

SPRINGER BRIEFS IN STATISTICS

Chiara Brombin
Luigi Salmaso

Permutation Tests in Shape Analysis

 Springer

Permutation Tests In Shape Analysis Springerbriefs In Statistics

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Fusilli**

Permutation Tests In Shape Analysis Springerbriefs In Statistics:

Permutation Tests in Shape Analysis LUIGI SALMASO, Chiara Brombin, 2013-09-06 Statistical shape analysis is a geometrical analysis from a set of shapes in which statistics are measured to describe geometrical properties from similar shapes or different groups for instance the difference between male and female Gorilla skull shapes normal and pathological bone shapes etc Some of the important aspects of shape analysis are to obtain a measure of distance between shapes to estimate average shapes from a possibly random sample and to estimate shape variability in a sample 1 One of the main methods used is principal component analysis Specific applications of shape analysis may be found in archaeology architecture biology geography geology agriculture genetics medical imaging security applications such as face recognition entertainment industry movies games computer aided design and manufacturing This is a proposal for a new Brief on statistical shape analysis and the various new parametric and non parametric methods utilized to facilitate shape analysis

Statistical Shape Analysis Ian L. Dryden, Kanti V. Mardia, 2016-09-06 A thoroughly revised and updated edition of this introduction to modern statistical methods for shape analysis Shape analysis is an important tool in the many disciplines where objects are compared using geometrical features Examples include comparing brain shape in schizophrenia investigating protein molecules in bioinformatics and describing growth of organisms in biology This book is a significant update of the highly regarded Statistical Shape Analysis by the same authors The new edition lays the foundations of landmark shape analysis including geometrical concepts and statistical techniques and extends to include analysis of curves surfaces images and other types of object data Key definitions and concepts are discussed throughout and the relative merits of different approaches are presented The authors have included substantial new material on recent statistical developments and offer numerous examples throughout the text Concepts are introduced in an accessible manner while retaining sufficient detail for more specialist statisticians to appreciate the challenges and opportunities of this new field Computer code has been included for instructional use along with exercises to enable readers to implement the applications themselves in R and to follow the key ideas by hands on analysis Offers a detailed yet accessible treatment of statistical methods for shape analysis Includes numerous examples and applications from many disciplines Provides R code for implementing the examples Covers a wide variety of recent developments in shape analysis Shape Analysis with Applications in R will offer a valuable introduction to this fast moving research area for statisticians and other applied scientists working in diverse areas including archaeology bioinformatics biology chemistry computer science medicine morphometrics and image analysis

Parametric and Nonparametric Inference for Statistical Dynamic Shape Analysis with Applications Chiara Brombin, Luigi Salmaso, Lara Fontanella, Luigi Ippoliti, Caterina Fusilli, 2016-02-11 This book considers specific inferential issues arising from the analysis of dynamic shapes with the attempt to solve the problems at hand using probability models and nonparametric tests The models are simple to understand and interpret and provide a useful tool to describe the global dynamics of the

landmark configurations However because of the non Euclidean nature of shape spaces distributions in shape spaces are not straightforward to obtain The book explores the use of the Gaussian distribution in the configuration space with similarity transformations integrated out Specifically it works with the offset normal shape distribution as a probability model for statistical inference on a sample of a temporal sequence of landmark configurations This enables inference for Gaussian processes from configurations onto the shape space The book is divided in two parts with the first three chapters covering material on the offset normal shape distribution and the remaining chapters covering the theory of NonParametric Combination NPC tests The chapters offer a collection of applications which are bound together by the theme of this book They refer to the analysis of data from the FG NET Face and Gesture Recognition Research Network database with facial expressions For these data it may be desirable to provide a description of the dynamics of the expressions or testing whether there is a difference between the dynamics of two facial expressions or testing which of the landmarks are more informative in explaining the pattern of an expression

Permutation Tests Phillip Good, 2013-04-17 In 1982 I published several issues of a samdzat scholarly journal called Random ization with the aid of an 8 bit I MH personal computer with 48K of memory upgraded to 64K later that year and floppy disks that held 400 Kbytes A decade later working on the first edition of this text I used a 16 bit 33 MH computer with 1 Mb of memory and a 20 Mb hard disk This preface to the second edition comes to you via a 32 bit 300 MH computer with 64 Mb memory and a 4 Gb hard disk And yes I paid a tenth of what I paid for my first computer This relationship between low cost readily available computing power and the rising popularity of permutation tests is no coincidence Simply put it is faster today to compute an exact p value than to look up an approximation in a table of the not quite appropriate statistic As a result more and more researchers are using Permutation Tests to analyze their data Of course some of the increased usage has also come about through the increased availability of and improvements in off the shelf software as can be seen in the revisions in this edition to Chapter 12 Publishing Your Results and Chapter 13 Increasing Computation Efficiency

Permutation Tests Phillip I. Good, 1994 Permutation tests permit us to choose the test statistic best suited to the task at hand This freedom of choice opens up a thousand practical applications including many which are beyond the reach of conventional parametric sta tistics Flexible robust in the face of missing data and violations of assumptions the permutation test is among the most powerful of statistical proce dures Through sample size reduction permutation tests can reduce the costs of experiments and surveys This text on the application of permutation tests in biology medicine science and engineering may be used as a step by step self guiding reference manual by research workers and as an intermediate text for undergraduates and graduates in statistics and the applied sciences with a first course in statistics and probability under their belts Research workers in the applied sciences are advised to read through Chapters 1 and 2 once quickly before proceeding to Chapters 3 through 8 which cover the principal applications they are likely to encounter in practice Chapter 9 is a must for the practitioner with advice for coping with real life emergencies such as missing or

censored data after the fact covariates and outliers Chapter 10 uses practical applications in archeology biology climatology education and social science to show the research worker how to develop new permutation statistics to meet the needs of specific applications The practitioner will find Chapter 10 a source of inspiration as well as a practical guide to the development of new and novel statistics

Permutation Tests for Complex Data Luigi Salmaso, Fortunato Pesarin, 2025-09-09 Timely update of a popular edition on permutation testing with numerous case studies included throughout The newly revised and updated Second Edition of Permutation Tests for Complex Data describes permutation tests from the point of view of experimental design with methodological details and illustrating the process of devising an appropriate permutation test through case studies In addition to the text this book includes two open source packages for permutation tests in Python and R which include a comprehensive code base to implement common permutation tests as well as code to implement each of the book's case studies The focus of this book is the permutation approach to a variety of univariate and multivariate problems of hypothesis testing in a typical nonparametric framework The book examines the most up to date methodologies of univariate and multivariate permutation testing includes real case studies from both experimental and observational studies and presents and discusses solutions to the most important and frequently encountered real problems in multivariate analyses Written by two highly qualified authors in the field of nonparametrics and applied statistics Permutation Tests for Complex Data includes information on sample topics including Theory of one dimensional and multi dimensional permutation tests covering test statistics arguments for selecting permutation tests and examples of one sample and multi sample problems Multiplicity control and closed testing covering raw and adjusted p values the MinP Bonferroni Holm procedure and weighted methods for controlling FWE and FDR Multivariate categorical variables covering stochastic ordering tests on moments for ordered variables and heterogeneity comparisons NPC tests for survival analysis and shape analysis covering analysis of PERC data and analysis with correlated landmarks Presenting a thorough overview of permutation testing with both formal description and proofs Permutation Tests for Complex Data is an excellent introduction to permutation tests for graduate level statistics or data science courses and will be ideal as a handbook for researchers hoping to use the open source code

Permutation Methods Paul W. Mielke (jr.), Kenneth J. Berry, 2001 The introduction of permutation tests by R A Fisher relaxed the parametric structure requirement of a test statistic For example the structure of the test statistic is no longer required if the assumption of normality is removed The between object distance function of classical test statistics based on the assumption of normality is squared Euclidean distance Because squared Euclidean distance is not a metric i.e the triangle inequality is not satisfied it is not at all surprising that classical tests are severely affected by an extreme measurement of a single object A major purpose of this book is to take advantage of the relaxation of the structure of a statistic allowed by permutation tests While a variety of distance functions are valid for permutation tests a natural choice possessing many desirable properties is ordinary i.e non

squared Euclidean distance Simulation studies show that permutation tests based on ordinary Euclidean distance are exceedingly robust in detecting location shifts of heavy tailed distributions These tests depend on a metric distance function and are reasonably powerful for a broad spectrum of univariate and multivariate distributions Least sum of absolute deviations LAD regression linked with a permutation test based on ordinary Euclidean distance yields a linear model analysis which controls for type I error

A Nonparametric Permutation Approach to Statistical Shape Analysis Chiara Brombin,2009

Bootstrap Methods and Permutation Tests ,2003

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observing mitosis lab background in a growing plant root the cells at the tip of the root are constantly dividing to allow the root to grow because each cell divides independently of the others a root tip contains cells at different stages of the cell cycle this makes a root tip an excellent tissue to study the stages of cell division

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these regions of growth are good for studying the cell cycle because at any given time you can find cells that are undergoing mitosis in order to examine cells in the tip of an onion root a thin slice of the root is placed onto a microscope slide and stained so the chromosomes will be visible the cells you ll be looking at in this activity

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compare and contrast mitosis and meiosis both mitosis and meiosis are involved in making new cells both start with diploid 2 sets of chromosomes o interphase occurs before both duplicating chromosomes before division o both mitosis and meiosis go through pmat prophase metaphase anaphase telophase meiosis goes through pmat twice i

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the cell cycle results in the formation of two genetically identical daughter cells from the division of a parent cell in this lab you will be observing plant cells onion in the various stages of mitosis and make time calculations based on the data you collect

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observing mitosis analysis and conclusion questions 1 mitosis is much the same in animal cells as in the plant cells you have examined what can you infer from this about the origins of mitosis a i can infer that the start of cell all came from one cell and where that cell came from we do not know but it was the start from that cell it when through the process of binary fission

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mitosis introduction in this lab you will examine the dividing root tip cells of an onion you will examine the specimen to identify the various phases of the cell cycle to see which phases cells spend more time in and you will answer related analysis questions to further your understanding of the eukaryotic cell cycle pre lab

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sep 14 2021 the process of mitosis is only a short period of the lifespan of cells mitosis is traditionally divided into four stages prophase metaphase anaphase and telophase the actual events of mitosis are not discreet but occur in a continuous sequence separation of mitosis into four stages is merely convenient for our discussion and organization

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jul 25 2019 procedure 1 create a data table with the following headings across the top number of cells percentage of all cells time min and the stages of mitosis down the side prophase metaphase anaphase telophase 2 carefully put the slide on the microscope and focus it under low power 40x is preferred 3

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feb 23 2022 many cells will be in various stages of mitosis number of words 244 words aim to study the image of onion cells under a microscope and identify actively dividing cells throughout mitosis during the cell cycle s phases materials and methods refer to the practical activity handout dna observing mitosis results

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discuss the answers to the questions with a partner think pair share and then the class activity 2 observe the stages of mitosis in onion root cells plant cells also use mitosis for growth maintenance and repair

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after completing this lab exercise you should be able to identify and describe the stages of the cell cycle mitosis and meiosis recognizing the events that occur during each stage distinguish between mitosis and cytokinesis as they take place in animal and plant cells

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the onion root is also a good place because this is the area where the plant is growing remember that when cells divide each new cell needs an exact copy of the dna in the parent cell this is why mitosis is only visible in cells that are dividing like the whitefish embryo and the onion root tip mitosis can take several hours to complete

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exercise 1 observing mitosis under the microscope examine prepared slides of both plant cells onion allium root tip and animal cells whitefish blastula under the microscope at 400x

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in general mitosis occurs through several stages that include prophase divided into prophase and prometaphase metaphase anaphase telophase because of the rapid rate at which onion root tips grow as a result of rapid cell division it is possible to observe and identify the different stages of mitosis

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feb 7 2017 view under a microscope and identify the stages of mitosis results calculations the percentage of cells in each stage of mitosis can be observed and noted down a mitotic index can also be formed number of cells containing visible chromosomes total number of cells in the field of view conclusion

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exercise 2 observing mitosis in cells in this exercise you will observe the steps of mitosis in both plant and animal cells procedure review the images of onion root tip cells undergoing the different phases of mitosis shown in figure 10 figure 10 *study of mitosis in onion root tip cells cell division process* - Jun 10 2022

to study and demonstrate the mitotic type of cell division using the onion root tip cells mitosis results in the formation of two daughter cells that are identical to each other learn how the experiment is carried out

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