

1. Record Nr.	UNINA9910144683203321
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Titolo	Exploration and analysis of DNA microarray and protein array data [[electronic resource] /] / Dhammika Amaratunga, Javier Cabrera
Pubbl/distr/stampa	Hoboken, NJ, : John Wiley, c2004
ISBN	1-282-30744-4 9786612307447 0-470-31712-4 0-470-31796-5
Descrizione fisica	1 online resource (270 p.)
Collana	Wiley series in probability and statistics
Altri autori (Persone)	CabreraJavier
Disciplina	572.8 572.8636
Soggetti	DNA microarrays - Statistical methods Protein microarrays - Statistical methods Electronic books.
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references (p. 222-236) and indexes.
Nota di contenuto	Exploration and Analysis of DNA Microarray and Protein A rray Data; Contents; Preface; 1. A Brief Introduction; 1.1. A Note on Exploratory Data Analysis; 1.2. Computing Considerations and Software; 1.3. A Brief Outline of the Book; 2. Genomics Basics; 2.1. Genes; 2.2. DNA; 2.3. Gene Expression; 2.4. Hybridization Assays and Other Laboratory Techniques; 2.5. The Human Genome; 2.6. Genome Variations and Their Consequences; 2.7. Genomics; 2.8. The Role of Genomics in Pharmaceutical Research; 2.9. Proteins; 2.10. Bioinformatics; Supplementary Reading; Exercises; 3. Microarrays 3.1. Types of Microarray Experiments3.1.1. Experiment Type 1: Tissue- Specific Gene Expression; 3.1.2. Experiment Type 2: Developmental Genetics; 3.1.3. Experiment Type 3: Genetic Diseases; 3.1.4. Experiment Type 4: Complex Diseases; 3.1.5. Experiment Type 5: Pharmacological Agents; 3.1.6. Experiment Type 6: Plant Breeding; 3.1.7. Experiment Type 7: Environmental Monitoring; 3.2. A Very Simple Hypothetical Microarray Experiment; 3.3. A Typical Microarray Experiment; 3.3.1. Microarray Preparation; 3.3.2. Sample Preparation;

3.3.3. The Hybridization Step; 3.3.4. Scanning the Microarray
3.3.5. Interpreting the Scanned Image
3.4. Multichannel cDNA Microarrays; 3.5. Oligonucleotide Arrays; 3.6. Bead-Based Arrays; 3.7. Confirmation of Microarray Results; Supplementary Reading and Electronic References; Exercises; 4. Processing the Scanned Image; 4.1. Converting the Scanned Image to the Spotted Image; 4.1.1. Gridding; 4.1.2. Segmentation; 4.1.3. Quantification; 4.2. Quality Assessment; 4.2.1. Visualizing the Spotted Image; 4.2.2. Numerical Evaluation of Array Quality; 4.2.3. Spatial Problems; 4.2.4. Spatial Randomness; 4.2.5. Quality Control of Arrays
4.2.6. Assessment of Spot Quality
4.3. Adjusting for Background; 4.3.1. Estimating the Background; 4.3.2. Adjusting for the Estimated Background; 4.4. Expression Level Calculation for Two-Channel cDNA Microarrays; 4.5. Expression Level Calculation for Oligonucleotide Arrays; 4.5.1. The Average Difference; 4.5.2. A Weighted Average Difference; 4.5.3. Perfect Matches Only; 4.5.4. Background Adjustment Approach; 4.5.5. Model-Based Approach; 4.5.6. Absent-Present Calls; Supplementary Reading; Exercises; 5. Preprocessing Microarray Data; 5.1. Logarithmic Transformation
5.2. Variance Stabilizing Transformations
5.3. Sources of Bias; 5.4. Normalization; 5.5. Intensity-Dependent Normalization; 5.5.1. Smooth Function Normalization; 5.5.2. Quantile Normalization; 5.5.3. Normalization of Oligonucleotide Arrays; 5.5.4. Normalization of Two-Channel Arrays; 5.5.5. Spatial Normalization; 5.5.6. Stagewise Normalization; 5.6. Judging the Success of a Normalization; 5.7. Outlier Identification; 5.7.1. Nonresistant Rules for Outlier Identification; 5.7.2. Resistant Rules for Outlier Identification; 5.8. Assessing Replicate Array Quality; Exercises; 6. Summarization
6.1. Replication

Sommario/riassunto

A cutting-edge guide to the analysis of DNA microarray data Genomics is one of the major scientific revolutions of this century, and the use of microarrays to rapidly analyze numerous DNA samples has enabled scientists to make sense of mountains of genomic data through statistical analysis. Today, microarrays are being used in biomedical research to study such vital areas as a drug's therapeutic value-or toxicity-and cancer-spreading patterns of gene activity. Exploration and Analysis of DNA Microarray and Protein Array Data answers the need for a comprehensive, cutting-edge overview of th
