

T. METIN SEZGIN

MIT CSAIL
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RESEARCH INTERESTS

Enabling people to interact with computers in a much more natural fashion by combining techniques from computer vision, machine learning, computer graphics and human-computer interaction. Specifically, developing efficient recognition technologies for intelligent pen-based human-computer interfaces to interpret free-hand drawings in real-time by combining spatial and temporal patterns in online sketches. Broad interests include applications of Computer Vision and Machine Learning in real world problems.

EDUCATION

Massachusetts Institute of Technology, Cambridge MA

Candidate for PhD in Electrical Engineering and Computer Science, May 2006 GPA: 5.0/5.0

Thesis Title: *“Online Sketch Recognition by Temporal and Spatial Feature Fusion”*

Thesis Committee: *Prof. Randall Davis (advisor), Prof. Leslie Pack Kaelbling, Prof. Tomás Lozano-Pérez.*

Qualifier Committee: *Dr. Trevor Darrell, Dr. Eric Demaine*

Minor Concentration: Management in Engineering, Sloan School of Management

Massachusetts Institute of Technology, Cambridge MA

Master of Science degree in Electrical Engineering and Computer Science, May 2001 GPA: 4.86/5.00

Thesis Advisor: *Prof. Randall Davis*

Thesis Title: *“Feature Point Detection and Curve Approximation for Early Processing of Free-Hand Sketches”*

Syracuse University, LC Smith College of Engineering and Computer Science, Syracuse NY

Bachelor of Science with Honors in Computer Science May 99.

Ranked 1st in the College of Engineering. GPA: 3.99/4.00 – overall, 4.0/4.0 – core

Honors Thesis Title: *“Logic Programming: A Dynamical Systems Approach”*

DISSERTATION

Sketching is a natural mode of interaction employed in a variety of settings. The emergence of hardware such as PDAs and Tablet PCs has enabled capturing pen input, paving the road to making sketching an additional human-computer interaction modality. Despite the hardware advances, relatively little effort has been put into using computers to understand and reason about sketches. Approaches to sketch recognition have traditionally relied on spatial features of sketches, which proved to be computationally costly in recognition. I have shown that in addition to spatial features, online sketches contain valuable temporal patterns. I have shown how these temporal patterns can be learned to perform efficient sketch recognition even when the input has complex temporal patterns. This has formed the foundation of a sketch recognition architecture that can combine temporal and spatial features for efficient recognition.

REPRESENTATIVE COURSEWORK

Graduate Level Computer Science: Advances in Computer Vision: Learning and Interfaces, Statistical Learning Theory and Applications, Computer Graphics, Embodied Intelligence, Expert Systems, Artificial Life and Evolutionary Games, Database Management Systems, Programming Languages Theory and Practice, Computer Architecture, Computability Theory, Analysis of Algorithms, Advanced Algorithms, Functional Programming via Haskell.

Selected Undergraduate Computer Science: System Software Design, Artificial Intelligence, Mobile Robotics, Advanced Digital Logic Design, Data Structures, Statistics for Engineers, Computer Organization and Assembly Language

Management Concentration: Management for Engineers, Competitive Decision-Making and Negotiation, Entrepreneurship Laboratory.

ACADEMIC EXPERIENCE

UROB Research Supervisor, Massachusetts Institute of Technology, Cambridge MA 05/01 – 09/02
Supervised an MIT undergraduate in the design and implementation of a special purpose geometry java programming interface package to support primitive geometry calculations for sketch recognition.

Teaching Assistant, Artificial Intelligence, Massachusetts Institute of Technology, Cambridge MA. 09/99 – 12/99
This is MIT's main undergraduate artificial intelligence class taught by Prof. Patrick Winston. The syllabus included a wide range of AI topics. My responsibilities included preparing and teaching tutorial sessions, recitations, holding exam reviews, preparing and grading homework and exams.

Grader for CIS 351 Data Structures and Algorithms, Syracuse University, Syracuse, NY 08/98 – 12/98
I graded homework and exams and help office hours for the core undergraduate data structures class as SU.

Teaching Assistant, Mobile Robotics, Syracuse University, Syracuse NY 01/98 – 05/98
This course, designed after MIT's autonomous robot competition, had weekly lectures and laboratory sessions. I assisted student teams that built and programmed autonomous robots with microcontrollers to run a maze. I ran weekly laboratory sessions and oversaw the progress of the projects.

PROFESSIONAL SERVICE AND AFFILIATIONS

Reviewer: Human Computer-Interaction Journal (HCI)

Reviewer: User Interface Software and Technology Conference (UIST)

Reviewer, Program Chair: MIT Student Oxygen Workshop (SOW)

MIT TechLink AI Lab representative

Organizer: MIT Dangerous Ideas Seminar Series

Member: American Association for Artificial Intelligence

HONORS AND AWARDS

Research Assistantship, Massachusetts Institute of Technology (1999-2005)

Earl H. Devoe Prize for Outstanding Undergraduate Research, Syracuse University (1999)

Warren Semon Prize for Outstanding Achievement in Computer Science, Syracuse University

Syracuse University 1998-1999 Remembrance Scholar

Second place in the Martin and Phyllis Berman Competition for innovative Computer Programs in 1998

Third Place in the Martin and Phyllis Berman Competition for innovative Computer Programs in 1997

Member of NY β chapter of Tau Beta Pi Honor Society at Syracuse University

Member of Phi Kappa Phi Honor Society at Syracuse University

Honorary Scholarship from Syracuse University covering full tuition during my undergraduate education (8 semesters)

Enrollment in the Upper Division Honors Program at Syracuse University.

L.C. Smith College of Eng. and Computer Science PRIDE 4.0 Club Certificate for Civic and Academic Excellence.

Dean's List (All semesters at Syracuse University)

SELECTED PUBLICATIONS

Refereed Conferences

T. M. Sezgin and R. Davis. **HMM-Based Efficient Sketch Recognition.** *In Proceedings of the International Conference on Intelligent User Interfaces (IUI'05), San Diego, CA.* (2005).

T. M. Sezgin and R. Davis. **Modeling Sketching as a Dynamic Process.** *In Proceedings of CSAIL Student Workshop '05 Gloucester, MA* (2005).

T. M. Sezgin and R. Davis. **Handling Overtraced Strokes in Hand-Drawn Sketches.** *In Proceedings of the AAAI Spring Symposium Series: Making Pen-Based Interaction Intelligent and Natural, Washington DC* (October 21-24 2004).

T. M. Sezgin and R. Davis. **Scale-space Based Feature Point Detection for Digital Ink.** *In Proceedings of the AAAI Spring Symposium Series: Making Pen-Based Interaction Intelligent and Natural, Washington DC* (October 21-24 2004).

T. M. Sezgin. **Recognition efficiency issues for freehand sketches.** *Proceedings of the MIT Student Oxygen Workshop. Gloucester, MA.* (2003).

T. M. Sezgin, T. Stahovich, and R. Davis. **Sketch Based Interfaces: Early Processing for Sketch Understanding.** *Proceedings of the Perceptive User Interfaces Workshop, Orlando FL.* (2001).

Book Chapter

H.A. Blair, F. Dushin, D.W. Jakel, A.J. Rivera and T. M. Sezgin. **Continuous Models of Computation for Logic Programs.** *Book chapter in The Logic Programming Paradigm: A 25-Year Perspective, Springer Series in Artificial Intelligence* (1999).

Abstracts and Technical Reports

T. M. Sezgin and R. Davis. **Efficient search space exploration for sketch recognition.** *In MIT Computer Science and Artificial Intelligence Laboratory Annual Research Abstract.* (2004).

T. M. Sezgin and R. Davis. **Early Sketch Processing with Application in HMM Based Sketch Recognition.** *In MIT Computer Science and Artificial Intelligence Laboratory Technical Report AIM-2004-016,* (2004).

R. Davis, A. Adler, C. Alvarado, T. Hammond, R. Hitchcock, T. M. Sezgin, and O. Veselova. **Designs for the Future.** *In MIT Artificial Intelligence Laboratory Annual Abstract.* (2002).

T. M. Sezgin and R. Davis. **Generating Domain Specific Sketch Recognizers from Object Descriptions.** *In MIT Artificial Intelligence Laboratory Annual Abstract.* (2002).

C. Alvarado, T. M. Sezgin, D. Scott, T. Hammond, Z. Kasheff, M. Oltmans, and R. Davis. **A Framework for Multi-Domain Sketch Recognition.** *In MIT Artificial Intelligence Laboratory Annual Abstract.* (2001).

T. M. Sezgin and R. Davis. **Scale-space Based Feature Point Detection for Noisy Digital Curves.** *In MIT Artificial Intelligence Laboratory Annual Abstract.* (2001).

WORK EXPERIENCE

Computer Software Engineer at Havelsan Aerospace Electronic Industry Inc. Ankara, Turkey 06/99 – 09/99
Participated in the development and testing of the Interceptor Firewall which became part of Havelsan GUARD, Turkey's national secure networking product. Main responsibilities included reviewing the design specifications and writing test cases for the user interface component of Interceptor Firewall.

Research Intern at ASELSAN Electronics. Ankara, Turkey 06/98 – 07/98
Evaluated Orbix and OrbixWeb implementations of CORBA for Windows, UNIX, and VxWorks platforms for ASELSAN, the leading electronics company in Turkey. My evaluation concentrated on the speed and ease of implementation tradeoffs of Orbix and OrbixWeb.

Computer Software Developer. Syracuse University Physics Department, Syracuse NY 09/96 – 12/98
Participated in development of programs for the NSF project "Integration of Information Age Networking and Parallel Supercomputer Simulations into University General Science and K-12 Curricula".

Computer Software Developer. BlackWatch Tech. Inc., Syracuse NY 08/96 – 05/98
Implemented user interface and database modules of a security tool for managing security policy generation, configuration, and enforcement in government, commercial, and health care applications.

WORKSHOPS PREPARED

Annual Oxygen Alliance Partnership Meeting, MIT CSAIL, Cambridge MA. 04/24/02
Prepared and presented a workshop with Michael Oltmans for industry professionals from Project Oxygen partner companies. The workshop taught essentials of building a sketch based application for PDAs and Tablet PCs from ground up using the low level sketch processing toolkit I developed as part of my master's thesis.

ORGANIZED SEMINAR SERIES

Dangerous Ideas Seminar Series, MIT CSAIL, Cambridge MA. 06/04 – 06/06
The Dangerous Ideas Seminar, part of the MIT CSAIL seminar series, is designed to spur cross-pollination of ideas in the lab and to foster creativity by challenging CSAIL researchers with each others' ideas. The speakers are invited to give visionary and innovative talks that don't fall under a traditional school of thought or research area. My responsibilities as the organizer included networking with CSAIL faculty, students and alumni to recruit speakers and facilitating the discussions during the seminar.

PRESS COVERAGE

PC World *Microsoft Looks in the Crystal Ball:*
October 2003 Research chief demonstrates Magic Paper, virtual classrooms, and other projects.

CNN *Breathing Life into Messy Sketches*
October 2003

New Scientist *Smart Software Makes Sense of Rough Sketches*
September 2003

Mass HighTech *MIT's Tablet Tech Gets a Look-See from Microsoft*