Curriculum Vitae

Parag H. Batavia

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Research Interests

I am interested in real-world applications of artificial intelligence and computer vision.

Education

Carnegie Mellon University, Robotics Institute, Sept. 1995 – Sept. 1999

Ph.D. (Robotics): 9/99
Academic Advisors: Charles E. Thorpe and Dean A. Pomerleau
M.S. (Robotics): 5/97
GPA: 3.79/4.0

Thesis: "Driver Adaptive Warning Systems"
My research was on driver modeling and lane departure warning systems, using optimization and memory based learning tools. Unlike previous systems, this work uses artificial intelligence and data mining techniques to learn the individual characteristics of a driver, and can use them to increase warning time and decrease false alarms.

Research: "Overtaking Vehicle Detection Using Optical Flow"
I developed an optical flow based algorithm which detects overtaking vehicles while robust to false positives due to lane markings, shadows, and other road features.

Research: "Continuous Replanning for Tactical Highway Driving"
In this research, I demonstrated that an A*-based planning algorithm can safely maneuver a simulated vehicle around other vehicles in a highway setting.

University of Southern California, Sept. 1991 - May 1995

B.S. Computer Engineering/Computer Science, magna cum laude
GPA: 3.56/4.0

Research: "A Reduced Complexity Vision System"
I designed and built a low cost vision system capable of arbitrary sampling and real time blob detection and tracking using a Motorola 68332 microprocessor, for use in an autonomous helicopter.

Research: "Benchmarking Rovers for Mars"
I was involved in setting up the USC Mars sandbox, similar to the JPL version. I also wrote code to control the wheeled and legged robots used in the project.

Employment

Carnegie Mellon, Pittsburgh, PA. March 2000 – Present

Visiting Scientist

I am working as a researcher on the Toro project, the goal of which is to automate a Toro riding lawnmower, specifically for golf courses. I am using computer vision to detect and avoid obstacles, through color segmentation and stereo.

Probotics, Inc., Pittsburgh, PA. Nov. 1999 – Present

Chief Scientist

Probotics is a robotics firm in Pittsburgh, specializing in building low-cost, capable robots for home and research use. Over 300 "Cye" robot units have been sold, and Cye has been featured in such magazines as Time, Esquire, Wired, and Kiplingers, along with TV appearances on CNN, Good Morning America, and numerous local outlets. As Chief Scientist, I was responsible for technology development and management, including the path planning module and the Cye WebBot. I was also responsible for managing outside contractors working on the WebBot, and guiding their developmental efforts. I was involved in determining the direction of in-house research efforts.

Allen Bradley Co., Milwaukee, WI. Summer 1993 and Summer 1994

Internship: "A Heterogeneous Distributed Object System (HDOS)"

I was responsible for enhancements to a distributed object system, similar to DCOM. The system allows a programmer to transparently reference objects located on networked machines. My contribution was to develop a monitoring system for an HDOS network, and to port the entire system from SunOS to Windows.

Teaching

1996-1997	Teaching Assistant - Carnegie Mellon University, Introduction to Manipulation
1994-1995	Grader - University of Southern California, Operating Systems

Awards

1996-1999	National Science Foundation Graduate Research Fellowship
1991-1995	USC Merit Research Scholarship
1991-1995	USC Dean's Scholarship
1991-1995	Dean's List, USC

Publications

Batavia, P.H., Nourbakhsh, I, *Path Planning for the Cye Personal Robot*, Submitted to IEEE International Conference on Robots and Systems, 2000.

Batavia, P.H., *Driver Adaptive Lane Departure Warning Systems*, Ph.D. Thesis, CMU Tech Report CMU-RI-99-25, 1999.

Batavia, P.H., *Driver Adaptive Warning Systems*, CMU Tech Report CMU-RI-98-07, 1998.

Batavia, P.H., Pomerleau, D.A., Thorpe, C.E., *Predicting Lane Position for Roadway Departure Prevention*, Proceedings of the IEEE Intelligent Vehicles Symposium, Stuttgart, Germany, October 1998.

Batavia, P.H., Pomerleau, D.A., Thorpe, C.E., *Overtaking Vehicle Detecting Using Implicit Optical Flow*, Proceedings of the IEEE Intelligent Transportation Systems Conference, Boston, MA, 1997.

Batavia, P.H., Pomerleau, D.A., Thorpe, C.E., *Detecting Overtaking Vehicles with Implicit Optical Flow*, CMU Tech Report CMU-RI-97-28, 1997 (This is a more complete version of the above publication).

Batavia, P.H., Lewis, M.A., Bekey, G., *A Reduced Complexity Vision System for Autonomous Helicopter Navigation*, Proceedings of the IEEE Robotics and Automation Conference, Nagoya, Japan, 1995.

Batavia, P.H., Lewis, M.A, Bekey, G., *A Low Cost Reduced Complexity Vision System for Autonomous Robotics*, Institute for Robotics and Intelligent Systems Tech Report #IRIS-94-323, 1995 (This is a more complete version of the above publication).

Skills

Programming: Expert in C++, C, Matlab. Experience with Java, Open Inventor, X Windows, X Toolkit Motif, Perl, CGI, HTML, 68332 Assembly, Real Time Systems, Visual C++ , MFC, DirectShow, and COM programming.
Hardware: Experienced in vision hardware design using the Motorola 68332 microcontroller.

Professional Activities

Reviewer: Journal of Autonomous Robots, John H. Wiley and Sons, Image and Vision Computing Journal, IEEE Robotics and Automation, IEEE Computer Vision and Pattern Recognition, TRB 1997.

Offices Held: Representative for the Graduate Student Assembly, 1996-1998; Member of the University Education Committee, 1997-1998; Member of the Vice Presidents Student Advisory Committee 1998-1999, Member of the Graduate Advisory Board 1998-1999, Maintainer of the CMU VASC Image Database 1996-present, Member of the Robotics Institute Ph.D. Admissions Committee, 1997-1999.

Hobbies, Interests

Flying (Private Pilot), Golf, Symphony, Reading.

References

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