

Quality of reconstruction measures

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Preface

These are notes on measures of the quality of reconstruction.
 This document is still in preparation. Please feel free to contact me
 with any suggestions, corrections or comments.

Keywords

*principal component analysis, data reduction, dimensionality reduction,
 linear algebra, MATLAB®, Python*

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1 Nomenclature

- \mathbf{A} is a matrix
- \mathbf{A}^T denotes a matrix transpose
- $\mathbf{A}_{:,j}$ is a vector formed by the j^{th} column of a matrix \mathbf{A} ,
it is equivalent to $\mathbf{A}(:,j)$
- $\mathbf{A}_{i,:}$ is a vector formed by the i^{th} row of a matrix \mathbf{A} ,
it is equivalent to $\mathbf{A}(i,:)$
- $a_{i,j}$ is an element from i^{th} row and j^{th} column of a matrix \mathbf{A} ,
it is equivalent to $\mathbf{A}(i,j)$

2 Coefficient of determination

3 Root mean squared error (RMSE)

$$RMSE_i = \sqrt{(\mathbf{X}_i - \mathbf{f}_i)^2} \quad (1)$$

3.1 Normalized root mean squared error (NRMSE)

$$NRMSE = \sqrt{\frac{(\mathbf{X} - \mathbf{f})^2}{\mathbf{X}^2}} \quad (2)$$

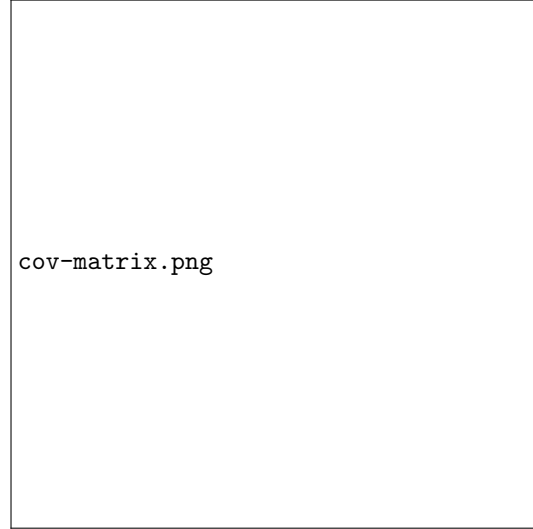


Figure 1: Covariance matrix \mathbf{S} graphical interpretation.

```
q = 1
Dataset_projected = np.dot(Dataset_proc,
np.transpose(pca.components_[:q,:]))
```

A Appendix

References