

## Encyclopedia of Machine Learning



Claude Sammut, Geoffrey I. Webb (Eds.)

# Encyclopedia of Machine Learning

With 293 Figures and 78 Tables

*Editors*

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# Preface

The term “Machine Learning” came into wide-spread use following the first workshop by that name, held at Carnegie-Mellon University in 1980. The papers from that workshop were published as *Machine Learning: An Artificial Intelligence Approach*, edited by Ryszard Michalski, Jaime Carbonell and Tom Mitchell. Machine Learning came to be identified as a research field in its own right as the workshops evolved into international conferences and journals of machine learning appeared.

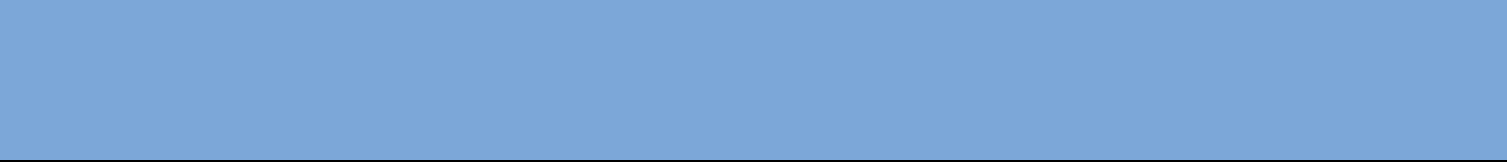
Although the field coalesced in the 1980s, research on what we now call machine learning has a long history. In his 1950 paper on “Computing Machinery and Intelligence”, Alan Turing introduced his imitation game as a means of determining if a machine could be considered intelligent. In the same paper he speculates that programming the computer to have adult level intelligence would be too difficult. “Instead of trying to produce a programme to simulate the adult mind, why not rather try to produce one which simulates the child’s? If this were then subjected to an appropriate course of education one would obtain the adult brain”. Investigations into induction, a fundamental operation in learning, go back much further to Francis Bacon and David Hume in the 17th and 18th centuries.

Early approaches followed the classical AI tradition of symbolic representation and logical inference. As machine learning began to be used in a wide variety of areas, the range of techniques expanded to incorporate ideas from psychology, information theory, statistics, neuroscience, genetics, operations research and more. Because of this diversity, it is not always easy for a new researcher to find his or her way around the machine learning landscape. The purpose of this encyclopedia is to guide enquiries into the field as a whole and to serve as an entry point to specific topics, providing overviews and, most importantly, references to source material. All the entries have been written by experts in their field and have been refereed and revised by an international editorial board consisting of leading machine learning researchers.

Putting together an encyclopedia for such a diverse field has been a major undertaking. We thank all the authors, without whom this would not have been possible. They have devoted their expertise and patience to the project because of their desire to contribute to this dynamic and still growing field. A project as large as this could only succeed with the help of the area editors whose specialised knowledge was essential in defining the range and structure of the entries.

The encyclopedia was started by the enthusiasm of Springer editors Jennifer Evans and Oona Schmidt and continued with the support of Melissa Fearon. Special thanks to Andrew Spencer, who oversaw production and kept everyone, including the editors on track.

Claude Sammut and Geoffrey I. Webb



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