

Lekshmi S. Raveendran, Minu Susan Jacob, R. Sathyabama Krishna

Machine Learning Tools & Techniques

Author :	Lekshmi S. Raveendran, Minu Susan Jacob, R. Sathyabama Krishna
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Email: contact@khannabooks.com | Tel: 011-2324 44 47 - 48 | Mobile: +91-99109 09320

Product Description

"Machine Learning Tools and Techniques" serves as a thorough and approachable guide, offering a comprehensive overview of essential ML concepts, tools, and methodologies crucial for navigating the modern era of artificial intelligence and big data. The book is purposefully structured to bridge the gap between theoretical foundations and practical implementation, making it a critical resource for developing intelligent systems.

The learning journey begins with core data mining principles, exploring the process, fielded applications across industries like finance and healthcare, and the foundational relationship between machine learning and statistics. It systematically builds expertise through detailed discussions on knowledge representation (including trees, linear models, and rules) and the crucial concepts of model credibility and evaluation, covering rigorous techniques like cross-validation, hyperparameter tuning, and the Minimum Description Length (MDL) principle. A strong emphasis is placed on essential data preprocessing and transformation methods, such as attribute selection and data cleansing.

Crucially, the book introduces a versatile ML tool-kit, providing hands-on application demonstrations for industry-standard platforms and libraries, including Scikit-Learn, TensorFlow, PyTorch, KNIME, and IBM Watson. This text is an ideal resource for students, researchers, and professionals seeking to gain hands-on expertise in applying cutting-edge ML solutions to develop real-world applications and contribute meaningfully to the field of AI and data analytics.

Salient Features:

• Foundational Concepts: Covers the complete data mining process, the core relationship between machine learning and statistics, and essential ethical considerations for responsible AI deployment.

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• Knowledge Representation: Detailed explanation of diverse representation methods, including decision trees, linear and rule-based models, instance-based learning, and unsupervised clustering techniques.

• Credibility and Validation: Focuses on rigorous model evaluation using techniques like cross-validation and hyperparameter selection, alongside the Minimum Description Length (MDL) principle to prevent overfitting.

• Data Transformation Methods: Explores crucial data preprocessing steps such as attribute selection, feature engineering, data cleansing, and techniques for handling multi-class data for binary classifiers.

• Algorithmic Techniques: Deep dive into predictive modeling using advanced Decision Trees, Classification and Association Rules, along with extending instance-based and local linear models.

• Practical ML Tool-Kit: Hands-on introduction to widely adopted machine learning platforms and libraries, including TensorFlow, Scikit-Learn, PyTorch, and visual tools like KNIME and WEKA.

• Real-World Applications: Features numerous fielded applications across healthcare, finance, e-commerce, and cybersecurity, including practical case studies for conceptual reinforcement.

• Refining Predictions: Discusses advanced concepts for enhancing model trustworthiness, such as evaluating numeric prediction models and calibrating class probabilities for reliable decision-making.

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