Aya Soffer

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EDUCATION

B.S. in Computer Science	Hebrew University of Jerusalem, Israel	June 1986
M.S. in Computer Science	University of Maryland, College Park	December 1992
Ph.D. in Computer Science	University of Maryland, College Park	October 1995

Thesis Topic: Retrieval by Content in Symbolic-Image Databases
Thesis Advisor: Professor Hanan Samet

PROFESSIONAL EXPERIENCE

Research Assistant Professor,
University of Maryland Baltimore County, September 1995 - Present

Also research scientist at Center of Excellence in Space Data and Information Sciences (CESDIS) at Goddard Space Flight Center, and at Center for Automation Research (CfAR), University of Maryland College Park. Participating in NASA's digital library effort.
Research topics include:

- A pictorial query language for symbolic images.
- Web Based Geospatial Metadata Input and Extraction.
- Image categorixation using NxM-grams.
- Fusion of satellite images and Geographic Information Systems, and retrieval of satellite images by content.

Teaching:

- Introduction to Database Management Systems (CMSC 461), University of Maryland Baltimore County, Spring 1997.

Graduate Research Assistant,
University of Maryland, September 1992 – August 1995

- Designed and implemented a system for legend-driven map recognition. This system can be used to convert symbolic images (e.g., maps, floor plans, and other graphical documents) into a logical representation that is suitable for supporting retrieval by content and incorporating into a Geographic Information System (GIS).
- Integrated the output of this conversion system into a spatial database management system (DBMS) based on the relational model. This system can retrieve map images based on both contextual (semantic) and spatial query specifications.

- This work dealt with issues involving pattern recognition, document analysis, query optimization, visual query specifications, and spatial databases.
- Supported by NASA Global Change Fellowship.

Teaching Assistant,
University of Maryland College Park, September 1990 – May 1993

- Algorithms (CMSC 251), University of Maryland, College Park Fall 1990, Spring 1991. Assisted students during office hours. Graded homework.
- Computer Architecture (CMSC 311), University of Maryland, College Park Summer 1991. Assisted students during office hours. Graded homework.
- Data Structures (CMSC 420), University of Maryland, College Park, Spring 1990, Fall 1991. Assisted students during office hours. Graded homework and computer projects.
- Data Structures (CMSC 420), University of Maryland, University College, Summer, Fall 1992, Spring 1993. Taught recitations on data structures and the LISP programming language.

Software Engineer,
Elscint Ltd., Haifa Israel

Nuclear Medicine Division, September 1988 – July 1990

- Designed and developed a distributed database system for managing clinical information and images. This database was part of Elscint's line of nuclear medicine imaging systems (*APEX*). This project involved many aspects including databases, computer communication, mass storage, and human interfaces.

Ultrasound Division, September 1986 – July 1988

- Designed and developed a software package for clinical evaluation of cardiac performance based on echocardiograms. This included the specification of requirements, implementation of the software, and the evaluation of its use in hospitals.

Programmer
Israel Department of Education, September 1984 – June 1986

- Developed educational software for use in Israel's public schools.

PUBLICATIONS

Negative Shape Features for Image Databases Consisting of Geographic Symbols (with H. Samet). *3rd International Workshop on Visual Form* Capri, Italy, May, 1997

Image Categorization using NxM-grams. *Proceeding of the SPIE, Storage and Retrieval of Still Image and Video Databases V*, pages 121-132, San-Jose, California, February, 1997

Image Categorization using Texture Features. To appear *Fourth International Conference on Document Analysis and Recognition*, Ulm, Germany, August, 1997.

MARCO: MAp Retrieval by COntent (with H. Samet). *IEEE transactions on Pattern Analysis and Machine Intelligence.* Special issue on Digital libraries: Representation and Retrieval, Vol. 18, No. 8, pages 783–798, August 1996.

Pictorial Queries by Image Similarity (with H. Samet). *Proceedings of the 13th International Conference on Pattern Recognition*, volume III, pages 114-119, Vienna, Austria, August 1996.

Handling Multiple Instances of Symbols in Pictorial Queries by Image Similarity (with H. Samet). *Proceedings of the First International Workshop on Image Databases and Multi Media Search*, pages 51–58, Amsterdam, The Netherlands, August 1996.

Retrieval by Content in Symbolic-Image Databases (with H. Samet). Proceedings of the *SPIE:Storage and Retrieval for Still Image and Video Databases IV*, pages 144-155, San Jose, California, February 1996.

A Map Acquisition, Storage, Indexing, and Retrieval System (with H. Samet). In *Third International Conference on Document Analysis and Recognition*, pages 992-996, Montreal, Canada, August 1995.

A legend-driven geographic symbol recognition system (with H. Samet). In *Proceedings of the 12th International Conference on Pattern Recognition*, volume II, pages 350–355, Jerusalem, Israel, October 1994.

Automatic interpretation of floor plans using spatial indexing (with H. Samet). In S. Impedovo, editor, *Progress in Image Analysis and Processing III*, pages 233–240. World Scientific, Singapore, 1994.

MAGELLAN: Map Acquisition of Geographic Labels by Legend Analysis (with H. Samet). Technical Report CS-TR-3386, University of Maryland, College Park, MD, December 1994. Submitted to *IEEE transactions on Pattern Analysis and Machine Intelligence.*

Integrating images into a relational database system (with H. Samet). Technical Report CS-TR-3371, University of Maryland, College Park, MD, October 1994.

REFERENCES

Available upon request.

AWARDS AND FELLOWSHIPS

Awarded NASA Global Change Fellowship, 1992-1995.

Member of the Association for Computing Machinery and IEEE Computer.

RESEARCH INTERESTS

Image Databases, Digital Libraries, Spatial Data Structures, Geographic Information Systems, Document Analysis, Multimedia Databases.