

# Lecture Notes in Computer Science

661

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# Machine Learning: From Theory to Applications

Cooperative Research at Siemens and MIT

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## Preface

This volume includes some of the key research papers in the area of machine learning produced at MIT and Siemens during a three-year joint research effort. It includes papers on many different styles of machine learning, spanning the field from theory, through symbolic learning, to neural networks and applications.

The joint research cooperation between MIT and Siemens began in 1987, when both organizations independently became interested in pursuing research in machine learning, because of recent technical advances and perceived opportunities. Siemens desired to establish a world-class Learning Systems Laboratory for the long-term purpose of developing corporate expertise and building applications in this area. MIT's Laboratory for Computer Science desired to strengthen its research focus in learning through new research in the area, as well as increased coordination with related research in MIT Artificial Intelligence Laboratory and other parts of MIT. In addition, Siemens looked to MIT for scientific leadership, while MIT looked to Siemens for its potential for industrial applications. We believe that our joint efforts have contributed substantially to advancing the state of the art.

The joint research program has exhibited a diversity of objectives and approaches, including, among others, natural and artificial connectionist learning methods, learning by analogy within a knowledge-based system, learning by the simulation of evolution, the theoretical study of concept learning from examples, and the learning of natural language.

During the first three years of the joint effort, some 60 papers were published, three workshops and conferences were held, and many visits and exchanges of personnel took place. This book contains a sampling of the research produced.

Siemens AG, Munich  
MIT, Cambridge, MA  
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Professor Dr. Heinz Schwärtzel  
Professor Michael Dertouzos

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