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Machine Learning and Applications

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PREFACE

The founder of modern computational logic, J.A. Robinson, opens this volume with a chapter on the field's great forefathers John von Neumann and Alan Turing. Stephen Muggleton follows with an analysis of Turing's legacy in logic and machine learning, conceiving these not in generality, but as specific means of imparting knowledge to computers, a theme first articulated by Turing in the late 1940's.

The present volume records the Machine Intelligence Workshop of 1992, held at Strathclyde University's Ross Priory retreat on Loch Lomond, Scotland. Here the series entered not only its second quarter-century but a new phase. As can be seen in these pages, machine learning emerged to declare itself as a seed-bed of new theory, as a practical tool in engineering disciplines, and as material for new mental models in the human sciences.

Connections with behavioural and cognitive psychology are illuminated in Chapters 9 and 10. The pioneers always stressed these connections. In 1953 Claude Shannon had this to say:

> The problem of how the brain works and how machines may be designed to simulate its activity is surely one of the most important and difficult facing science ...Can we organise machines into a hierarchy of levels, as the brain appears to be organised, with the learning of the machine gradually progressing up the hierarchy? ...How can computer memory be organised to learn and remember by association, in a manner similar to the human brain?

Approaches to learning by association "in a manner similar to the human brain" have recently engendered unprecedented interest, one might almost say turbulence. Chapter 13 pre-views a joint European endeavour of six academic and six industrial laboratories to steer the topic towards clearer waters. The com-

plete comparative study is now available as a book from Ellis Horwood (Simon and Schuster).

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Stephen Muggleton
Executive Editor
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We are also indebted to the Royal Society of London for facilitating Professor Enn Tyugu's participation from the Estonian Academy of Sciences. Strathclyde University, the Turing Institute, and Scottish Enterprise also contributed help and resource in the many small ways that go towards the making of a great occasion.

The Editors would also like to express their thanks to Ashwin Srinivasan for the many hours of effort involved in persuading LaTeX to produce the standard Machine Intelligence look-and-feel within this volume. Thanks are also due to the Oxford University Computing Laboratory for kindly allowing use of printing and document preparation facilities in the production of this volume.