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Curriculum Vitae

ILAN M. SHIMSHONI

ADDRESS

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PERSONAL

ID No.: 05595399-6
Date & Place of Birth: August 3, 1959, Rehovot Israel
Family Status: Married plus two children

ACADEMIC DEGREES

B.S.	-	Department of Mathematics, Hebrew University, Jerusalem, Israel, June 1984.
M.S.	-	Department of Applied Mathematics, Weizmann Institute of Science, Rehovot, Israel, December 1989.
Ph.D.	-	Department of Computer Science, the University of Illinois at Urbana-Champaign, October 1995.

ACADEMIC APPOINTMENTS

1998–present	:	Senior Lecturer, Faculty of Industrial Engineering and Management, Information Systems Group, Technion, Haifa, Israel.
1995–1998	:	Post-Doctoral fellow (Koret/Goldschmidt Fellowship), Department of Computer Science, Technion, Haifa, Israel.
1991–1995	:	Research Assistant, Department of Computer Science, University of Illinois.
1985–1986	:	Research Assistant, Robotics Laboratory, Weizmann Institute of Science.

PROFESSIONAL EXPERIENCE

1984–1991	:	Software Engineer, Adcad Ltd, Rehovot, Israel and i-Logix Inc, Boston, Ma. In charge of software design of the "Statemate" software engineering tool for specification of reactive systems.
1977–1982	:	Computer Programmer, Intelligence, Israel Defense Forces.

RESEARCH INTERESTS

- Probabilistic Reasoning in Computer Vision
- 3D Object Recognition
- Robot Motion Planning
- Vision Guided Robot Control
- Line-Drawing Analysis
- Physics-Based Vision
- Aspect Graphs
- Face Recognition and Animation

TEACHING EXPERIENCE

236873 "Computer Vision", Fall 1996,Spring 1997, Technion Israel (undergraduate and graduate).

096220 "Database Engineering", Fall 1997, Technion Israel (undergraduate and graduate).

094221 "Design and Implementation of Information Systems", Spring 1998, Fall 1998, Fall 1999, Fall 2000, Technion Israel (undergraduate).

234122 "Introduction to Systems Programming", Spring 1998, Technion Israel (undergraduate).

096240 "Design and Implementation of Real-Time Systems", Spring 1999, Spring 2000, Technion Israel (undergraduate and graduate).

096260 "Geometric issues in 3D Computer Vision", Fall 1999, Fall 2000, Technion Israel (undergraduate and graduate).

094220 "Software Engineering", Spring 2001, Fall 2001, Technion Israel (undergraduate).

096280 "Multiple View Geometry in Computer Vision", Fall 2001 Technion Israel (undergraduate and graduate).

PUBLIC PROFESSIONAL ACTIVITIES

Refereed Journals: IEEE Trans. on Pattern Analysis and Machine Intelligence; Computer Vision and Image Understanding (Computer Vision Graphics and Image Processing); International Journal on Document Analysis and Recognition; IEEE Trans. on Robotics and Automation; International Journal on Computer Vision; Journal of Mathematical Imaging and Vision.

Refereed Conferences: IEEE Computer Vision and Pattern Recognition Conference; International Conference on Pattern Recognition; International Conference on Computer Vision; International Conference on Robotics and Automation.

Refereed Grants: Israel Science Foundation.

Program Committee Member: IEEE Model Based 3D Image Analysis (MB3IA) workshop 1998;
IEEE Computer Vision and Pattern Recognition Conference 2000;

MEMBERSHIP IN PROFESSIONAL SOCIETIES

Member of IEEE, IAPR.

HONORS

Graduated with Honors 1984, Hebrew University, Jerusalem.

GRADUATE STUDENTS

Ph.D. Students - Graduated

Adam Amit, "Active Navigation". Primary advisor: Ehud Rivlin.

M.Sc. Students - Graduated

Guy Froimovich, "Object Classification by Functional Parts". Primary advisor: Ehud Rivlin.

Moshe Klausner "Post-Link Code Optimization Based on a True Disassembler"
(with David Bernstein). Primary advisor: Ilan Shimshoni.

M.Sc. Students - In Progress

Aviva Sassporta, "Object Recognition by Transformation Clustering Using Uncertainty Regions".

Eyal Hameiri, “Recognizing Objects in 3-D Scenes by Matching Curvature Maps”
(with Michael Lindenbaum). Primary advisor: Ilan Shimshoni.

Ariel Fligler, “Mass Customization in Marketing Using Genetic Algorithms: A Niching and Co-Evolution Approach”
(with Gila Fruchter). Primary advisor: Ilan Shimshoni.

Igal Koifman “Distance Learning over the Internet”
(with Ayellet Tal). Primary Advisor: Ilan Shimshoni.

Sara Keren “Extracting and handling 3D models from uncalibrated images”. Primary Advisor: Ayellet Tal.

Gil Gattegno “3D Object Recognition from 2D Images Based on Geometric Hashing”
(with Michael Lindenbaum). Primary Advisor Ilan Shimshoni.

RESEARCH GRANTS

Research on the topic of Automatic Target Recognition from aerial photographs has been awarded a grant from the Israeli Ministry of Defense and Rafael. The grant was awarded to Michael Lindenbaum, Ehud Rivlin and myself. Amount $60,000, 6/1997-7/1999.

An infrastructure grant of the ministry of science on the topic of “Image-Space Technology for Vision and Robotics Applications” was awarded to a group of researchers. The group includes Dr. Ehud Rivlin, Dr. Michael Lindenbaum and myself from the technion, Prof. Shimon Ullman and Dr. Ronen Basri from the Weizmann Institute of Science and Dr. Daniel Keren from Haifa University. I coordinated the proposal and wrote large parts of it. Amount 700,000 NIS/year for three years, 10/97-10/2000.

I joined in the research activities of a Multimedia Magnet Consortium “Computer Vision Methods for Multimedia”, with Ayellet Tal from the Electrical Engineering Department of the Technion and Ronen Basri and Shimon Ullman from the Weizmann Institute of Science. Amount $120,000, 1996-1998.

Research grant from the company Applied Materials on topics related to visual chip inspection. The grant was awarded to Alfred Bruckstein Yoram Baram and several other researchers including myself. Amount $50,000, 1/1999-12/1999.

An infrastructure grant of the ministry of science on the topic of “Vision Based Active Robot Navigation” was awarded to a group of researchers. The group includes Prof. Ehud Rivlin, Prof. Michael Lindenbaum Prof. Alfred Bruckstein and myself from the technion, Prof. Ronen Basri from the Weizmann Institute of Science and Prof. Leo Joskowicz from The Hebrew University. Amount 483,000 NIS/year for three years, 4/00-4/03.

“Shape reconstruction from a combination of geometric and photometric constraints”, Israel Science Foundation. $45,000/year for three years, 10/01-9/05, with Dr. Yael Moses Interdisciplinary Center.

PUBLICATIONS

Theses

M.S. Thesis, 1989: "Time/space tradeoff algorithms for the permutation representation problem", Weizmann Institute of Science, Rehovot (Advisor: Professor Adi Shamir).

Ph.D. Thesis, 1995: "Interpreting images of polyhedral objects in the presence of uncertainty", University of Illinois at Urbana-Champaign (Advisor: Professor Jean Ponce).

Refereed Papers in Professional Journals

1. I. Shimshoni, R. Kimmel and A. Bruckstein, "Global Shape from Shading," *Comp. Vision Image Understanding*, Vol 64, No 1, 188–189, July 1996.
2. I. Shimshoni and J. Ponce, "Recovering the shape of polyhedra using line-drawing analysis and complex reflectance models," *Comp. Vision Image Understanding*, Vol 65, No 2, 296–310, February 1997.
3. I. Shimshoni and J. Ponce, "Finite resolution aspect graphs of polyhedral objects," *IEEE Trans. Patt. Anal. Mach. Intell.*, Vol 19, No 4, 315–327, April 1997.
4. I. Shimshoni, R. Basri, and E. Rivlin, "The Geometric Interpretation of Weak-Perspective Motion," *IEEE Trans. Patt. Anal. Mach. Intell.*, Vol 21, No 3, 252–257, March 1999.
5. I. Shimshoni, "On Estimating the Uncertainty in the Location of Image Points in 3D Recognition from Match Sets of Different Sizes", *Comp. Vision Image Understanding*, Vol 74, No 3 163–173, June 1999.
6. R. Basri, E. Rivlin and I. Shimshoni, "Visual Homing: Surfing on the Epipoles", *Int. J. of Comp. Vision*, Vol 33, No 2, 117–137, September 1999.
7. I. Shimshoni and J. Ponce, "3D Probabilistic Object Recognition", *Int. J. of Comp. Vision*, Vol 36, No 1, 51–70, January 2000.
8. D. Keren, E. Rivlin, I. Shimshoni, and I. Weiss, "Recognizing 3D Objects Using Tactile Sensing and Curve Invariants", *Journal of Mathematical Imaging and Vision*, Vol 12, No 1, 5–23, February 2000.
9. I. Shimshoni, Y. Moses, and M. Lindenbaum, "Shape Reconstruction of 3D Bilaterally Symmetric Surfaces", *Int. J. of Comp. Vision*, Vol 39, No 2, 97–100, September 2000.
10. A. Adam, E. Rivlin, and I. Shimshoni, "RoR: Rejection of Outliers by Rotations", *IEEE Trans. Patt. Anal. Mach. Intell.*, Vol 23, No 1, 78–84, January 2001.
11. A. Adam, E. Rivlin, and I. Shimshoni, "Computing the Sensory Uncertainty Field of a Vision-based Localization Sensor", *IEEE Trans. Robotics and Automation*, Vol 17, No 3, 258–267, June 2001.

Accepted

12. G. Moiza, A. Tal, I. Shimshoni, D. Barnett, and Y. Moses "Image-Based Animation of Facial Expressions", *The Visual Computer.*

13. I. Shimshoni, "On Mobile Robot Localization from Landmark Bearings", *IEEE Trans. Robotics and Automation*

Submitted

1. G. Froimovich, E. Rivlin, and I. Shimshoni, "Object Classification by Functional Parts", *IEEE Systems, Man, and Cybernetics B*

2. I. Shimshoni, "A Simple Algebraic Algorithm for Orientation Estimation from a Trihedral Corner", *Pattern Recognition*

BOOK CHAPTERS

R. Basri, E. Rivlin, and I. Shimshoni, "Visual Homing: Surfing on the Epipoles", in *The Confluence of Vision and Control*, Springer-Verlag in the Lecture Notes in Control and Information Systems (LNCIS) series, Vol 237, 1998.

PATENTS

A patent "Guiding robots to desired positions in space using images", has been submitted in the USA. Patent pending. Inventors: Ronen Basri, Ehud Rivlin, and Ilan Shimshoni.

TECHNICAL REPORTS

1. I. Shimshoni and J. Ponce, "Recovering the shape of polyhedra using line-drawing analysis and complex reflectance models", Beckman Institute Technical Report UIUC-BI-AI-RCV-93-09, University of Illinois at Urbana-Champaign.

2. I. Shimshoni, "Interpreting Images of Polyhedral Objects in the Presence of Uncertainty", Department of Computer Science Technical Report UIUCDCS-R-95-1909, University of Illinois at Urbana-Champaign.

3. I. Shimshoni, "A Fast Method for Estimating the Uncertainty in the Location of Image Points in 3D Recognition", Department of Computer Science Technical Report CIS9614, Technion.

4. R. Basri, E. Rivlin, and I. Shimshoni, "Visual Homing: Surfing on the Epipoles", Department of Computer Science Technical Report CIS9709, Technion.

5. I. Shimshoni, Y. Moses, and M. Lindenbaum, "Auto Photometric/Geometric Stereo from a Single Image or Class Based Reconstruction of Bilaterally Symmetric Objects", Department of Computer Science Technical Report CIS9710, Technion.
6. A. Tal, I. Shimshoni, G. Moiza, D. Barnett, and Y. Moses. "Animation of Facial Expressions: From Images to Images through Images", Faculty of Electrical Engineering, Technion, CC-270, EE-1196, 1999.

CONFERENCES

Contributed Talks

30th Ann. IEEE Symp. on Foundations of Computer Science, 1989.
A. Fiat, S. Moses, A. Shamir, I. Shimshoni, and G. Tardos, "Planning and learning in permutation groups". Speaker: A. Shamir.

IEEE Int. Conf. on Robotics and Automation, Nice, France, May 1992.
J. Ponce and I. Shimshoni, "An algebraic approach to line-drawing analysis in the presence of uncertainty". Speaker: J. Ponce.

IEEE Workshop on Qualitative Vision, New York, New York, June 1993.
I. Shimshoni and J. Ponce, "Finite resolution aspect graphs of polyhedral objects". Speaker: I. Shimshoni.

Israeli Symposium on Artificial Intelligence Computer Vision and Neural Networks, Ramat Gan, Israel, December 1993.
I. Shimshoni and J. Ponce, "Finite resolution aspect graphs of polyhedral objects". Speaker: I. Shimshoni.

IEEE Conf. Comp. Vision Patt. Recog., Seattle, Washington, June 1994.
I. Shimshoni and J. Ponce, "Recovering the shape of polyhedra using line-drawing analysis and complex reflectance models". Speaker: I. Shimshoni.

Int. Conf. on Computer Vision, Boston, Massachusetts, June 1995.
I. Shimshoni and J. Ponce, "3D Probabilistic Object Recognition". Speaker: I. Shimshoni.

Int. Conf. Patt. Recog., Vienna Austria, August 1996. I. Shimshoni, "A Fast Method for Estimating the Uncertainty in the Location of Image Points in 3D Recognition". Speaker: I. Shimshoni.

3D Image Analysis and Synthesis '96, Erlangen, Germany, November 1996.
J. Hornegger, H. Niemann and I. Shimshoni, "Probabilistic Methods for 3-D Object Recognition". Speaker: J. Hornegger.

The 6th International Conference on Computer Vision, Bombay, India, January 1998.
R. Basri, E. Rivlin and I. Shimshoni, "Visual Homing: Surfing on the Epipoles". Speaker: I. Shimshoni.

IEEE International Conference on Robotics and Automation 1998, Leuven, Belgium, May 1998.
D. Keren, E. Rivlin, I. Shimshoni and I. Weiss, "Recognizing Surfaces Using Curve Invariants and Differential Properties of Curves and Surfaces". Speaker: I. Shimshoni.

IEEE International Conference on Image Processing 1998, Chicago, USA, October 1998.
D. Keren, E. Rivlin, I. Shimshoni and I. Weiss, "Recognizing Surfaces Using 3D Curves". Speaker: I. Shimshoni.

DARPA Image Understanding Workshop 1998.
D. Keren, E. Rivlin, I. Shimshoni and I. Weiss, "Recovering Surface Invariants from Curves". Speaker: I. Weiss.

IEEE International Conference on Robotics and Automation 1999, Detroit, USA, May 1999.
R. Basri, E. Rivlin, and I. Shimshoni, "Image-Based Robot Navigation Under the Perspective Model". Speaker: I. Shimshoni.

10th International Conference on Image Analysis and Processing 1999, Venice, Italy, September 1999.
I. Shimshoni, Y. Moses, and M. Lindenbaum, "Shape Reconstruction of 3D Bilaterally Symmetric Surfaces". Speaker: M. Lindenbaum.

IEEE International Conference on Robotics and Automation 2000, San Francisco, USA, April 2000.
A. Adam, E. Rivlin, and I. Shimshoni, "Computing the Sensory Uncertainty Field of a Vision-based Localization Sensor". speaker: A. Adam.

IEEE Computer Vision Pattern Recognition, Hilton Head, South Carolina, June 2000.
A. Adam, E. Rivlin, and I. Shimshoni, "ROR: Rejection of Outliers by Rotations in Stereo Matching". Speaker: A. Adam.

Int. Conf. on Patt. Recog., Barcelona, Spain, September 2000.
A. Adam, E. Rivlin, and I. Shimshoni, "Using Model-Based Localization with Active Navigation". Speaker: A. Adam.

IEEE Int. Conf. On Robotics and Automation 2001, Seoul, Korea, May 2001.
A. Adam, E. Rivlin and I. Shimshoni, "Towards a Meta Motion Planner A: Model and Framework". Speaker I. Shimshoni.

IEEE Int. Conf. On Robotics and Automation 2001, Seoul, Korea, May 2001.
A. Adam, E. Rivlin and I. Shimshoni, "Towards a Meta Motion Planner B: Algorithm and Applications". Speaker I. Shimshoni.

IEEE Int. Conf. On Robotics and Automation 2001, Seoul, Korea, May 2001.
I. Shimshoni, "On Mobile Robot Localization From Landmark Bearings". Speaker I. Shimshoni.

Recognition, Analysis and Tracking of Faces and Gestures in Real-time Systems, Vancouver, Canada, July 2001.
G. Moiza, A. Tal, I. Shimshoni, D. Barnett and Y. Moses, "Reconstruction of Movies of Facial Expressions". Speaker I. Shimshoni.

Refereed Papers in Conference Proceedings

1. A. Fiat, S. Moses, A. Shamir, I. Shimshoni and G. Tardos, "Planning and learning in permutation groups", In *Proc. of the 30th Ann. IEEE Symp. on Foundations of Computer Science*, pp. 274–279, 1989.

2. J. Ponce and I. Shimshoni, "An algebraic approach to line-drawing analysis in the presence of uncertainty", In *IEEE Int. Conf. on Robotics and Automation*, pp. 1786–1791, Nice, France, May 1992.

3. I. Shimshoni and J. Ponce, "Finite resolution aspect graphs of polyhedral objects", In *IEEE Workshop on Qualitative Vision*, pp. 140–150, New York, New York, June 1993.

4. I. Shimshoni and J. Ponce, "Finite resolution aspect graphs of polyhedral objects", in *Israeli Symposium on Artificial Intelligence Computer Vision and Neural Networks*, pp. 505–514, Ramat Gan, Israel, December 1993.

5. I. Shimshoni and J. Ponce, "Recovering the shape of polyhedra using line-drawing analysis and complex reflectance models", In *Proc. IEEE Conf. Comp. Vision Patt. Recog.*, pp. 514–519, Seattle, Washington, June 1994.

6. I. Shimshoni and J. Ponce, "3D Probabilistic Object Recognition", In *Int. Conf. on Computer Vision*, pp. 488–493, Boston, Massachusetts, June 1995.

7. I. Shimshoni, "A Fast Method for Estimating the Uncertainty in the Location of Image Points in 3D Recognition", In *Int. Conf. Patt. Recog.*, pp. 590–594, Vienna Austria, August 1996.

8. J. Hornegger, H. Niemann and I. Shimshoni, "Probabilistic Methods for 3-D Object Recognition", In *3D Image Analysis and Synthesis '96*, pp. 73–80, Erlangen, Germany, November 1996.

9. R. Basri, E. Rivlin and I. Shimshoni, "Visual Homing: Surfing on the Epipoles", In *The 6th International Conference on Computer Vision*, pp. 863–869, Bombay, India, January 1998.

10. D. Keren, E. Rivlin, I. Shimshoni and I. Weiss, "Recognizing Surfaces Using Curve Invariants and Differential Properties of Curves and Surfaces", In *IEEE International Conference on Robotics and Automation 1998*, pp. 3375–3381, Leuven, Belgium, May 1998.

11. D. Keren, E. Rivlin, I. Shimshoni and I. Weiss, "Recognizing Surfaces Using 3D Curves", In *IEEE International Conference on Image Processing 1998*, Chicago, USA, October 1998.

12. D. Keren, E. Rivlin, I. Shimshoni and I. Weiss, "Recovering Surface Invariants from Curves", In *Proc. DARPA Image Understanding Workshop 1998*, pp. 1221–1228.

13. R. Basri, E. Rivlin, and I. Shimshoni, "Image-Based Robot Navigation Under the Perspective Model," In *IEEE International Conference on Robotics and Automation 1999*, pp. 2578–2583, Detroit, USA, May 1999.

14. I. Shimshoni, Y. Moses, and M. Lindenbaum, "Shape Reconstruction of 3D Bilaterally Symmetric Surfaces", In *10th International Conference on Image Analysis and Processing 1999*, pp. 76–81, Venice, Italy, September 1999.

15. A. Adam, E. Rivlin, and I. Shimshoni, "Computing the Sensory Uncertainty Field of a Vision-based Localization Sensor", In *IEEE International Conference on Robotics and Automation 2000*, San Francisco, USA, April 2000.

16. A. Adam, E. Rivlin, and I. Shimshoni, "ROR: Rejection of Outliers by Rotations in Stereo Matching", In *Computer Vision Pattern Recognition*, Vol 1, pp 2–9, Hilton Head, South Carolina, June 2000.

17. A. Adam, E. Rivlin, and I. Shimshoni, "Using Model-Based Localization with Active Navigation", In *Int. Conf. on Patt. Recog.*, Vol. IV, pp. 676–680 Barcelona, Spain. September 2000.

18. A. Adam, E. Rivlin and I. Shimshoni, "Towards a Meta Motion Planner A: Model and Framework", In *IEEE Int. Conf. On Robotics and Automation 2001*, Seoul, Korea, May 2001.

19. A. Adam, E. Rivlin and I. Shimshoni, "Towards a Meta Motion Planner B: Algorithm and Applications", In *IEEE Int. Conf. On Robotics and Automation 2001*, Seoul, Korea, May 2001.

20. I. Shimshoni, "On Mobile Robot Localization From Landmark Bearings", In *IEEE Int. Conf. On Robotics and Automation 2001*, Seoul, Korea, May 2001.

21. G. Moiza, A. Tal, I. Shimshoni, D. Barnett and Y. Moses, "Reconstruction of Movies of Facial Expressions", In *Recognition, Analysis and Tracking of Faces and Gestures in Real-time Systems*, pp 8–15, Vancouver, Canada, July 2001.