge University Press, in press

2. T. Bourlai, **P. Buddharaju**, I. Pavlidis, and Barbara Bass, "Methodological advances on pulse measurement through functional imaging", in *Computational Surgery and Dual Training, Advances in Pattern Recognition*, M. Garbey, B.L. Bass, C. Collet, M. de Mathelin, and R. Tran-Son-Tay, editors, pp. 101-121, Springer, 2010.
3. **P. Buddharaju**, I. Pavlidis, and C. Manohar, "Face recognition beyond the visible spectrum", in *Advances in Biometrics: Sensors, Algorithms and Systems*, N.K. Ratha and V. Govindaraju, editors, ch.9, pp. 157-180, Springer, October 2007
4. **P. Buddharaju** and I. Pavlidis, "Physiology-based face recognition in the thermal infrared spectrum", in *Medical Infrared Imaging*, N.A. Diakides and J.D. Bronzino, editors, Taylor and Francis Books, July 2007
5. **P. Buddharaju** and I. Pavlidis, "Multispectral face recognition – fusion of visual imagery with physiological information ", in Face Biometrics for Personal Identification: Multi-Sensory Multi-Modal Systems, R.I. Hammoud, B.R. Abidi, and M.A. Abidi, editors, pp. 91-108, Springer, 2007
6. I. Pavlidis, P. Tsiamyrtzis, C. Manohar, and **P. Buddharaju**, "Biometrics: Face recognition in thermal infrared", in *Biomedical Engineering Handbook*, 3rd Edition, ch. 29, pp. 1-15, CRC Press, 2006

**CONFERENCES**

1. **P. Buddharaju**, D. Shastri, A. Mandapati, S. Vaidya, and I. Pavlidis "Who said monitoring is boring?" *Proceedings of the 2011 ACM Conference on Human Factors in Computing Systems (CHI)*, Vancouver, British Columbia, May 7 - 12, 2011
2. **P. Buddharaju,** Y. Fujiki, I. Pavlidis, and E. Akleman " A Novel Way to Conduct Human Studies and Do Some Good", *ACM Conference on Human Factors in Computing Systems (CHI)*, Atlanta, GA, April 10-15, 2010
3. T. Bourlai, **P. Buddharaju**, I. Pavlidis, and B. Bass " On Enhancing Cardiac Pulse Measurements Through Thermal Imaging", Proceedings of the *9th International Conference on Information Technology and Applications in Biomedicine*, Larnaca, Cyprus, November 5-7, 2009
4. **P. Buddharaju**, and I. Pavlidis "Physiological Face Recognition is Coming of Age", in Proceedings of the *IEEE Computer Society Conference on Computer Vision and Pattern Recognition (CVPR'09)*, Miami, FL, June 20-26, 2009
5. K. Kazakos, Y. Fujiki, C. Puri, **P. Buddharaju**, I. Pavlidis, and J. Levine, "NEAT-o-Games: Exertion interfaces interwoven in daily life", in *Proceedings of the 2008 ACM Workshop on Exertion Interfaces*, Florence, Italy, April 6, 2008
6. **P. Buddharaju**, Y. Fujiki, K. Kazakos, C. Puri, I. Pavlidis, and J. Levine, "NEAT-o-Games: Ubiquitous game changes modern sedentary lifestyle", in *Video Proceedings of the 9th International Conference on Ubiquitous Computing*, Innsbruck, Austria, September 16-19, 2007
7. **P. Buddharaju**, I.T. Pavlidis, and P. Tsiamyrtzis, "Pose-invariant physiological face recognition in the thermal infrared spectrum", in *Proceedings of the 2006 IEEE Conference on Computer Vision and Pattern Recognition*, pp. 53-60, New York, New York, June 17-22, 2006
8. C. Puri, **P. Buddharaju**, N. Sun, and I. Pavlidis, "Physio-Vision with ATHEMOS", in *Video Proceedings of the IEEE Computer Society Conference on Computer Vision and Pattern Recognition*, New York, New York, June 17-22, 2006
9. Y. Ma, B. Miller, **P. Buddharaju**, and M. Bazakos. "Activity awareness: from predefined events to new pattern discovery", *Proceedings of the IEEE*

*International Conference on Computer Vision Systems*, New York, NY, January 5-7, 2006

10. Y. Ma, **P. Buddharaju**, and M. Bazakos. "Pattern discovery for video surveillance", *International Symposium on Visual Computing (ISVC 2005)*, Lake Tahoe, Nevada, December 5-7, 2005
11. **P. Buddharaju**, I. Pavlidis, and P. Tsiamyrtzis. "Physiology-based face recognition using the vascular network extracted from thermal facial images: A novel approach ", *Proceedings of the IEEE International Conference on Advanced Video and Signal based Surveillance*, Como, Italy, Sep 15-16, 2005
12. **P. Buddharaju**, J. Dowdall, P. Tsiamyrtzis, D. Shastri, I. Pavlidis and M.G. Frank. "Automatic Thermal Monitoring System (ATHEMOS) for Deception Detection", *Video Proceedings of the IEEE Computer Society Conference on Computer Vision and Pattern Recognition*, San Diego, CA, June 20-26, 2005
13. **P. Buddharaju**, I. Pavlidis and I.A. Kakadiaris. "Face Recognition in the Thermal Infrared Spectrum", In *Proceedings of the Joint IEEE International Workshop on Object Tracking and Classification Beyond the Visible Spectrum (OTCBVS'04)*, Washington, DC, July, 2004

---

**WORK IN PROGRESS**

1. **P. Buddharaju**, and I. Pavlidis "Physiological Face Recognition is Coming of Age", received reviews from *IEEE Transactions on Pattern Analysis and Machine Intelligence,* preparing revision
2. I. Pavlidis, P. Tsiamyrtzis, D. Shastri, A. Wesley, Y. Zhou, P. Lindner, **P. Buddharaju**, R. Joseph, A. Mandapati, B. Dunkin, and B. Bass "Fast by Nature - How Stress Patterns Define Human Experience and Performance", in review
3. **P. Buddharaju,** Y. Fujiki, P. Tsiamyrtzis, I. Pavlidis, and E. Akleman "A Study of Human Physical Activity Patterns Through Mobile Gaming Platform", under submission
4. A. Wesley, **P. Buddharaju**, D. Shastri, I. Pavlidis, and P. Robert "A Comparative Analysis of Thermal and Visual Imaging Modalities for Facial Expression Recognition", under submission

---

**TALKS**

- *A Study of Human Physical Activity Patterns Through Walk n' Play*, The 6th Annual Games for Health Conference, Boston, MA, May 25, 2010
- *A Novel Way to Conduct Human Studies and Do Some Good*, Serious Games & Virtual Environment Symposium, Texas A&M University, May 13, 2010
- *A Novel Way to Conduct Human Studies and Do Some Good*, ACM Conference on Human Factors in Computing Systems (CHI), Atlanta, GA, April 15, 2010
- *Physiological Face Recognition is Coming of Age*, IEEE Computer Society Conference on Computer Vision and Pattern Recognition (CVPR'09), Miami, FL, June 23, 2009
- *Novel Biometrics*, A ***short course*** at the IEEE Computer Society Conference on Computer Vision and Pattern Recognition (CVPR'07), Minneapolis, MN, June 20, 2007
- *Physiological Face Recognition*, 3rd International Summer school for Advanced Studies on Biometrics for Secure Authentication, Alghero, Italy, June 2006 **(Winner of the Outstanding Paper Award)**
- *Physiology-based face recognition in the thermal infrared spectrum*, *22nd Annual Houston Conference on Biomedical Engineering Research*, Houston, Texas, February 10-11, 2005
- *Physiology-based face recognition in the thermal infrared spectrum*, Sigma Xi Poster Competition, Houston, TX, February 2006 **(Winner of the Graduate**

**Computer/Computational Sciences and Math Honorable Mention)**

---

**PROFESSIONAL ACTIVITIES**

**CONFERENCE ACTIVITIES**

- *Program Committee Member,* 9th IEEE International Conference on Automatic Face and Gesture Recognition (FG 2011), Santa Barbara, California, March 21-25, 2011
- *Biometrics Area Chair*, 5th IEEE International Conference on Advanced Video and Signal Based Surveillance (AVSS'08), Santa Fe, NM, September 1-3, 2008

**EXTERNAL REVIEWER**

- Image and Vision Computing Journal (2010)
- Transactions on Information Forensics & Security (2009)
- Journal of Machine Vision and Applications (2010)
- IEEE Computer Graphics and Applications Journal (2010)
- The ACM CHI Conference on Human Factors in Computing Systems (2010)
- Journal of Biomedical Optics (2010)

**TEACHING**

- ***Co-Instructor*** of the novel course '*Ubiquitous Computing*' at the Department of Computer Science, University of Houston – fall 2008, 2009, and 2010
  - One of the first courses among the country to use iPhone OS as the ubiquitous platform for the course
  - The students of the course were divided into groups, and were guided to develop an application for an iPhone, iPad or iPod Touch device
  - Several of the applications that were developed by students in course were published in App Store and are being used by thousands of users
- ***Instructor*** of the successful '*iPhone Programming Outreach Course*' offered in collaboration with the College of Continuing Education at the University of Houston – October 5-29, 2010
  - In response to several requests, this course was offered to all participants in and outside the campus
  - In this 24-hour hands-on training course, I taught them how to build mobile apps using the major tools and APIs in the iOS SDK
- ***Teaching Assistant*** to Prof. Ioannis Pavlidis in the courses '*Fundamentals of Software Engineering*' and '*Infrared Imaging*' – fall 2004, spring 2004
  - Winner of the **Best Teaching Assistant Award**, Department of Computer Science
- ***Instructional Assistant*** in the Learning and Teaching Support Center, Department of Computer Science, University of Houston (Tutor for undergraduate computer science students) – fall 2002 to fall 2003

---

**GRANTS AND CONTRACTS**

- **Air Quality Mapping and Related Data Management**
  *Role:* Co-Investigator
  *Sponsors:* Houston Endowment
  *Performance Period:* Just awarded!
  *Funding:* TBA
  *Description:* The program aims to provide data management and web/iPhone interfaces of animated ozone maps superimposed on physical activity and other applications.

- **Human Identification and Intent Determination from Thermal Imagery I**

*Role:* Co-Investigator
*Sponsors:* Department of Defense
*Performance Period:* 02/01/2011 – 08/01/2011
*Funding:* $21,000
*Description:* This is a pilot program that aims to design imaging technology to identify individuals and determine their intent at a distance

- **Instrumentation Grant for iPhone Class**
  *Role:* Co-Investigator
  *Sponsors:* The Faculty Development Initiative Program (FDIP) - University of Houston
  *Performance Period:* 08/15/2009 – 08/15/2010
  *Funding:* $25,000
  *Description:* The grant supports the establishment of an iMac/iPhone lab in support of iPhone programming instruction in the Ubiquitous Computing course

---

**INDUSTRY EXPERIENCE**

**Research Intern** at the Honeywell Technology Center, Minneapolis, MN during Summer 2004, 2005, and 2006. During the internship, I worked collaboratively on the following projects:

- *"Automatic Tailgate Detection System"*: monitors a secured area for tailgating violation and reports it to the guard if a violation occurs
- *"Common Object Reasoning Engine (CORE)":* automatically captures and defines new events, and presents the newly detected events to the operator who checks for their validity and adds them into the event library
- *"People Activity Detection System (PADS)":* dynamically detects predefined events from a video

---

**HONORS**

- **Best PhD Award** – *Department of Computer Science*, Houston, TX, May 2010
- **Best Teaching Assistant Award** – for assistance in courses "Fundamentals of Software Engineering (COSC 4351)" and "Infrared Imaging (COSC 6397)", *Department of Computer Science, University of Houston*, Houston, TX, 2005
- **Outstanding Paper Award** – for the paper "Physiology-based face recognition" at the *3rd International Summer school for Advanced Studies on Biometrics for Secure Authentication*, Alghero, Italy, June 2006
- **2nd Place in Poster Competition** – for the poster "NEAT-o-Games" at *Department of Computer Science Open House Poster Competition*, Houston, TX, October 2007
- **Graduate Computer/Computational Sciences and Math Honorable Mention** – for the poster "Physiology-based face recognition in the thermal infrared spectrum", *Sigma Xi Poster Competition*, Houston, TX, February 2006
- **Certificate of Merit** – for securing Second Rank in B. Tech examinations, *Jawaharlal Nehru Technological University***,** Hyderabad, India, May 2002

---

**PRESS CITATIONS**

- Articles about our iPhone application ***Walk n' Play***, which is being downloaded and used by several users (total 20,000 users worldwide as of August 2010) everyday to keep track of their physical activity:
  - Medical News Today: http://www.medicalnewstoday.com/articles/150512.php
  - Houston Business Journal: http://houston.bizjournals.com/houston/stories/2009/05/18/daily11.html?ed

=2009-05-19&ana=e_du_pub
    - KUHF Radio's "UH Moment of the Week": http://app1.kuhf.org/houston_public_radio-news-display.php?articles_id=1239140195
    - University of Houston National Press Release: http://www.uh.edu/news-events/stories/2009articles/may2009/05182009_pavlidis_iphone_app.php
    - College of Natural Sciences and Mathematics Breakthrough Newsletter: http://breakthrough.nsm.uh.edu/2009_03/brief_walkplay.htm
- An article by the University of Houston about the successful course 'COSC 6355: Ubiquitous Computing' that I co-taught with Prof. Ioannis Pavlidis :
    - http://breakthrough.nsm.uh.edu/2009_02/iphone.htm
- An article about my research by the College of Natural Sciences and Mathematics, University of Houston: http://www.nsm.uh.edu/news-events/stories/2006news/0613_buddharaju.php

---

**REFERENCES** Available on Request