

Ofer Melnik

Phone: 781-893-8322
Email: melnik@brandeis.edu

Status: Permanent Resident (Israeli), soon to be naturalized
Languages: native English and Hebrew, basic French, Spanish and Japanese

EDUCATION

1995-2000 *Brandeis University, Waltham Massachusetts*

PhD-- Sloan fellow for Theoretical Neuroscience, advisor Jordan B. Pollack

Main theme—How information is encoded in artificial neural networks. Given a neural network trained to solve a problem using training data, what has it learned about the data? The methods developed can also be used to efficiently analyze other high-dimensional classifier models, e.g., SVM, KNN (strong applications to Data Mining).

1999 *Riken Brain Science Institute, Tokyo Japan*

National Science Foundation's Summer Institute in Japan Program, at Professor Shuinichi Amari's lab.

1997 *Santa Fe Institute, Santa Fe New Mexico*

Santa Fe Institute Summer School for Complex systems

1990/2-1995/2 *Open University, Tel-Aviv Israel*

Baccalaureate in Computer Science, Open University Tel-Aviv, graduated in top 5% of class. Completed concurrent with military service in Israel Defense Forces.

1989/10-1994/11 *Israel Defense Forces, Israel*

Independent study granting equivalent status as a *Mamram* (the Central Computer Agency in the IDF) programmer. Courses in many topics: Advanced Unix programming, X-Windows/Motif, C++, Unix Admin, Oracle, Parallel Programming.

AWARDS

1998 *IEEE and INNS Joint Conference on Neural Networks (IJCNN), Anchorage Alaska*

Best Student Paper Award, for a paper titled "A Gradient Descent Method for a Neural Fractal Memory".

1991 *Israel Defense Forces, Israel*

Shiber Award for development of an 80x86 protected mode debugger, "Given to ... Ofer Melnik ... due to the initiative creativity and talent of the developer ... "

COMPUTER EXPERIENCE

Real-Time and Embedded Systems: *Developer / Instructor / Course commander* **5+ years.**

Weizmann institute 88-89, Israel Defense Forces 89-93, Hi-Tech College 94, Pragma Systems 98

Topics: Real-Time operating systems including Windows CE, NT and UNIX, Driver development, Control systems, Real-Time programming, Intel and Motorola microprocessors/microcontrollers including x86, 8051/96 680x0, 68HC11, Digital Signal Processing, Image Processing, digital hardware design, low-level and high-level communications.

System: *Manager/ Commander/ Developer* **3 years**

Israel Defense Forces 92-95 - Second in command of systems group in charge of large, critical network.

Topics: Automated performance monitoring and fault detection, criticality, user and programmer support, communications, security, UNIX, AOS/VS and Novell.

Development Environments and Respective Languages:

Mainframe- MVS, CMS

Mini- UNIX, VMS, AOS/VS,

PC- DOS, Windows 95/NT, Linux

Embedded- CE, RMX, ICE, Serial

PL/1, JCL, DB2, PROLOG

C++, ADA, Assembler, Perl, SAS, FORTRAN

C/C++, Java, Pascal, Assembler, VB, MATLAB, etc.

C/C++, PL/M, Assembler

PUBLICATIONS

- Melnik, O. (2000) Decision Region Connectivity Analysis: A method for analyzing high-dimensional classifiers. *Machine Learning*, in press.
- Melnik, O. and Pollack J.B. (2000) Theory and Scope of Exact Representation Extraction from Threshold Feed-Forward Networks. Submitted to *Cognitive Systems Research Journal*.
- Melnik, O., Levy, S. and Pollack, J.B. (2000). RAAM for Infinite Context-Free Languages. *IJCNN 2000*, IEEE.
- Ficici, Sevan G., Melnik, Ofer and Pollack, Jordan B. (2000). A Game-Theoretic Investigation of Selection Methods Used in Evolutionary Algorithms. *CEC 2000*, IEEE.
- Levy, S., Melnik, O. and Pollack, J.B. (2000). Infinite RAAM: A Principled Connectionist Basis for Grammatical Competence. *COGSCI 2000*, IEEE.
- Melnik, O. and Pollack, J.B. (2000). Exact Representations from Feed-Forward Networks. *IJCNN 2000*, IEEE.
- Melnik, O. and Pollack, J.B. (2000). Using Graphs to Analyze High-Dimensional Classifiers. *IJCNN 2000*, IEEE.
- Melnik, O. and Pollack, J.B. (1998). A Gradient Descent Method for a Neural Fractal Memory. *IJCNN 98*, IEEE.

EXPERIENCE CHRONOLOGY

1997-2000 <i>Brandeis University</i>	Thesis research in neural computation, advisor Jordan Pollack, exploring how information is encoded in high-dimensional decision region models such as neural networks, and the nature of continuous information representations.
1998/1,8-9 <i>Pragma Systems, Israel</i>	Developed Windows NT and Windows CE device drivers for a multi-io card, HDLC card, and pcmcia CANcard.
1995/9-1996 <i>Brandeis University</i>	Multiple lab rotations in genetics, electrophysiology, computational neuroscience and neural networks. Courses taken include neuroscience, neurogenetics, computational neuroscience, molecular biology, physical chemistry of macromolecules, neural networks, machine learning, and advanced combinatorics.
1995/5-8 <i>Independent</i>	Developed distributed database phone information system using Delphi under win 3.11 and NT.
1994/12, 1995/2 <i>Hi-Tech College Herzeliyah Israel</i>	Taught 80486 protected mode architecture courses to Elbit developers through Hi-Tech College.
1993/6-1994/11 <i>Israel Defense Forces</i>	Second in command of systems group, managing and providing support for a large heterogeneous network of computers geographically dispersed throughout the country. The operation of the different applications running on the network was of a critical nature, as such it mandated around the clock attention, and the ability to provide phone support to local sites. The network consisted of Data General computers running DG/UX as well as the older AOS/VS II. Developed applications to provide distributed performance monitoring and potential problem detection using perl, C, and SAS.
1993-1995 <i>Weizmann Inst. Dept. of Math and CoSci.</i>	Provided voluntary intermittent system administration support for a network of Internet connected UNIX workstations.
1989/11-1993/6 <i>Israel Defense Forces</i>	Instructor/ Commander/ Programmer in an Embedded Systems/ Real-Time group. Commanded Courses/ Developed Courses/ Taught in the following topics: Real-Time systems design and programming, Real-Time OSes, Real-Time Artificial Intelligence, Digital Image Processing, Digital Signal Processing, Communications and Networks, Microprocessors/ Microcontrollers including 8086, 80x86, 8051, 68000, 8096, 68HC11, Hardware Design.
	Organized conferences on Real-Time Unix and VHDL. Taught in Mamram basic computer courses. Novell LAN manager for a classroom network. Developed debugger for 80386 protected mode programs under DOS.
1989/4-1988/9 <i>Weizmann Institute, Physics</i>	Developed PC based software for data acquisition and analysis of hydrodynamics experiments. Gave system support for lab PC's, including library ports and teaching a course on 8086 assembly.
1987/7-8 <i>Unipress NJ</i>	Developed text tools for Unix based EMACS product, using standard Unix tools under SunOS.
1985/7-8,12 <i>Tadiran Israel</i>	Developed software to calculate voltage degradation across standard cells and gate arrays in FORTRAN under VMS.