

Modelling soccer matches using bivariate discrete distributions with general dependence structure

Ian McHale and Phil Scarf

*Centre for Operational Research and Applied Statistics,
Salford Business School,
University of Salford,
Salford,
Manchester
M5 4WT, UK.*

email i.mchale@salford.ac.uk, p.a.scarf@salford.ac.uk

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Modelling Soccer Matches Using Bivariate Discrete

**Jim Albert, Mark E. Glickman, Tim B.
Swartz, Ruud H. Koning**



Modelling Soccer Matches Using Bivariate Discrete:

Predictive Modelling for Football Analytics Leonardo Egidi, Dimitris Karlis, Ioannis Ntzoufras, 2025-11-07 Predictive Modelling for Football Analytics discusses the most well known models and the main computational tools for the football analytics domain. It further introduces the footBayes R package that accompanies the reader through all the examples proposed in the book. It aims to be both a practical guide and a theoretical foundation for students, data scientists, sports analysts, and football professionals who wish to understand and apply predictive modelling in a football context. **Key Features:** Discusses various modelling strategies and predictive tools related to football analytics. Introduces algorithms and computational tools to check the models, make predictions, and visualize the final results. Showcases some guided examples through the use of the footBayes R package available on CRAN. Walks the reader through the full pipeline from data collection and preprocessing through exploratory analysis and feature engineering to advanced modelling techniques and evaluation. Bridges the gap between raw football data and actionable insights. This text is primarily for senior undergraduates, graduate students, and academic researchers in the fields of mathematics, statistics, and computer science, willing to learn about the football analytics domain. Although technical in nature, the book is designed to be accessible to readers with a background in statistics, programming, or a strong interest in sports analytics. It is well suited for use in academic courses on sports analytics, data science projects, or professional development within football clubs, agencies, and media organizations.

Handbook of Statistical Methods and Analyses in Sports Jim Albert, Mark E. Glickman, Tim B. Swartz, Ruud H. Koning, 2017-02-03 This handbook will provide both overviews of statistical methods in sports and in-depth treatment of critical problems and challenges confronting statistical research in sports. The material in the handbook will be organized by major sport: baseball, football, hockey, basketball, and soccer, followed by a section on other sports and general statistical design and analysis issues that are common to all sports. This handbook has the potential to become the standard reference for obtaining the necessary background to conduct serious statistical analyses for sports applications and to appreciate scholarly work in this expanding area.

Copulae in Mathematical and Quantitative Finance Piotr Jaworski, Fabrizio Durante, Wolfgang Karl Härdle, 2013-06-18 Copulas are mathematical objects that fully capture the dependence structure among random variables and hence offer great flexibility in building multivariate stochastic models. Since their introduction in the early 1950s, copulas have gained considerable popularity in several fields of applied mathematics, especially finance and insurance. Today, copulas represent a well-recognized tool for market and credit models, aggregation of risks, and portfolio selection. Historically, the Gaussian copula model has been one of the most common models in credit risk. However, the recent financial crisis has underlined its limitations and drawbacks. In fact, despite their simplicity, Gaussian copula models severely underestimate the risk of the occurrence of joint extreme events. Recent theoretical investigations have put new tools for detecting and estimating dependence and risk, like tail dependence, time-varying models, etc., in the spotlight. All such

investigations need to be further developed and promoted a goal this book pursues The book includes surveys that provide an up to date account of essential aspects of copula models in quantitative finance as well as the extended versions of talks selected from papers presented at the workshop in Cracow *Machine Learning in Sports* Keisuke Fujii, 2025-05-12 This open access book provides cutting edge work on machine learning in sports analytics emphasizing the integration of computer vision data analytics and machine learning to redefine strategic sports analysis This book not only covers the essential methodologies of capturing and analyzing real sports data but also pioneers the integration of real world analytics with digital modeling advancing the field toward sophisticated digital modeling in sports Through a seamless blend of theoretical frameworks and practical applications the book illustrates how these integrated technologies can be utilized to predict evaluate and suggest next plays in sports By leveraging the power of machine learning the book presents cutting edge approaches to sports analytics where data from actual games is enhanced with predictive simulations for strategic planning and decision making The use of digital modeling in sports opens up new dimensions of interaction between the physical play and its digital analysis offering a comprehensive understanding that was previously unattainable This book is an essential read for postgraduates researchers and technologists who are interested in sports analysts The book consists of five parts Part I which comprises a single chapter exploring the fundamentals and scope of learning based sports analytics Parts II III IV and V review the various aspects of this field including data acquisition with computer vision predictive analysis and play evaluation with machine learning potential play evaluation with learning based agent modeling and future perspectives and ecosystems on the field This structure provides a comprehensive overview that will engage and inform researchers and practitioners interested in the intersection of analytical research and cutting edge technology in sports **Regularization**

Methods for Item Response and Paired Comparison Models Gunther Schauburger, 2015-12-11 A main aspect in psychometric modeling is the measurement of latent traits This dissertation focuses on two popular methods to analyze latent traits namely item response methods and paired comparisons In conventional models for item response e g the Rasch model or paired comparison data e g the Bradley Terry model no covariate information is used This thesis is concerned with the inclusion of different types of covariates into item response and paired comparison models The increased flexibility of the proposed models also leads to a higher complexity of the models Regularization methods prove to be an effective instrument to deal with the increased number of parameters and to differentiate between necessary and unnecessary parameters The proposed methods are illustrated in various simulations and real data applications Ein Hauptaspekt der psychometrischen Modellierung liegt in der Messung latenter Eigenschaften Diese Arbeit besch ftigt sich haupts chlich mit zwei weit verbreiteten Methoden um latente Eigenschaften zu analysieren n mlich Item Response Daten und Paarvergleiche In gebr uchlichen Modellen f r Item Response Daten z B dem Rasch Modell oder Paarvergleichsdaten z B dem Bradley Terry Modell wird keine Information aus Kovariablen ber cksichtigt Diese Arbeit behandelt die Einbeziehung verschiedener Arten von

Kovariablen in Item Response Modellen und Paarvergleichsmodellen Die gr ere Flexibilit t der vorgeschlagenen Methoden f hrt aber auch zu einer gr eren Komplexit t der Modelle Regularisierungsmethoden erweisen sich als probates Instrument um mit der gr eren Anzahl an Parametern umzugehen und um zwischen notwendigen und unn tigen Parametern zu unterscheiden Die vorgeschlagenen Methoden werden anhand von verschiedenen Simulationen und Anwendungen auf echte Daten veranschaulicht **Progress in Industrial Mathematics at ECMI 2008** Alistair D. Fitt, John Norbury, Hilary

Ockendon, Eddie Wilson, 2010-07-23 The 15th European Conference on Mathematics for Industry was held in the agreeable surroundings of University College London just 5 minutes walk from the British Museum in the heart of London over the ve warm sunny days from 30 June to 4 July 2008 Participants from all over the world met with the common aim of reinforcing the role of mathematics as an overarching resource for industry and business The conference attracted over 300 participants from 30 countries most of them participating with either a contributed talk a minisymposium presentation or a plenary lecture Mathematics in Industry was interpreted in its widest sense as can be seen from the range of applications and techniques described in this volume We mention just two examples The Alan Tayler Lecture was given by Mario Primicerio on a problem arising from moving oil through pipelines when temperature variations affect the shearing properties of wax and thus modify the flow The Wacker Prize winner Master s student Lauri Harhanen from the Helsinki University of Technology showed how a novel piece of mathematics allowed new software to capture real time images of teeth from the data supplied by present day dental machinery see ECMI Newsletter 44 The meeting was attended by leading figures from government business and science who all shared the same aim to promote the application of innovative mathematics to industry and identify industrial sectors that offer the most exciting opportunities for mathematicians to provide new insight and new ideas **INFORMS Annual**

Meeting Institute for Operations Research and the Management Sciences. National Meeting, 2007 **Mastering Python Data Analysis** Magnus Vilhelm Persson, Luiz Felipe Martins, 2016-06-27 Become an expert at using Python for advanced statistical analysis of data using real world examples About This Book Clean format and explore data using graphical and numerical summaries Leverage the IPython environment to efficiently analyze data with Python Packed with easy to follow examples to develop advanced computational skills for the analysis of complex data Who This Book Is For If you are a competent Python developer who wants to take your data analysis skills to the next level by solving complex problems then this advanced guide is for you Familiarity with the basics of applying Python libraries to data sets is assumed What You Will Learn Read sort and map various data into Python and Pandas Recognise patterns so you can understand and explore data Use statistical models to discover patterns in data Review classical statistical inference using Python Pandas and SciPy Detect similarities and differences in data with clustering Clean your data to make it useful Work in Jupyter Notebook to produce publication ready figures to be included in reports In Detail Python a multi paradigm programming language has become the language of choice for data scientists for data analysis visualization and machine learning Ever imagined how to

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In recent years computer science in sport has grown extremely mainly because more and more new data has become available Computer science tools in sports whether used for opponent preparation competition or scientific analysis have become indispensable across various levels of expertise nowadays A completely new market has emerged through the utilization of these tools in the four major fields of application clubs and associations business science and the media This market is progressively gaining importance within university research and educational activities This textbook aims to live up to the now broad diversity of computer science in sport by having more than 30 authors report from their special field and concisely summarise the latest findings The book is divided into four main sections data sets modelling simulation and data analysis In addition to background information on programming languages and visualisation the textbook is framed by history and an outlook Students with a connection to sports science are given a comprehensive insight into computer science in sport supported by a didactically sophisticated concept that makes it easy to convey the learning content Numerous questions for self testing underpin the learning effect and ensure optimal exam preparation For advanced students the in depth discussion of time series data mining artificial neural networks convolution kernels transfer learning and random forests offers additional value

Exploring Data in Engineering, the Sciences, and Medicine Ronald Pearson,2011-02-03 This book introduces various widely available exploratory data analysis methods emphasizing those that are most useful in the preliminary exploration of large datasets involving mixed data types Topics include descriptive statistics graphical analysis tools regression modeling and spectrum estimation along with practical issues like outliers missing data and variable selection *Journal of Economic Literature* ,1996 *International Aerospace Abstracts* ,1982 Stochastic Modelling of Soccer Match Results Stephen

Dobson, John Goddard, University College of Swansea. Department of Economics, 2000 **Soccer championship probabilities estimation**, 2001 Neste trabalho apresentamos uma metodologia para obter probabilidades de classificação e rebaixamento de equipes em campeonatos de futebol A metodologia consiste basicamente em 4 etapas Na primeira etapa ajustamos modelos de séries temporais para dados de contagem a séries de gols a favor e sofridos pelas equipes em partidas sucessivas do campeonato utilizando variáveis explicativas para considerar o efeito do mando de campo da participação de determinados jogadores e de mudanças de técnico Alguns problemas referentes construção de intervalos de confiança e testes de hipóteses para os hiperparâmetros dos modelos foram solucionados via bootstrap Na segunda etapa obtivemos as distribuições de probabilidade associadas aos resultados das partidas futuras do campeonato utilizando o Princípio da Máxima Entropia para combinar as distribuições preditivas dos modelos ajustados Na terceira etapa utilizamos as distribuições dos resultados das partidas futuras para simular cenários para o campeonato e na quarta e última etapa estimamos as probabilidades de classificação e rebaixamento das equipes pela frequência relativa da ocorrência destes eventos em um grande número de cenários gerados A metodologia foi aplicada no Campeonato Brasileiro 1999 e na Copa João Havelange 2000

Decoding **Modelling Soccer Matches Using Bivariate Discrete**: Revealing the Captivating Potential of Verbal Expression

In a period 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 "**Modelling Soccer Matches Using Bivariate Discrete**," a mesmerizing literary creation penned by a celebrated wordsmith, readers set about an enlightening odyssey, unraveling the intricate significance of language and its enduring effect on 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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