

Homework 2

IE 7275 Data Mining in Engineering

Task 1: Tutorial

- Reading chapter “Principal components and factor analysis.”

Task 2: Perform principal component analysis

- Input the raw data matrix to `fa.parallel()` function to determine the number of components to extract
- Input the raw data matrix to `principal()` function to extract the components. If raw data is input, the correlation matrix is automatically calculated by `principal()` function.
- Rotate the components
- Compute component scores
- Graph an orthogonal solution using `factor.plot()`
- Interpret the results

Task 3: Perform factor analysis

- Input the raw data matrix to `fa.parallel()` function to determine the number of components to extract
- Input the raw data matrix to `fa()` function to extract the components. If raw data is input, the correlation matrix is automatically calculated by `fa()` function.
- Rotate the factors
- Compute factor scores
- Graph an orthogonal solution using `factor.plot()`
- Graph an oblique solutions using `fa.diagram()`
- Interpret the results

Task 4: Perform multidimensional scaling

- Input the raw data matrix to `fa.parallel()` function to determine the number of components to extract
- Input the raw data matrix to `cmdscale()` function to perform multidimensional scaling. `cmdscale()` function which is available in the base installation performs a classical multidimensional scaling.
- Graph an orthogonal solution using `factor.plot()`
- Interpret the results

Problem 1

Perform Task 2 on **US Judge Ratings.dat**

Problem 2

Perform Task 2 on **Glass Identification Data.xlsx**

Problem 3

Perform Task 3 on **Harman23.cor**

Problem 4

Perform Task 3 on **Herman74.cor**

Problem 5

Perform Task 4 on **Vertebral Column Data.xlsx**

Files Included in the Folder:

Homework 1.pdf
PCA and FA Tutorial.pdf
US Judge Rating.dat
Glass Identification Data.xlsx
Glass Identification Data Description.pdf
Herman23.cor
Herman74.cor
Vertebral Column Data.xlsx
Vertebral Column Description.pdf