# A Comparison Of Cox And Logistic Regression For Use In

Survival analysis arises in many fields of study including medicine, biology, engineering, public health, epidemiology, and economics. This book provides a comprehensive treatment of Bayesian survival analysis. It presents a balance between theory and applications, and for each class of models discussed, detailed examples and analyses from case studies are presented whenever possible. The applications are all from the health sciences, including cancer, AIDS, and the environment.

A straightforward and easy-to-follow introduction to the main concepts and techniques of the subject. It is based on numerous courses given by the author to students and researchers in the health sciences and is written with such readers in mind. A "user-friendly" layout includes numerous illustrations and exercises and the book is written in such a way so as to enable readers learn directly without the assistance of a classroom instructor. Throughout, there is an emphasis on presenting each new topic backed by real examples of a survival analysis investigation, followed up with thorough analyses of real data sets. Each chapter concludes with practice exercises to help readers reinforce their understanding of the concepts covered, before going on to a more comprehensive test. Answers to both are included. Readers will enjoy David Kleinbaums style of presentation, making this an excellent introduction for all those coming to the subject for the first time.

This book should be of interest to senior undergraduate and postgraduate students of applied statistics.

This book serves as a practical guide for the use of carbon ions in cancer radiotherapy. On the basis of clinical experience with more than 7,000 patients with various types of tumors treated over a period of nearly 20 years at the National Institute of Radiological Sciences, step-by-step procedures and technological development of this modality are highlighted. The book is divided into two sections, the first covering the underlying principles of physics and biology, and the second section is a systematic review by tumor site, concentrating on the role of therapeutic techniques and the pitfalls in treatment planning. Readers will learn of the superior outcomes obtained with carbon-ion therapy for various types of tumors in terms of local control and toxicities. It is essential to understand that the carbon-ion beam is like a two-edged sword: unless it is used properly, it can increase the risk of severe injury to critical organs. In early series of dose-escalation studies, some patients experienced serious adverse effects such as skin ulcers, pneumonitis, intestinal ulcers, and bone necrosis, for which salvage surgery or hospitalization was required. To preclude such detrimental results, the adequacy of therapeutic techniques and dose fractionations was carefully examined in each case. In this way, significant improvements in treatment results have been achieved and major toxicities are no longer observed. With that knowledge, experts in relevant fields expand upon techniques for treatment delivery at each anatomical site, covering indications and optimal treatment planning. With its practical focus, this book will benefit radiation oncologists, medical physicists, medical dosimetrists, radiation therapists, and senior nurses whose work involves radiation therapy, as well as medical oncologists and others who are interested in radiation therapy.

Many texts are excellent sources of knowledge about individual statistical tools, but the art of data analysis is about choosing and using multiple tools. Instead of presenting isolated techniques, this text emphasizes problem solving strategies that address the many issues arising when developing multivariable models using real data and not standard textbook examples. It includes imputation methods for dealing with missing data effectively, methods for dealing with nonlinear relationships and for making the estimation of transformations a formal part of the modeling process, methods for dealing with "too many variables to analyze and not enough observations," and powerful model validation techniques based on the bootstrap. This text realistically deals with model uncertainty and its effects on inference to achieve "safe data mining".

Survival Analysis Using S: Analysis of Time-to-Event Data is designed as a text for a one-semester or one-quarter course in survival analysis for upper-level or graduate students in statistics, biostatistics, and epidemiology. Prerequisites are a standard pre-calculus first course in probability and statistics, and a course in applied linear regression models. No prior knowledge of S or R is assumed. A wide choice of exercises is included, some intended for more advanced students with a first course in mathematical statistics. The authors emphasize parametric log-linear models, while also detailing nonparametric procedures along with model building and data diagnostics. Medical and public health researchers will find the discussion of cut point analysis with bootstrap validation, competing risks and the cumulative incidence estimator, and the analysis of left-truncated and right-censored data invaluable. The bootstrap procedure checks robustness of cut point analysis and determines cut point(s). In a chapter written by Stephen Portnoy, censored regression quantiles - a new nonparametric regression methodology (2003) - is developed to identify important forms of population heterogeneity and to detect departures from traditional Cox models. By generalizing the Kaplan-Meier estimator to regression models for conditional quantiles, this methods provides a valuable complement to traditional Cox proportional hazards approaches.

"[This book] provides new researchers with the foundation for understanding the various approaches for analyzing time-to-event data. This book serves not only as a tutorial for those wishing to learn survival analysis but as a ... reference for experienced researchers ..."--Book jacket.

The time for an event to take place in an individual is called a survival time. Examples include the time that an individual survives after being diagnosed with a terminal illness or the time that an electronic component functions before failing. A popular parametric model for this type of data is the Weibull model, which is a flexible model that allows for the inclusion of covariates of the survival times. If distributional assumptions are not met or cannot be verified, researchers may turn to the semi-parametric Cox proportional hazards model. This model also allows for the inclusion of covariates of survival times but with less restrictive assumptions. This report compares estimates of the slope of the covariate in the proportional hazards model using the parametric Weibull model and the semi-parametric Cox proportional hazards model to estimate the slope. Properties of these models are discussed in Chapter 1. Numerical examples and a comparison of the mean square errors of the estimates of the slope of the covariate for various sample sizes and for uncensored and censored data are discussed in Chapter 2. When the shape parameter is known, the Weibull model far out performs the Cox proportional hazards model, but when the shape parameter is unknown, the Cox proportional hazards model and the Weibull model give comparable results.

A standard analysis of prostate cancer biochemical failure data is done by conducting two approaches in which risk factors or covariates are measured. Cox regression and discrete-time survival models were compared under different attributes: sample size, time periods, and parameters in the model. The person-period data was reconstructed when examining the same data in discrete-time survival model. Twentyfour numerical examples covering a variety of sample sizes, time periods, and number of parameters displayed the closeness of Cox regression and discrete-time survival methods in situations typical of the cancer study.

The Cox model has traditionally been used to analyse the relationship between a set of covariates and a time-to-event outcome. However, it has been found to lead to biased estimates when fitting time-varying covariates subject to measurement error. Joint modelling procedures have thus been developed with the purpose of alleviating this problem. Simulations were performed in which we compared bias and variability in parameter estimates between the Cox model and Rizopoulos (2010) joint model, concluding that the Cox model is heavily biased when the data is generated according to a joint model. Furthermore, we analysed medical data which recorded the onset time of bipolar/major mood disorder (in years since birth) for subjects who were considered at risk. The Cox model and both joint models agreed that a time-varying covariate, the Hamilton anxiety score, had a significant effect (at a 5% level) on the risk of bipolar/major mood disorder.

This book constitutes the refereed proceedings of the 17th Conference on Artificial Intelligence in Medicine, AIME 2019, held in Poznan, Poland, in June 2019. The 22 revised full and 31 short papers presented were carefully reviewed and selected from 134 submissions. The papers are organized in the following topical sections: deep learning; simulation; knowledge representation; probabilistic models; behavior monitoring; clustering, natural language processing, and decision support; feature selection; image processing; general machine learning; and unsupervised learning.

Critically acclaimed and resoundingly popular in its first edition, Modelling Survival Data in Medical Research has been thoroughly revised and updated to reflect the many developments and advances--particularly in software--made in the field over the last 10 years. Now, more than ever, it provides an outstanding text for upper-level and graduate courses in survival analysis, biostatistics, and time-to-event analysis.The treatment begins with an introduction to survival analysis and a description of four studies that lead to survival data. Subsequent chapters then use those data sets and others to illustrate the various analytical techniques applicable to such data, including the Cox regression model, the Weibull proportional hazards model, and others. This edition features a more detailed treatment of topics such as parametric models, accelerated failure time models, and analysis of interval-censored data. The author also focuses the software section on the use of SAS, summarising the methods used by the software to generate its output and examining that output in detail. Profusely illustrated with examples and written in the author's trademark, easy-to-follow style, Modelling Survival Data in Medical Research, Second Edition is a thorough, practical guide to survival analysis that reflects current statistical practices.

Comparison of Cox's and Gray's Models in Survival AnalysisApplication of Multiple Regression to Survival DataA Comparison with Cox RegressionA Comparison of Two Survival ModelsCox Proportional Hazards and FrailtyA Comparison of Cox and Joint Models for Time-to-Event Data

In this definitive book, D. R. Cox gives a comprehensive and balanced appraisal of statistical inference. He develops the key concepts, describing and comparing the main ideas and controversies over foundational issues that have been keenly argued for more than two-hundred years. Continuing a sixty-year career of major contributions to statistical thought, no one is better placed to give this much-needed account of the field. An appendix gives a more personal assessment of the merits of different ideas. The content ranges from the traditional to the contemporary. While specific applications are not treated, the book is strongly motivated by applications across the sciences and associated technologies. The mathematics is kept as elementary as feasible, though previous knowledge of statistics is assumed. The book will be valued by every user or student of statistics who is serious about understanding the uncertainty inherent in conclusions from statistical analyses.

This volume collects the refereed contributions based on the presentations made at the Seventh Workshop on Advanced Mathematical and Computational Tools in Metrology, a forum for metrologists, mathematicians and software engineers that will encourage a more effective synthesis of skills, capabilities and resources. The volume contains articles by world renowned metrologists and mathematicians involved in measurement science and, together with the six previous volumes in this series, constitutes an authoritative source of the mathematical, statistical and software tools necessary in modern metrology. Contents: Modeling Measurement Processes in Complex Systems with Partial Differential Equations: From Heat Conduction to the Heart (M Baer et al.); Mereotipological Approach for Measurement Software (E Benoit & R Dapoigny); Data Evaluation of Key Comparisons Involving Several Artefacts (M G Cox et al.); Box-Cox Transformations Versus Robust Control Charts in Statistical Process Control (M I Gomes & F O Figueiredo); Decision Making Using Sensor's Data Fusion and Kohonen Self Organizing Maps (P S Girao et al.); Generic System Design for Measurement Databases Applied to Calibrations in Vacuum Metrology, Bio-Signals and a Template System (H Gro et al.); Repeated Measurements: Evaluation of Their Uncertainty from the Viewpoints of Classical and Bayesian Statistics (I Lira & W Woger); Detection of Outliers in Interlaboratory Testing and Some Thoughts About Multivariate Precision (C Perruchet); On Appropriate Methods for the Validation of Metrological Software (D Richter et al.); Data Analysis-A Dialogue (D S Sivia); Validation of a Virtual Sensor for Monitoring Ambient Parameters (P Ciarlini et al.); Evaluation of Standard Uncertainties in Nested Structures (E Filipe); Linking GUM and ISO 5725 (A B Forbes); Monte Carlo Study on Logical and Statistical Correlation (B Siebert et al.); Some Problems Concerning the Estimate of the Uncertainty of the Degree of Equivalence in MRA Key Comparisons (F Pavese); Preparing for a European Research Area Network in Metrology: Where are We Now? (M Kuhne et al.); and other papers. Readership: Researchers, graduate students, academics and professionals in metrology.

This book is for statistical practitioners, particularly those who design and analyze studies for survival and event history data. Building on recent developments motivated by counting process and martingale theory, it shows the reader how to extend the Cox model to analyze multiple/correlated event data using marginal and random effects. The focus is on actual data examples, the analysis and interpretation of results, and computation. The book shows how these new methods can be implemented in SAS and S-Plus, including computer code, worked examples, and data sets.

Survival analysis is a commonly used tool in many fields but has seen little use in education research despite a common number of research questions for which it is well suited. Researchers often use logistic regression instead; however, this omits useful information. In research on retention and graduation for example, the timing of the event is an important piece of information omitted when using logistic regression. A simulation study was conducted to evaluate four methods of analyzing competing risks survival data, Cox proportional hazards regression, Weibull regression, Fine and Gray's Method, and Cox proportional hazards regression with frailty. College student retention and graduation is presented as an example. The results indicate that there is no one best model for all simulated scenarios. Instead, it appears the selection of the method of analysis should be based on the characteristics of the data. Both Cox proportional hazards and the Weibull regression are accurate with the base combination (sample size of 500 per group, continuous event time format, no correlation between event times, homogeneous shape parameter for both events for both groups, homogeneous failure rates for both events for both groups, and no frailty) as well as when one parameter is changed from the base combination. In addition, for data where the event time distribution shape does not differ by event, the accuracy of the models is quite similar. However, differences begin to emerge with some combinations of conditions. Cox performs especially poorly with data sets containing both differing event time distribution shapes by event and differing failure rates by group or event while Weibull is least accurate with the combination of homogeneous event time distribution shape, heterogeneous failure rate by group and/or event, and discrete format time. Fine and Gray's method was often ranked last by accuracy, but there are some situations where its accuracy is quite good including retention and graduation data. Cox proportional hazards regression with frailty performed very similarly to the Cox regression without frailty with no clear benefits.

The 37 expository articles in this volume provide broad coverage of important topics relating to the theory, methods, and applications of goodness-of-fit tests and model validity. The book is divided into eight parts, each of which presents topics written by expert researchers in their areas. Key features include: * state-of-the-art exposition of modern model validity methods, graphical techniques, and computer-intensive methods * systematic presentation with sufficient history and coverage of the fundamentals of the subject * exposure to recent research and a variety of open problems * many interesting real life examples for practitioners * extensive bibliography, with special emphasis on recent literature * subject index This comprehensive reference work will serve the statistical and applied mathematics communities as well as practitioners in the field.

Hurricane is a natural disaster which could cause many deaths and considerable damage if improper emergency management was applied. Figuring out an efficient method to dynamically forecast the hurricane evacuation demand with high accuracy plays a crucial role in preparedness work of hurricane management. Recently, substantial studies and research exit on understanding hurricane evacuation behavior. However, in this thesis, some forecast covariates which were not mentioned before, are introduced into the prediction of hurricane evacuation rate. Moreover, two travel demand models are applied in this study: A Sequential Logit Model and a Cox proportional hazards model. These two models are used for estimating the probability of each household to evacuate in the specific time step. After applying the data from Hurricane Gustav (2008) in Louisiana, over 76% households' dynamic evacuation behavior are predicted correctly.