Machine Learning and Data Mining

Assignment 1

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The exercises in this assignment are of theoretical nature and may not be solved by execution of high-level Python commands but through manual step-by-step calculations which must be included in submissions. For this assignment it is also allowed to upload a single .pdf file generated from LATEX code or scanned and compressed (!) handwritten solutions.

1 Statistics — 18 points

1.1 — 6 points

1.2 — 6 points

2 Error Calculation 12 points

You are given many computed outputs y_i and desired outcomes $\hat{y}_i$.Provide the following error measures in regards to y_i and $\hat{y}_i$ by writing down their formula and a short description about their characteristics, i.e., the behavior in regard to the difference between computed and desired outcome.

2.1 Sum of Square Error (SSE)

$$SSE = \sum_{n=1}^{n} (\hat{y}_i - y_i)^2$$

y_i : computed output
$\hat{y}_i$: desired output

- The error will be the difference between y_i (computed value) and $\hat{y}_i$ (actual value).
- The difference is squared in order to avoid total error =0,which would be the result of negative differences cancelling out the positive differences.

3 Research tasks 20 points

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3.1 Collision

3.2 IPv6

4 Routing Table — 20 points