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	Nota di contenuto	1 Introduction -- 1.1 Bayesian and frequentist views of learning -- 1.2 Bayesian neural networks -- 1.3 Markov chain Monte Carlo methods -- 1.4 Outline of the remainder of the book -- 2 Priors for Infinite Networks -- 2.1 Priors converging to Gaussian processes -- 2.2 Priors converging to non-Gaussian stable processes -- 2.3 Priors for nets with more than one hidden layer -- 2.4 Hierarchical models -- 3 Monte Carlo Implementation -- 3.1 The hybrid Monte Carlo algorithm -- 3.2 An implementation of Bayesian neural network learning -- 3.3 A demonstration of the hybrid Monte Carlo implementation -- 3.4 Comparison of hybrid Monte Carlo with other methods -- 3.5 Variants of hybrid Monte Carlo -- 4 Evaluation of Neural Network Models -- 4.1 Network architectures, priors, and training procedures -- 4.2 Tests of the behaviour of large networks -- 4.3 Tests of Automatic Relevance Determination -- 4.4 Tests of Bayesian models on real data sets -- 5 Conclusions and Further Work -- 5.1 Priors for complex models -- 5.2 Hierarchical Models — ARD and beyond -- 5.3 Implementation using

Sommario/riassunto	Artificial "neural networks" are widely used as flexible models for classification and regression applications, but questions remain about how the power of these models can be safely exploited when training data is limited. This book demonstrates how Bayesian methods allow complex neural network models to be used without fear of the "overfitting" that can occur with traditional training methods. Insight into the nature of these complex Bayesian models is provided by a theoretical investigation of the priors over functions that underlie them. A practical implementation of Bayesian neural network learning using Markov chain Monte Carlo methods is also described, and software for it is freely available over the Internet. Presupposing only basic knowledge of probability and statistics, this book should be of interest to researchers in statistics, engineering, and artificial intelligence.