INSIDE CS

Department of Computer Science

SPRING 2008

Notes from the Chair by Prof. Larry Davis

The past several months have been very hectic in College Park. During the fall semester, promotion and tenure dossiers were prepared for four of our Assistant Professors: Lise Getoor, Francois Guimbretiere, Mike Hicks, and Jonathan Katz. I am pleased to announce that all four of them were promoted to Associate Professor with tenure, and are now looking forward to sabbaticals next academic year.

This spring was a very busy time recruiting to fill three faculty positions. A few senior candidates visited the campus to discuss the Minker Professor position, and seven candidates were interviewed for a new position in natural language processing. In each of the past two years, we have hired a junior faculty member in computational biology, and this year we are hoping to fill a third position. Six candidates were interviewed in the past few weeks, and we expect to make an offer to one of them soon.

Every year the campus honors some of its most distinguished alumni; one of the awards is devoted to the most outstanding international alumni. The department is honored that Dr. Luiquing Larry Hwang, who was a student of Yiannis Aloimonos's in the Computer Vision Laboratory, has been selected for his contributions to the software engineering industry in China. Dr. Hwang has not only started a successful software engineering company, but has developed a new approach to the entire software development process that has been very influential in China.

Each spring the Department honors one of its alumni at the College's awards ceremony. This year, Prof. Narendra Ahuja, a student of Prof. Azriel Rosenfeld, is being honored. Narendra is a Chaired Professor at the University of Illinois and has made a large number of important research contributions to computer vision. He has won many awards for his research, including the IEEE's Peori Award, one of its most prestigious. Narendra has also been added to our Alumni Hall of Fame, along with Dr. P. (Gopal) Gopalakrishman, VP, India Software Lab. Articles on both follow in this newsletter. A roster of the hall of fame can be found at http://www.cs.umd.edu/alumni/

The Department's semi-annual Staff Award covering July through December 2007 went to JoAnn Simms, an outstanding member of the Department's business office.

The Department continues to reach out to area high schools. It held the 18th H.S. Programming Contest on Saturday, March 8 with over 40 local high schools participating. This summer, we are planning to hold our highly successful Java Passport Program, which has brought hundreds of young students to the campus to learn about computer science.

Last year, with the assistance of Prof. Michael Ma of the Institute for Global Chinese Affairs, the department collaborated with Sichuan University in Chengdu, China, and hosted four faculty from that institution. That collaboration is continuing this year with three new visitors, Zhang Weihua, Chen Rong, and Peng Jian.

Finally, Ashok Agrawala and his team of graduate students have developed a new software package, "MyeVyu", which can pinpoint a user's position by using data from the Wi-Fi stations scattered across the campus. An article on this software and its use also follows in this newsletter.

HCIL Opens New UX Lab

The new HCIL UX Lab located in room 3452 AVW was officially opened to students and faculty members on Wednesday, March 12th. Profs. Guimbretiere and Sazawal worked for months selecting equipment and furnishings, and their hard work was worth the outcome. The lab is a good example of a comfortable, open, and fun environment with a video link to the other HCIL lab located in Hornbake Library. During the dedication, there was a large turnout of department and UMIACS personnel with plenty of food and student demos. Both units provided funds to support the renovation and purchase of equipment. Following is a detailed description of the lab and its use:

Increasingly, rigorous evaluations of software with human subjects are expected in computer science research. Computer science researchers are also studying how humans perform tasks so that they can evaluate how best to augment these tasks with technology.

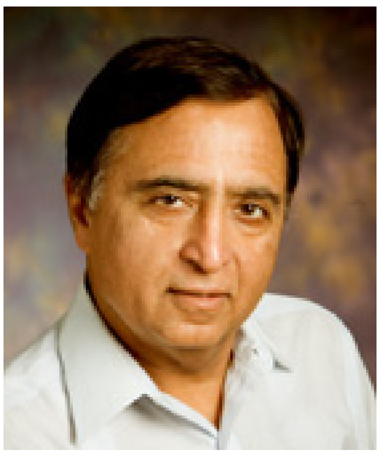
To support these research needs, we have built a usability lab. It is equipped with video recording, screen capture and analysis software, all of which can be used to support user studies. The lab consists of three small rooms. Two of the three rooms are subject rooms where experiments will be conducted and one room is a monitoring room for the researcher.

Each subject room contains:
- two pan/ tilt/ zoom cameras
- screen capture support
- keystroke and mouse logging
- a microphone

The monitoring room contains:
- PCs that accept multistroke video feeds
- camera controls
- software for analyzing video and screen capture feeds

The analysis software is very helpful for turning user study sessions into publishable results. It allows the researcher to identify and assign codes to events in the video stream. For example, when viewing a screen capture of someone using a web application, one can mark each time the subject moves the mouse near something but does not click on it. Researchers can also mark other events of particular interest to their research. The software also allows one to play back the video related to the research, and it will compute statistics and visualizations.

Distinguished Alumni of the Year: Dr. Narendra Ahuja



Narendra Ahuja received his Ph.D. degree in computer science from the University of Maryland, College Park, in 1979. He then joined the University of Illinois at Urbana-Champaign as Assistant Professor where he is currently the Donald Biggar Willet Professor in the Department of Electrical and Computer Engineering, the Beckman Institute, and the Coordinated Science Laboratory. His current research emphasizes integrated use of multiple image sources of scene information to construct three-dimensional and other descriptions of scenes; the use of integrated image analysis for realistic image synthesis; sensors for computer vision; extraction and representation of spatial structure, e.g., in images and video; and use of the results of image analysis for a variety of applications including visual communication, image manipulation, robotics, and scene navigation.

Prof. Ahuja has advised 32 Ph.D. and 36 M.S. thesis students. He has 4 patents; co-authored 3 books; co-edited 1 book; written 20 book Chapters, over 80 Journal papers, and 250 Conference Papers. His Ph.D. and related subsequent work on texture modeling introduced image regions, in place of the usual pixels, as modeling primitives, and involved finding new solutions to unsolved problems in random geometry.

Prof. Ahuja's paper on integrated formulation of active stereo made the first integrated use of the distinct visual cues of stereo, focus, zoom and camera movements for 3-D scene reconstruction. He built one of the first two active eyes-neck-body, verge-focus-zoom stereo vision systems. Such active systems became the bases for the development of commercial products.

In 1992, Prof. Ahuja invented the omnifocus camera. Since then, over 15 new major types of special purpose cameras have been introduced by computer vision researchers worldwide, including several by him. Two of his cameras are being commercialized by his company Vision Technology.

Prof. Ahuja introduced the notion of segmentation tree in computer vision - a structure capturing all segmentations instead of a single segmentation. This, in conjunction with a statistical physics-inspired transform he proposed, has lead to the most complete and accurate solution to the image segmentation problem.

Prof. Ahuja's paper on integrating concepts from information theory, signal processing and computer vision for error-free wireless video transmission and video-on-demand received the 2006 Best Paper Award from the IEEE Transactions on Multimedia. His algorithms have been used in systems developed by Advanced Technology, CMC, Honeywell and Westinghouse.

Prof. Ahuja was the Founding Director of International Institute of Information Technology (IIIT) at Hyderabad, the first educational institution in India focused on education and research in Information Technology.

In Focus: Dr. P (Gopal) Gopalakrishnan

Dr. P (Gopal) Gopalakrishnan received his Ph.D. degree in Computer Science from the University of Maryland in December 1986. He joined IBM at the Thomas J. Watson Research Lab in Yorktown Heights, NY in 1986 and was part of the world-leading speech recognition effort at that lab for many years. During that time he did seminal work in the area of search algorithms for speech recognition and acoustic modeling for continuous speech recognition. He and his colleagues also developed with his colleagues IBM's first real-time continuous speech recognition system which was a precursor to the development of IBM's large vocabulary continuous dictation product. His next research focus was on conversational interfaces and use in mobile computing. He led the team that developed IBM's embedded speech recognition systems which is currently deployed in several production cars from leading manufacturers. Dr. Gopalakrishnan is the co-author of several significant papers in the field.

Dr. Gopalakrishnan led IBM's research strategy in pervasive computing and managed the Pervasive Infrastructures Department at the IBM Thomas J. Watson Research Center. In this role he managed the development of advanced technologies in infrastructure middleware, device components, and prototype solutions for pervasive computing and set research priorities for IBM labs worldwide.

Between 2003 and 2006 Dr. Gopalakrishnan was the Director of the IBM India Research Laboratory, with facilities in New Delhi and Bangalore. He lead a research team developing innovative technologies for IBM products and services while addressing the unique issues faced by customers in the region.

Dr. Gopalakrishnan is currently Vice President, India Software Lab (ISL). In this capacity he oversees product development and technology innovation efforts of a team for over three thousand engineers. The ISL is one of the largest development centers for IBM, with projects ranging from semiconductor research and development to AIX, including IBM major software brands.

Dr. Gopalakrishnan has received numerous awards from IBM during his tenure, including an Outstanding Innovation Award and several Invention Achievement awards. He has over twenty patents to his credit and has published extensively in conferences and journals. An inhabitant of the flat world, Dr. Gopalakrishnan maintains homes in New York and Bangalore and regularly commutes between them.

Research Spotlight: HCIL

Mary Ramos with members of Kidsteam, HCIL's research team of children

In June, the Human-Computer Interaction Lab (HCIL) celebrates 25 years of transforming the experience people have with new technologies. Prof. Allison Druin, the HCIL's current director explains, "The HCIL has the distinction of being the oldest HCI lab in the country, yet the HCIL continues to lead the way in research on information visualization techniques, mobile computing, digital libraries for children, pen/paper-based computing, creativity support tools, social computing and more." From understanding user needs, to designing, developing, and analyzing those technologies, the lab's interdisciplinary faculty, staff, and students work together on collaborative research, service projects, lab talks, and the annual Symposium. Prof. Ben Shneiderman, the HCIL's founder explains, "I'm very proud [of] the tradition of this lab, which focused on public service and doing things for government agencies, working with the Library of Congress [and] working with the Library of Medicine. Those are great satisfactions and success stories."

To celebrate the HCIL's 25th anniversary there will be a very special Symposium on May 29, 2008. Not only will there be talks about cutting-edge research being conducted at the HCIL, but this year the Symposium will begin with a special keynote panel, "25 Years of HCI, 25 Years of the HCIL." Esteemed colleagues from industry and academia outside of the HCIL will offer their reflections on the importance of the lab's work. In addition, this year the lab will continue the tradition of demos and posters following the talks, but these will happen as a part of lab tours where Symposium participants will be able to see the HCIL's new facilities. The following day, May 30, 2008 there will be a wide variety of tutorials and workshops that can't be missed. Be sure to sign up early at: ***http://www.cs.umd.edu/hcil/soh***, since space is limited.

CS graduate student Hyunyoung Song explains her modelcraft project to a Symposium participant

MyeVyu: Improving the Quality of Life on Campus Through Ubiquitous Computing

Computer systems of the future will be ubiquitous, pervasive and seamless. Profs. Agrawala and Varshney are working on the MyeVyu system – handheld clients that connect students, faculty and staff with services focused on public safety, education and social networking. The philosophy is to integrate university services and enhance them with context – time, location, and security.

Members of the campus community employ a variety of information which they use in all aspects of their day to day activities. Easy availability of such information can improve their academic and professional environments while on campus. The MyeVyu technology, built on open standards, aims to improve that environment for members of the University community including its visitors and local businesses.

Profs. Agrawala and Varshney, along with their team of graduate students, developed MyeVyu with the primary purpose of helping to improve campus safety. It is hoped that once the technology's use becomes a standard at Maryland, it will evolve into what Prof. Agrawala has called "the next generation of social networking." Christian Almazan, a CS graduate student, is basing his doctoral dissertation on this research project.

A user of MyeVyu will employ a client device, such as a cell phone or PDA and will be connected through the campus WiFi network. The system will track user context, including the location, time and other information the user considers significant and will provide information and support functions as and when needed. The MyeVyu system addresses privacy concerns by allowing a user to limit who their location tracking information is shared with or even turn it off entirely.

Some of the more important intended applications of the system are:

Public Safety
MyeVyu will enable individuals in the community to report problems, concerns, and crimes-in-progress to the University Police. The system will pinpoint a user's position on the campus within about 10 feet by using data from the 3,300 WiFi stations scattered across campus. With the touch of a button, MyeVyu users will be connected with the dispatch desk of the University Police Department. The dispatcher will receive not only the user identity but also the user's location, recent user activity, and an audio/video stream from the user. Additional, the police will be able to respond with auditory and visual feedback to the user. The police will be able to make a recording of the audio/video streams which can subsequently be used in court.

In addition to communicating with University Police, MyeVyu can be used for other services, such as accessibility, student, and visitor services, just to name a few. Communication with the appropriate people will mean MyeVyu users will receive appropriate information when and where they want it.

Educational Support
MyeVyu can remind users about classes and assignments as a deadline draws near and can keep users informed about study group meetings, lab sessions, and upcoming exams. Recorded classes can be viewed on the client device anywhere on campus.

Social Networking and Campus Life
MyeVyu will provide next generation capabilities for social networking, supporting location and live video feeds among its users. MyeVyu strives to provide individuals with an enriched social and community experience while on campus. Campus and community information on the World Wide Web is scattered. Even when visiting the University web site, a user may visit several different web sites to obtain information. MyeVyu integrates many of these web sites and creates an easy-to-use portal for users. This information includes the university shuttle, people finder services, and local events such as the movies playing at the Hoff Theater. The MyeVyu system's open API will facilitate university students and independent developers to continually refine and add additional features and web sites that can be used within the system and further enhance its relevance to the campus community.

Currently MyeVyu only works with the Nokia N810 but developers expect to have working versions for other phones starting with the iPhone by fall 2008. Demos will be given on Saturday, April 26 during the 'Maryland Day' festivities. See ***http://mindlab.umd.edu/myevyu/*** for more information on the architecture and underlying technical problems addressed by the MyeVyu architecture.

CASINO NIGHT!!
Association for Women in Computing

Prof. Larry Davis at the Black Jack table with students

On April 4, the Association for Women in Computing (AWC) hosted a Casino Night complete with games, food and prizes. Students from all over campus came to play Craps, Roulette, Texas Hold'em and Blackjack with guest dealers Profs. Larry Davis, Dave Mount, Mike Hicks, Amol Deshpande, Dr. Evan Golub and Mr. Matt Katsouros. With the assistance of Roman Steichen, a 2007 graduate of the computer science department, the AWC was able to provide an experience not unlike that of a night in a Las Vegas or Atlantic City Casino. Steichen's game company provided the participants with a great deal of fun.

Students were able to try their hand at Blackjack with Prof. Davis providing advice and entertainment. He amazed a group of students by besting them all with an unlikely dealer's twenty one, winning many chips for the house. "I wish that we had been able to take a picture of his hand," said Kristen Stephens, AWC treasurer and one of the organizers of the event. "It was amazing!"

Matt Katsouros dealt Texas Hold'em to a table full of experienced poker players. Many of the students who stayed at Katsouros' table remarked continually how impressed they were with his dealing skills. "He can deal anything!" said Jason Venezia Walerstein, one of the guests and winner of a dinner for four to Adele's Restaurant, a gift provided by Prof. Jim Purtilo, the Undergraduate Education Chair.

Student volunteer dealers included Cassandra Lewis, Ederlyn Lacson, Drew Sollenberger, Richard Bolhofer and Allen Harp. In order to make this event possible the members of the AWC solic ited and received donations from companies including Microsoft and Google as well as CS faculty including Profs. Bill Pugh, Jim Reggia, Bobby Bhattacharjee, Francois Guimbretiere, Neil Spring, and Dr. Michele Hugue. The AWC also received a most generous donation from Robert Krolikowski of Silver Spring, MD. Additionally, the AWC received items from many local businesses used for the raffle held at the end of the evening.

"We hope to make this event an annual one!" said Pamela Krolikowski, one of the co-chairs of the AWC.

Prof. Dave Mount and students get in on the fun

In The News...

- Prof. Aravind Srinivasan was an invited speaker at the Network Design Workshop of the 9th INFORMS Telecommunications Conference.

- Prof. Dianne O'Leary will be the AWM-SIAM Sonia Kovalevsky Lecturer at the SIAM Annual Meeting, July 7, in San Diego. Dianne is also one of four plenary speakers at the 2008 SIAM Conference on Data Mining, Atlanta, April 25. As of January 2009, Dianne will serve as editor-in-chief of the SIAM Journal on Matrix Analysis and Applications.

- Prof. Jonathan Katz was invited to speak at the Fifth Theory of Cryptography Conference (TCC).

- HCIL's NSF-funded workshop on Children's Mobile Technologies gathered 45 people from 5 different countries.

- Prof. Atif Memon has been invited to give an Information Technology Laboratory (ITL) seminar on "Testing Event-Driven Systems" at the National Institute of Standards & Technology.

- Prof. Ben Bederson co-authored Voting Technology: The Not-So-Simple Act of Casting a Ballot, an investigative study into how voters respond to new equipment.

- Prof. Steven Salzberg was mentioned on GenomeWeb Daily News in February. Salzberg, like many scientists, is concerned about potential spending cuts in biomedical research proposed by President George Bush in his budget request for 2009. He said the future of U.S. medical research is being sold short.

- Prof. VS Subrahmanian was featured in articles by the United Press International, Computerworld Magazine, IT Week, UPI News Track Top News, Network World, Digital Trends News, Government Computer News, Tech Tree India, and Eurekalert.com on February 26. The articles discussed the Stochastic Opponent Modeling Agents, or SOMA, Terror Organization Portal, developed by Subrahmian and his team of researchers. SOMA will allow analysts to query automatically learned rules on terrorist organization behavior - and forecast potential behavior based on those rules and communicate with other analysts examining the same subjects. The story was also picked up by over 100 public radio channels and Canadian TV, and received top news coverage in India, Australia, UK, Estonia, and Malaysia.

- Prof. Ben Bederson was featured in Wireless Week in an article about his company Zumobi. Bederson announced that their new software for mobile devices is out of beta tests and is now available for public downloading.

- The paper titled "Scalable network distance browsing in spatial databases" authored by Prof. Hanan Samet, and his students Jagan Sankaranarayanan and Houman Alborzi (who moved to Google) has been chosen to receive a "best paper" award in the SIGMOD 2008 conference in Vancouver, British Columbia, Canada, June 2008.

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