

Introduction to Bayesian Inference

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March 19, 2021

Introduction to Statistical Thinking

- Statistical thinking is a way of understanding a complex world by describing it in relatively simple terms.
- The idea is to capture essential aspects of its structure and to provide us some idea of how uncertain we are about that knowledge.
- The foundations of statistical thinking come primarily from mathematics and statistics, but also from computer science, psychology, and other fields of study. [Poldrack, 2019]

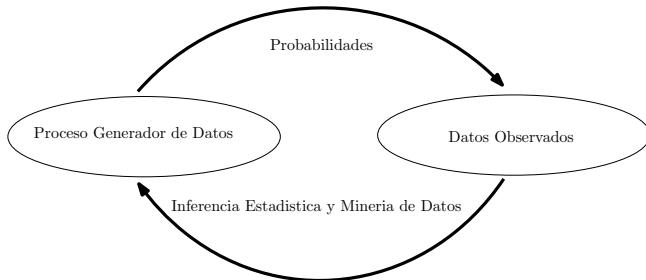
Motivation

- Collections of data are stored on a daily basis. For example: The Web, e-commerce, transactional data.
- Computers are becoming cheaper and more powerful.
- Analyzing this data allows to find hidden patterns.
- A good use of data can bring business benefits. Ex: customer segmentation, demand prediction.



Probability and Statistics

- Probability is the language of uncertainty that is also the basis for statistical inference.
- The problem studied in probabilities is: given a data generating process, which are the properties of the outputs?
- The problem studied in statistical inference, data mining and machine learning is: given the outputs, what can we say about the process that generates the observed data?



References I



Poldrack, R. A. (2019).
Statistical Thinking for the 21st Century.