

Bayesian Machine Learning For Dummies

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1 Introduction

This is a project that aims to introduce us to the Bayesian approach to machine learning. The project is being carried out by uploading a reading list every week followed by a discussion session every week and an assignment every two weeks.

2 Week 1

Week 1 introduced us to the basic concepts of probability such as random events, independent events and mutually exclusive events. Following this we were introduced to some different approaches to probability such as classical definition, relative frequency approach and the modern approach. Conditional probability was also introduced, this is very important for Bayesian ML, and we discussed the famous Monty Hall problem. Bayes' Theorem was taught, this as the name suggests is the basic foundation of the Bayesian approach to Machine Learning.

3 Week 2

Random variables were introduced in week 2. We also covered the probability density function (pdf) and cumulative distribution function (cdf) and how to utilize it to find the probability of an event with a continuous random variable. Also, we learnt how to find the cdf given the pdf and vice-versa. The content of this week ended with a brief discussion on expectation. This was followed by Assignment 1.

4 Week 3

We were taught the definition of Moment Generating Function and how to use them to find expectations and higher moments of pdfs. Also, the concept of median was introduced and we were made familiar to various distributions :

- Discrete Uniform
- Degenerate and Bernoulli
- Binomial
- Geometric and Hypergeometric
- Exponential
- Gaussian (Normal)
- Poisson
- Beta
- Gamma
- Continuous Uniform
- Cauchy
- Laplace

and their properties like expectation and variance.