

CS 567 Machine Learning – Programming Assignment 1

Curve Fitting

Nazar Khan, PUCIT
Fall 2018

Assigned	Friday, November 30, 2018
Due	Monday, December 10, 2018 before 5:30 pm

In this assignment, we will learn how to fit a polynomial to data points $\{x, t\}_1^N$ using

1. Maximum Likelihood (ML) estimation – find \mathbf{w} that maximises $p(T|X, \mathbf{w})$.
2. Maximum Posterior (MAP) estimation – find \mathbf{w} that maximises $p(\mathbf{w}|X, T)$

The goal is to reproduce Figures 1.4 till 1.7 from Chapter 1 of Bishop's book. The main Matlab files in this assignment are

- `generate_data.m` generates N data points from the $\sin(2\pi)$ function and adds random noise.
- `evaluate_polynomial.m` evaluates polynomial \mathbf{w} at points in vector \mathbf{x} .
- `fit_polynomial_ML.m` fits a polynomial to data X, T via Maximum Likelihood (ML) estimation.
- `fit_polynomial_MAP.m` fits a polynomial to data X, T via Maximum Posterior (MAP) estimation.

You have to fill in the missing pieces of code in

- `evaluate_polynomial.m`
- `fit_polynomial_ML.m`
- `fit_polynomial_MAP.m`

To generate all results required for this assignment, call the function `get_all_results('YOUR.ROLL.NUMBER')`. Do not forget the single quotes around your roll number. This will create a file `PA1-YOUR.ROLL.NUMBER.zip` which will contain:

- `evaluate_polynomial.m`
- `fit_polynomial_ML.m`
- `fit_polynomial_MAP.m`

and

- `Figure_1.4.png`
- `Figure_1.5.png`
- `Figure_1.6.png`
- `Figure_1.7.png`
- `polynomial_fitting_ML_VS_MAP.png`

Submission: Paste `PA1-YOUR.ROLL.NUMBER.zip` to

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