ITSB | Eco Industry Oriented University

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Basic Statistics

Fundamentals of Data Science using

Written by:

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First Edition

Basis Statistics

Fundamentals of Data Science using R

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Table of contents

We live in a world overflowing with data. From science and business to policy and everyday life, the ability to interpret data through statistics has become a core skill for critical thinking and decision-making. Statistics doesn't just organize numbers; it uncovers patterns, quantifies uncertainty, and transforms raw information into knowledge we can act on.

This module takes learners on a journey from the basics to the essentials of statistical reasoning. We start with data types and collection methods, then move to how data can be organized and presented through clear tables, visuals, and descriptive summaries. We dive into measures of central tendency and dispersion to understand what data is really telling us, before laying the groundwork of probability and distributions as the language of uncertainty.

From there, learners will explore statistical inference, confidence intervals and hypothesis testing to make evidence-based generalizations from samples to populations. By the end, participants won't just know statistical methods; they'll be able to apply them confidently, communicate insights clearly, and make better decisions in real-world contexts.

Preface

About the Writer

Bakti Siregar, M.Sc., CDSS works as a Lecturer at the ITSB Data Science Program. He earned his Master's degree from the Department of Applied Mathematics at National Sun Yat Sen University, Taiwan. In addition to teaching, Bakti also works as a Freelance Data Scientist for leading companies such as JNE, Samora Group, Pertamina, and PT. Green City Traffic.

He has a strong enthusiasm for projects (and teaching) in the fields of Big Data Analytics, Machine Learning, Optimization, and Time Series Analysis, particularly in finance and investment. His core expertise lies in statistical programming languages such as R Studio and Python. He is also experienced in implementing database systems like MySQL/NoSQL for data management and is proficient in using Big Data tools such as Spark and Hadoop.

Some of his projects can be viewed here: Rpubs, Github, Website, and Kaggle

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Acknowledgments

In an era dominated by data, mastering statistics is crucial for making evidence-based decisions and revealing meaningful patterns within complex datasets. This module introduces learners to the fundamental principles and methods of statistics, equipping

them with the skills to explore, summarize, and interpret data effectively. This Book covers:

- Introduction to statistics and its role in decision-making
- Data types and collection methods for accurate and reliable analysis
- Data presentation using clear tables, charts, and visual summaries
- Measures of central tendency and dispersion to describe datasets
- Probability concepts and probability distributions to quantify uncertainty
- Confidence intervals and statistical inference for drawing robust conclusions
- Nonparametric methods for analyzing data without strict distribution assumptions

By completing this module, learners will gain the analytical capabilities to manage real-world data, extract actionable insights, and communicate findings with clarity and rigor, establishing a strong foundation for advanced study or professional practice in data science, research, and industry.

Feedback & Suggestions

Your feedback is essential for improving the clarity, relevance, and usefulness of this module. Readers are invited to share their thoughts on the content, structure, and practical applications, as well as suggestions for new topics, examples, or tools.

This input helps make the E-book a more practical and comprehensive resource for **Basic Statistics**, bridging academic learning and real-world application. Thank you for contributing to the evolution of this material!

For feedback and suggestions, feel free to contact:

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Chapter 1

Intro to Statistics

Chapter 2

Data Overview

2.1 Data Types

2.2 Data Collection

Chapter 3

Basic Data Visualizations

Chapter 4

Central Tendency

Chapter 5

Statistical Dispersion

Chapter 6

Essentials of Probability

Chapter 7

Probability Distributions

Chapter 8

Confidence Interval

Chapter 9

Statistical Inference

Chapter 10

Nonparametric Methods