CURRICULUM VITAE

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Work History

- Professor and Chairperson, Information Systems Group, Stern School of Business, New York University.
- Principal, Morgan Stanley and Company, 1995-1997. Founded and managed the Data Mining group, focusing on automated trading models, sales force management, and customer profiling in the asset gathering business. Also advised the Venture Capital group on emerging technologies in data mining and warehousing.
- Associate Professor and Ph.D. Program Coordinator, Department of Information Systems, Stern School of Business, New York University,1983-1994.
- Visiting Scientist, Artificial Intelligence Laboratory, Microelectronics Computer Corporation (MCC), Austin, Texas, August 1988-January 1989. Worked on intelligent search algorithms for solving combinatorial problems.
- Project Leader, Intelligent Systems Laboratory, Robotics Institute, Carnegie-Mellon University, January 1982-August 1983. Worked on building computer-based systems to support planning and logistics in manufacturing.

Current Research

My work focuses on the analysis of large amounts of time series data for problems such as sales and trading, and risk management, where large amounts of data exist. On the trading side, my objective is to create an artificial intelligence that performs consistently in the top decile of all traders. The empirical question here is whether the disadvantages of human beings, namely, their inherent biases as described by Tversky and Kahneman, outweigh the advantages they have over computers in their ability to form gestalts and to better interpret news events. I am modeling financial markets using a combination of evolutionary computation techniques such as genetic algorithms. These models take as input histories of data and attempt to reconstruct the psychological and economic forces that drive markets as described by experienced professionals. There are also several specific offshoots from this research, namely, whether “simpler” patterns discovered from data are more robust than more complex patterns where simpler is defined in terms of the structure of the model (linear/nonlinear), the number of variables is uses, and so on.

More generally, my research focuses on creating “knowledge intensive” organizations through better design and use of their data repositories and business processes. In the asset gathering and management business, for example, I have analyzed large amounts of transaction and portfolio performance data and the customer service process to improve product and service delivery. Output from this research has been used to manage the asset gathering business in a large investment bank.

University degrees

- Ph.D. in Artificial Intelligence, University of Pittsburgh, June 1984
- M.Phil, University of Pittsburgh, August 1982
- B.Tech in Chemical Engineering, Indian Institute of Technology, Delhi, May 1978

Major Grants

- Principal Investigator, An Analysis of Non-parametric Search Methods for Predicting Bond Yields awarded by **Moody's Investors Service**, March 2003.
- Principal Investigator, Pattern Discovery with Very Large Databases, three-year grant awarded by ***The National Science Foundation*****,** 1994-1997.
- Principal Investigator, A Methodology for Understanding the Scope of Reengineering Projects, funded by the ***IBM Corporation***, March 1992-August 1993.
- Principal Investigator, REMAP: A New Approach for Large Systems Development and maintenance, three-year grant funded by the ***National Science Foundation***, August 1988-July 1991.
- Principal Investigator, A Knowledge-Based Approach for Assessing Inherent Risk, two-year grant funded by the ***Peat Marwick International Research Foundation***, June 1985 - June 1987.
- Principal Investigator, Knowledge-Based Support for Back-Office Processing in Banking (automation of large volumes of forms containing free-form text data), funded by ***Chemical Bank***, New York, July 1985 - April 1986.
- Principal Investigator, The Robotics Institute, Carnegie Mellon University for the ROME Project: Knowledge-Based Support for Information Systems Planning, funded by ***Digital Equipment Corporation***, January 1982-August 1983.

Publications

Books

Seven Methods for Transforming Corporate data Into Business Intelligence, by Vasant Dhar and Roger Stein, published by Prentice-Hall (1997), currently in its second printing. It provides a vocabulary for expressing business requirements, and demonstrates the application of major Artificial Intelligence techniques to data-intensive business problems. The book contains seven real-world case studies that illustrate how to formulate problems in a way that leverages the strengths of each of the techniques, and conditions under which it makes sense to apply each of them.

Intelligent Decision Support Methods: The Science of Knowledge Work, Prentice-Hall, NJ, 1997 (academic version of the above).

REFEREED ACADEMIC JOURNAL ARTICLES

1. Dhar, V., and Chou, D., A Comparison of Nonlinear Methods for Predicting Earnings Surprises and Returns, *IEEE Transactions on Neural Networks*, Vol. 14, No. 4, July 2001.
2. Dhar, V., D. Chou, and F. Provost (2000), "Discovering Interesting Patterns in Investment Decision Making with GLOWER – A Genetic Learning Algorithm Overlaid With Entropy Reduction," *Data Mining and Knowledge Discovery*, October 2000.

3. Dhar, V., “Data Mining in Finance: Using Counterfactuals to Generate Knowledge from Organizational Information Systems,” *Information Systems*, Vol. 23, No. 7, 1998.
4. Benaroch, M., V. and Dhar, “On the Scope of Reasoning with Financial Knowledge,” *Journal of Organizational Computing*.
5. Benaroch, M., and V. Dhar, “Controlling the Complexity of Investment Decisions Using Qualitative Reasoning Techniques,” *Decision Support Systems*, Vol. 15, December 1995.
6. Ramesh, B., and V. Dhar, “Representing and Maintaining Process Knowledge for Large Scale Systems Development,” *IEEE Expert*, Vol. 9, No. 4, April 1994.
7. Dhar, V., and A. Tuzhilin, “Abstract Driven Pattern Discovery in Databases,” *IEEE Transactions on Knowledge and Data Engineering*, Vol. 5, No. 6, December 1993.
8. Croker, A., and V. Dhar, “A Knowledge Representation for Constraint Satisfaction Problems,” *IEEE Transactions on Knowledge and Data Engineering*, Vol. 5, No. 5, October 1993.
9. Ramesh, B., and V. Dhar, “Process Knowledge-Based Group Support for Requirements Engineering,” *IEEE Transactions on Software Engineering*, Vol. 18, No. 6, June 1992.
10. Dhar, V., and M. Jarke, “On Modeling Process,” *Decision Support Systems*, Vol. 8, Fall 1992.
11. Chen, H., and V. Dhar, “Cognitive Process as a Basis for Intelligent Retrieval Systems Design,” *Information Processing and Management*, Vol. 27, No. 3, 1991.
12. Dhar, V., and N. Ranganathan, “Integer Programming vs. Expert Systems: An Experimental Comparison,” *Communications of the ACM*, Vol. 33, No. 3, March 1990.
13. Chen, H., and V. Dhar, “User Misconceptions of Information Retrieval Systems,” *International Journal of Man-Machine Studies*, Vol. 32, pp. 673-692, 1990.
14. Dhar, V., “A Truth Maintenance System for Supporting Constraint-Based Reasoning,” *Decision Support Systems*, Vol. 5, Fall 1989.
15. Peters, J., B. Lewis, and V. Dhar, “Assessing Inherent Risk During Audit Planning: The Development of a Knowledge-Based Model,” *Accounting, Organizations, and Society*, Vol. 14, No. 4, pp. 359-378, 1989.
16. Dhar, V., B. Lewis, and J. Peters, “A Knowledge-Based Model of Inherent Risk,” *AI Magazine*, Vol. 9, No. 3, Fall 1988.
17. Dhar, V., and M. Jarke, “Learning and Dependency-directed Reasoning in Systems Maintenance Support,” *IEEE Transactions on Software Engineering*, Vol. 14, No. 2, February 1988.
18. Dhar, V., and A. Croker, “Knowledge-Based Systems in Business: Issues and a Solution,” *IEEE Expert*, Vol. 3, No. 1, February 1988.
19. Dhar, V., and H. Pople, “Rule-Based Versus Structure-Based Models in Explaining and Generating Expert Behavior,” *Communications of the ACM*, Vol. 30, No. 6, June 1987.
20. Dhar, V., “On the Plausibility and Scope of Expert Systems in Management,” *Journal of Management Information Systems*, Vol. 3, No. 3, Summer 1987.
21. Dhar, V., “Non-chronological Backtracking Employing Knowledge Used in Heuristic Search,” *Computational Intelligence: An International Journal*, Vol. 2, No. 3, 1986.

TRADE JOURNAL ARTICLES

22. Dhar, V., and R. Stein, "Finding Robust and Usable Patterns with Data Mining: Examples from Finance," *PCAI* September/October, 1998.
23. Dhar, V., and R. Stein, "Neural Networks in Finance: The Importance of Methodology over Technology," *PCAI*, July/August 1998.
24. Stein, R., and V. Dhar, "Satisfying Customers: Intelligently Scheduling High Volume Service Requests," *AI Expert*, December 1994.

REFEREED PROCEEDINGS ARTICLES

25. Mc Macskassy, S, Hirsh, H., Provost, F., Sankaranarayanan, R.,Dhar, Vasant., Intelligent Information Triage, The 24th Annual Internationl Conference on Research and Development in Information Retrieval (SIGIR), September 2001.
26. Dhar, V., and Sundarajan, A., Customer Interaction Patterns in Electronic Commerce: Maximizing Information Liquidity for Adaptive Decision Making, European Conference of Information Systems, Vienna, Austria, July 2000.
27. Madhavan, R., Dhar, V., and Weigend, A., The Value of Transparency: An Empirical Comparison of GARCH, Rule-Based, and Neural Net Trading Models, *Neural Networks in Capital Markets,* December 1997.
28. Johar, H., and Dhar, V., Dependency Based Coordination for Consistent Solutions in Distributed Work, *Information and Knowledge Management, CIKM-92*, Baltimore, MD, November, 1992.
29. Benaroch, M., and Dhar, V., Qualitative Synthesis of System Configurations Based on Desired Behavior, *9th Canadian Conference on Artificial Intelligence*, Vancouver, Canada, IEEE Press, May 1992.
30. Ramesh, B., and Dhar, V., Process Knowledge-Based Modification in Systems Development, *AAAI-92 Stanford Spring Symposium*, Stanford, CA, March 1992.
31. Benaroch, M., and Dhar, V., A Knowledge-Based Approach to Solving Hedge Design Problems, *First International Conference on Wall Street Applications*, New York, NY, October 1991.
32. Ramesh, B., and Dhar, V., Process Knowledge-based Modification in Systems Development, working paper, Naval Postgraduate School, Monterey, CA, October 1991. Also appears in *AAAI-92 Stanford Spring Symposium*.
33. Ramesh, B., and V. Dhar, Representation and Maintenance of Process Knowledge for Large Scale Systems Development, *Sixth Knowledge Based Software Engineering Conference,* Rome Laboratory, Syracuse, NY, September 1991.
34. Ramesh, B., and V. Dhar, Capturing and Reasoning with Process Knowledge in Large Scale Systems Design and Maintenance, *Workshop on Design Synthesis,* S. Howell, ed., Silver Springs, MD, September 1991.
35. Benaroch, M., and Dhar, V., An Intelligent System for Financial Hedging, *Seventh IEEE Conference on Artificial Intelligence Applications*, Miami, FL, February 1991.
36. Chen, H., and Dhar, V., Online Query Refinement in IRS: A Process Model of Searcher/System Interaction, *13th International Conference on Research and Development in Information Retrieval*, Brussels, Belgium, September 5-7, 1990.

37. Rossi, F., Dhar, V., and Petrie, C., On the Equivalence of Constraint Satisfaction Problems, *Eleventh European Conference on Artificial Intelligence*, Stockholm, Sweden, August 1990.
38. Chen, H., and Dhar, V., A Knowledge-based Approach to the Design of Document-based Retrieval Systems, *Seventh International Conference on Office Information Systems*, MIT, Cambridge, MA, April 1990.
39. Ramesh, B., and Dhar, V., Knowledge-Based Support for Systems Design and Maintenance, Workshop on Automated Systems Design, *Eleventh International Joint Conference on Artificial Intelligence*, Detroit, MI, August 1989.
40. Dhar, V., Ramesh, B., and Jarke, M., The REMAP Project: An Environment for Supporting Requirements Analysis and Maintenance, *Artificial Intelligence and Software Engineering*, AAAI Spring Symposium, March 1989.
41. Chen, H., and Dhar, V., Reducing Indeterminism in Consultation: A Cognitive Model of User/Librarian Interactions, *American Association of Artificial Intelligence* (AAAI), Seattle, WA, July 1987.
42. Dhar, V., and Ranganathan, P., Automating Review of Forms for International Trade Transactions: A Natural Language Processing Approach, *Third International Conference on Office Information Systems*, Carl Hewitt. ed., Providence, RI, October 1986.
43. Orlikowski, W., and Dhar, V., Imposing Structure on Linear Programming Problems: An Empirical Analysis of Expert/Novice Models, *American Association for Artificial Intelligence* (AAAI), Philadelphia, PA, August 1986.
44. Dhar, V., and Jarke, M., Using Teleological Design Knowledge for Large Systems Development and Maintenance, *Sixth International Workshop on Expert Systems*, Avignon, France, April 1986.
45. Dhar, V., On the Plausibility and Scope of Expert Systems in Management, *Nineteenth Hawaii International Conference on Systems Sciences* (HICSS), Honolulu, HI, January 1986.
46. Dhar, V., and Jarke, M., Learning from Prototypes, *Sixth International Conference on Information Systems* (ICIS), Indianapolis, IN, December 1985.
47. Dhar, V., and Quayle, C., An Approach to Dependency Directed Backtracking Using Domain-Specific Knowledge, *Ninth International Joint Conference on Artificial Intelligence* (IJCAI), Los Angeles, CA, July 1985.
48. Dhar, V., and Davis, J., A Process Model of Information Requirements Analysis for Planning Management Information Systems, *American Institute of Decision Sciences*, Boston, MA, November 1981.

TECHNICAL REPORTS

49. Stein, R., and Dhar, V., Maximization of Organizational Uptime Using an Interactive Genetic-Fuzzy Scheduling and Support System, *CRIS Working Paper IS-93-27*, December 1994.
50. Dhar, V., A Value-chain Based Process Model to Support Business Process Reengineering, IBM Technical Report 17221 (#77966), February 1992.
51. Ramesh, B., and Dhar, V., Process Knowledge-based Group Support for Requirements Engineering, working paper, Naval Postgraduate School, Monterey, CA, June 1991.

52. Ramesh, B., and V. Dhar, Role of Process Knowledge in Group Decision Support, working paper, Naval Postgraduate School, Monterey, CA, December 1991.
53. Rossi, F., Dhar, V., and Petrie, C., On the Equivalence of Binary and Non-Binary Constraints, MCC Technical Report, 1989.
54. Dhar, V., Adding the Knowledge Component to Spreadsheet Systems: A Knowledge-based Architecture for the Formulation and Maintenance of Planning Models, in *Expertensysteme im Untemehmen (Expert Systems in Business)*, H. Krallman, ed., Erich Schmidt Verlag, Berlin, West Germany, 1986.
55. Kosy, D., and Dhar, V., Knowledge-Based Systems for Long Range Planning, Technical Report, The Robotics Institute, Carnegie-Mellon University, Pittsburgh, PA, December 1983

BOOK CHAPTERS

56. Dhar, V., The Role of Machine Learning in Organizational Learning, in *Managerial and Organizational Cognition,* Teresa Lant and Zur Shapira (eds), Lawrence Erlbaum Associates, 1999.
57. Stein, R., Schocken, S., and Dhar V., A Practical Methodology for Applying Neural Networks to Business Decision Problems," *Encyclopedia of Computer Science and Technology*, Vol. 38, Marcel Dekker, January 1998.
58. Dhar, V., Duliba, K., and Kauffman, R., Re-Engineering Trading and Treasury Operations in International Financial Services, in *Global Information Systems and Technology*, C. Deans and K. Karwan, eds., Idea Group Publishing, Middletown, PA, 1994.
59. Ramesh, B., and Dhar, V., Group Support and Change Propagation in Requirements Engineering, in *Development Assistance for Interactive Database Applications,* M. Jarke, ed., Heidelberg, Germany, Springer Verlag, 1991.
60. Dhar, V., and Olson, M., Assumptions Underlying Systems that Support for Work Group Collaboration, *Technological Support for Work Group Collaboration*, Lawrence Erlbaum and Associates, New York, May 1987.

RECENT INVITED PRESENTATIONS

- MIT Sloan School of Management Research Seminar Series, November 20, 2003. Title: An Analysis of Genetic Algorithms in Time Series Pattern Discovery.
- NYU Courant Institute of Mathematical Sciences, January 16, 2004. Title: Genetic Search: Are Simpler Patterns More Robust?
- Invited speaker: Global Economic Forum, Thunderbird School of Management, January 15, 2004. Title: Financial Engineering and its Implications for Investment Management.
- Invited panelist: Decision Sciences 2003, November 25, 2003 Washington DC. Teaching Data Mining in a Business School.
- Keynote speaker, “Genetic Algorithms for Pattern Discovery from Large Databases”, 10th Portuguese Conference on Artificial Intelligence”, Porto, Portugal, December 2001.
- Invited plenary speaker, “Data Mining in Finance”, International Conference on Computational Finance, London, May 2001.
- Keynote Speaker, “Knowledge Discovery and Management in Electronic Financial Services”, Electronic Commerce Group, Deutsche Bank, London, December 2001.

- Invited speaker, “Data Mining in Finance”, Research Seminar Series, SUNY Albany, Feb 2002.

RECENT PROFESSIONAL ACTIVITIES

- Expert Panel, NSF Information and Data Management special initiative on Machine Learning and Data Mining, July 2003.
- Program Co-Chair, Seventh International Conference on Knowledge Discovery Data Mining and, Industrial Track, San Francisco, August 2001.
- Program Co-Chair, First International Symposium on Intelligent Commerce, Stern School of Business, New York, April, 2001.
- Program Committee, SIAM International Conference on Data Mining, Chicago, April 2001.
- Program Committee, International Conference on Computational Finance, Hong Kong, 2002.