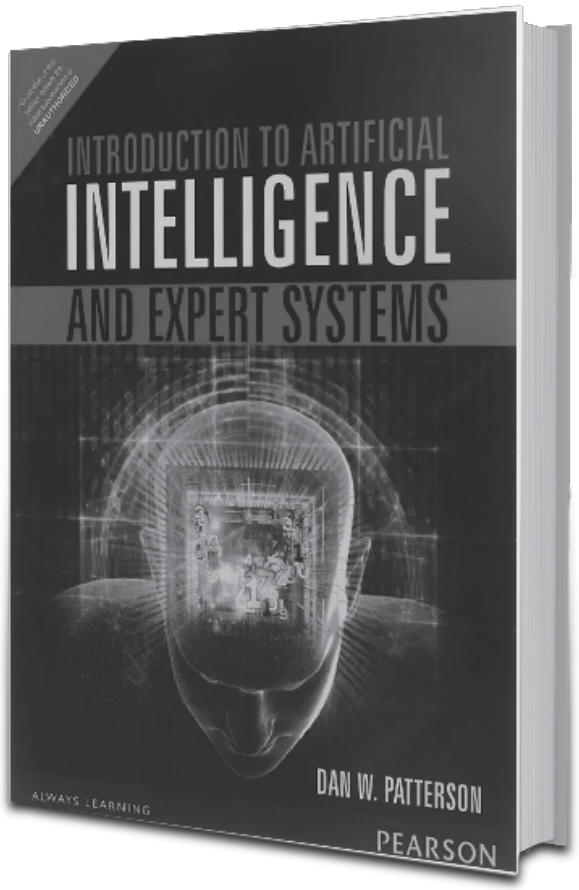
Book Review

Introduction to Artificial Intelligence and expert systems

by Dan W. Patterson



Pearson India Education Services Pvt. Ltd.,
Sixth impression, **Pages:** 448, **Price:** INR 224/-
ISBN: 978-93-325-5194-7

About the Author

Dan W. Patterson is the author of this book, he was born on 22nd December, 1930 (age 89 years). He has authored various books on Artificial Intelligence, some of the distinct ones are - Introduction to Artificial Intelligence and Expert Systems, Full Power: Aircraft Engines That Made History. He is associated with University of Texas, El Paso. This is the sixth impression of the book Introduction to Artificial Intelligence and expert systems, published in 2018.

Appreciation and Critique

This text deals with knowledge on Artificial Intelligence and expert systems. It gives an overview of AI, importance of AI and related fields. This text provides comprehensive knowledge of all-important topics in artificial intelligence and expert systems. It shares the knowledge-based systems approach. Knowledge representation, organization and acquisition, many examples, covers the latest results in all key areas of AI, including knowledge representation, pattern matching, natural language processing, computer vision, memory organization, pattern recognition, expert systems, neural networks, AI tools and machine learning.

The book provides chapter introductions and chapter summaries. The content of the book is divided into five parts. The first part deals with the overview and introduction of Artificial Intelligence, knowledge-based systems and its importance, introduction to programming languages, input, output and local variables. Array definitions and examples are briefly introduced. This chapter is concluded with other AI languages and noted object orientated languages. The second part deals with knowledge representation. Formalized symbolic logics, dealing with inconsistencies, uncertainties and probabilistic reasoning. The author has considered propositional first order predicate logics. Programs using resolution methods have been developed for numerous systems with varying degrees of success. In addition to valid forms of inference based on deductive method three invalid but useful types of inferences are also presented.

The author has considered various methods of representing and dealing with uncertainty and inconsistencies. Two popular approaches have been considered in this chapter: the Bayesian probability method and the Dempster-Shafer approach. In addition to method based on formal theories the more pragmatic ad hoc approaches to uncertain reasoning are also examined.

In the third part of the book the author explains knowledge organization and manipulation, various

examples of search problems have been listed to explain the preliminary concept, structures used in matching, partial matching, fuzzy matching algorithms, integrating knowledge in memory and memory organization system. Search is a characteristic of almost all AI problems; the author has used search in natural language understanding and generation in machine vision, in planning, in expert systems, in game playing programs and in machine learning. The author has examined representation structures used in match comparison operations and considered various measures of similarity and distance between two or more structures.

The part four deals with perception, communication and expert systems. Details on natural language processing, pattern recognition, visual image understanding and expert systems architectures have been considered by the author. Understanding and generating human language is difficult problem. It requires knowledge of grammar and language of syntax and semantics. Three general approaches have been followed in developing natural language system. Keyword and pattern matching, syntactic and semantic directed analysis, matching real world scenarios. Before recognition can be established system must learn the criteria for object recognition, learning may be accomplished by direct designer encoding, supervised learning or unsupervised learning. The final stage is the knowledge application stage; this requires task and domain specific knowledge. Computer vision is a computation intensive process. It involves multiple transformations starting with arrays of low-level pixels and progressing to high level scene descriptions. Expert and other knowledge-based systems are usually composed of at least a knowledge base an inference engine. Since the introduction of the first expert system sin late 1970s a number of building tools have been developed. A few representative building tools have been described by the author and some general characteristics of tools for developers mentioned.

The last part of the book deals with Knowledge acquisition, general concept in knowledge acquisition, early work in machine learning, learning by induction, examples of other inductive learners, analogical and explanation-based learning. An important lesson learned by expert system researchers is that knowledge acquisition is difficult, often requiring tens of person years to assemble several hundred rules. The author has examined examples of early work done in machine learning including perceptions. Learning a concept through induction requires generalization, a search through a lattice of hypothesis. Examples of four different inductive learning paradigms are presented by the author in the part of the text. The examples are described as attribute values of objects. The author has described two promising approaches to machine learning, the analogical and explanation-based learning paradigms. Both methods offer great potential as autonomous learning methods.

Finally, this book explores and introduces to Artificial Intelligence and expert systems, it illustrates the knowledge based approach, the text included methods of dealing with uncertain and incomplete knowledge. Covers knowledge and knowledge representation methods accompanied by examples. It includes the latest results in all key AI areas including knowledge representation, pattern matching, natural language processing, computer vision, memory organization, pattern recognition, expert system, neural networks, artificial intelligence tools and machine learning. Contain explanation with numerous figures, diagrams and examples.

Each chapter is provided with an introduction (overviews and motivational background) followed and the end by chapter summaries.

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