



A Statistical Approach to Neural Networks for Pattern Recognition

Robert A. Dunne

WILEY SERIES IN COMPUTATIONAL STATISTICS



Pattern Recognition A Statistical Approach

Andrew R. Webb, Andrew Webb



Pattern Recognition A Statistical Approach:

Pattern Recognition Pierre A. Devijver, Josef Kittler, 1982 Introduction To Pattern Recognition: Statistical, Structural, Neural And Fuzzy Logic Approaches Menahem Friedman, Abraham Kandel, 1999-03-01 This book is an introduction to pattern recognition meant for undergraduate and graduate students in computer science and related fields in science and technology Most of the topics are accompanied by detailed algorithms and real world applications In addition to statistical and structural approaches novel topics such as fuzzy pattern recognition and pattern recognition via neural networks are also reviewed Each topic is followed by several examples solved in detail The only prerequisites for using this book are a one semester course in discrete mathematics and a knowledge of the basic preliminaries of calculus linear algebra and probability theory **A Statistical Approach to Neural Networks for Pattern Recognition** Robert A.

Dunne, 2007-07-30 An accessible and up to date treatment featuring the connection between neural networks and statistics A Statistical Approach to Neural Networks for Pattern Recognition presents a statistical treatment of the Multilayer Perceptron MLP which is the most widely used of the neural network models This book aims to answer questions that arise when statisticians are first confronted with this type of model such as How robust is the model to outliers Could the model be made more robust Which points will have a high leverage What are good starting values for the fitting algorithm Thorough answers to these questions and many more are included as well as worked examples and selected problems for the reader Discussions on the use of MLP models with spatial and spectral data are also included Further treatment of highly important principal aspects of the MLP are provided such as the robustness of the model in the event of outlying or atypical data the influence and sensitivity curves of the MLP why the MLP is a fairly robust model and modifications to make the MLP more robust The author also provides clarification of several misconceptions that are prevalent in existing neural network literature Throughout the book the MLP model is extended in several directions to show that a statistical modeling approach can make valuable contributions and further exploration for fitting MLP models is made possible via the R and S PLUS codes that are available on the book's related Web site A Statistical Approach to Neural Networks for Pattern Recognition successfully connects logistic regression and linear discriminant analysis thus making it a critical reference and self study guide for students and professionals alike in the fields of mathematics statistics computer science and electrical engineering

Pattern Recognition Robert J. Schalkoff, 1992 Explores the heart of pattern recognition concepts methods and applications using statistical syntactic and neural approaches Divided into four sections it clearly demonstrates the similarities and differences among the three approaches The second part deals with the statistical pattern recognition approach starting with a simple example and finishing with unsupervised learning through clustering Section three discusses the syntactic approach and explores such topics as the capabilities of string grammars and parsing higher dimensional representations and graphical approaches Part four presents an excellent overview of the emerging neural approach

including an examination of pattern associations and feedforward nets Along with examples each chapter provides the reader with pertinent literature for a more in depth study of specific topics

Syntactic and Structural Pattern Recognition

Horst Bunke,Alberto Sanfeliu,1990 This book is currently the only one on this subject containing both introductory material and advanced recent research results It presents at one end fundamental concepts and notations developed in syntactic and structural pattern recognition and at the other reports on the current state of the art with respect to both methodology and applications In particular it includes artificial intelligence related techniques which are likely to become very important in future pattern recognition The book consists of individual chapters written by different authors The chapters are grouped into broader subject areas like Syntactic Representation and Parsing Structural Representation and Matching Learning etc Each chapter is a self contained presentation of one particular topic In order to keep the original flavor of each contribution no efforts were undertaken to unify the different chapters with respect to notation Naturally the self containedness of the individual chapters results in some redundancy However we believe that this handicap is compensated by the fact that each contribution can be read individually without prior study of the preceding chapters A unification of the spectrum of material covered by the individual chapters is provided by the subject and author index included at the end of the book

Statistical

Pattern Recognition Andrew R. Webb,Andrew Webb,1999 This book provides an introduction to statistical pattern recognition theory and techniques Most of the material presented in this book is concerned with discrimination and classification and has been drawn from a wide range of literature including that of engineering statistics computer science and the social sciences This book is an attempt to provide a concise volume containing descriptions of many of the most useful of today's pattern processing techniques including many of the recent advances in nonparametric approaches to discrimination developed in the statistics literature and elsewhere The techniques are illustrated with examples of real world applications studies Pointers are also provided to the diverse literature base where further details on applications comparative studies and theoretical developments may be obtained Page xv

Pattern Recognition Sankar K. Pal,Pal.

Amita,2001 This volume containing contributions by experts from all over the world is a collection of 21 articles which present review and research material describing the evolution and recent developments of various pattern recognition methodologies ranging from statistical syntactic linguistic fuzzy set theoretic neural genetic algorithmic and rough set theoretic to hybrid soft computing with significant real life applications In addition the book describes efficient soft machine learning algorithms for data mining and knowledge discovery With a balanced mixture of theory algorithms and applications as well as up to date information and an extensive bibliography Pattern Recognition From Classical to Modern Approaches is a very useful resource Contents Pattern Recognition Evolution of Methodologies and Data Mining A Pal Adaptive Stochastic Algorithms for Pattern Classification M A L Thathachar Shape in Images K V Mardia Decision Trees for Classification A Review and Some New Results R Kothari Syntactic Pattern Recognition A K Majumder Fuzzy Sets as a Logic Canvas for

Pattern Recognition W Pedrycz Neural Network Based Pattern Recognition V David Sanchez A Networks of Spiking Neurons in Data Mining K Cios Genetic Algorithms Pattern Classification and Neural Networks Design S Bandyopadhyay et al Rough Sets in Pattern Recognition A Skowron Automated Generation of Qualitative Representations of Complex Objects by Hybrid Soft Computing Methods E H Ruspini Writing Speed and Writing Sequence Invariant On line Handwriting Recognition S H Cha Tongue Diagnosis Based on Biometric Pattern Recognition Technology K Wang et al and other papers Readership Graduate students researchers and academics in pattern recognition

Pattern Recognition Approach to Data

Interpretation Diane Wolff, 2012-12-06 An attempt is made in this book to give scientists a detailed working knowledge of the powerful mathematical tools available to aid in data interpretation especially when confronted with large data sets incorporating many parameters A minimal amount of computer knowledge is necessary for successful applications and we have tried conscientiously to provide this in the appropriate sections and references Scientific data are now being produced at rates not believed possible ten years ago A major goal in any scientific investigation should be to obtain a critical evaluation of the data generated in a set of experiments in order to extract whatever useful scientific information may be present Very often the large number of measurements present in the data set does not make this an easy task The goals of this book are thus fourfold The first is to create a useful reference on the applications of these statistical pattern recognition methods to the sciences The majority of our discussions center around the fields of chemistry geology environmental sciences physics and the biological and medical sciences In Chapter IV a section is devoted to each of these fields Since the applications of pattern recognition techniques are essentially unlimited restricted only by the outer limitations of

Statistical Approach to the Problem of Learning Pattern Recognition V. A. Kovalevskii, FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO., 1970 The paper shows that the problem of learning to recognize patterns is susceptible of statistical formulation and may be viewed as a particular case of the general problem of statistical solutions Learning in this case may be accomplished by two methods one of which is applicable when it is possible to measure directly the risk function characterizing the performance of the machine being taught learning by reinforcement The second method called learning by patterns is used when the risk function cannot be measured Exact solution of this problem consists in finding the a posteriori distribution of unknown parameters and subsequent averaging of distributions containing these parameters with the above mentioned distribution serving as a weight An evaluation is made of the minimum learning time showing that in the absence of any substantial limitations superimposed on the probability distribution or on the determinant rules the learning process must involve nearly all input signals In the case of multidimensional input signals learning time in the absence of limitations proves to be inadmissibly long

Robustness in Statistical Pattern Recognition Y.

Kharin, 2012-12-22 This book is concerned with important problems of robust stable statistical pattern recognition when hypothetical model assumptions about experimental data are violated disturbed Pattern recognition theory is the field of

applied mathematics in which principles and methods are constructed for classification and identification of objects phenomena processes situations and signals i.e. of objects that can be specified by a finite set of features or properties characterizing the objects Mathematical Encyclopedia 1984 Two stages in development of the mathematical theory of pattern recognition may be observed At the first stage until the middle of the 1970s pattern recognition theory was replenished mainly from adjacent mathematical disciplines mathematical statistics functional analysis discrete mathematics and information theory This development stage is characterized by successful solution of pattern recognition problems of different physical nature but of the simplest form in the sense of used mathematical models One of the main approaches to solve pattern recognition problems is the statistical approach which uses stochastic models of feature variables Under the statistical approach the first stage of pattern recognition theory development is characterized by the assumption that the probability data model is known exactly or it is estimated from a representative sample of large size with negligible estimation errors Das Gupta 1973 1977 Rey 1978 Vasiljev 1983

Decoding **Pattern Recognition A Statistical Approach**: Revealing the Captivating Potential of Verbal Expression

In an era characterized by interconnectedness and an insatiable thirst for knowledge, the captivating potential of verbal expression has emerged as a formidable force. Its ability to evoke sentiments, stimulate introspection, and incite profound transformations is genuinely awe-inspiring. Within the pages of "**Pattern Recognition A Statistical Approach**," a mesmerizing literary creation penned by a celebrated wordsmith, readers attempt an enlightening odyssey, unraveling the intricate significance of language and its enduring affect our lives. In this appraisal, we shall explore the book's central themes, evaluate its distinctive writing style, and gauge its pervasive influence on the hearts and minds of its readership.

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