

EXERCISES

1. La tabla `painters` del paquete `MASS` se muestra parcialmente en el siguiente gráfico:

```
> library(MASS)
> data(painters)
> painters
```

	Composition	Drawing	Colour	Expression	School
Da Udine	10	8	16	3	A
Da Vinci	15	16	4	14	A
Del Piombo	8	13	16	7	A
Del Sarto	12	16	9	8	A
Fr. Penni	0	15	8	0	A
Guilio Romano	15	16	4	14	A
Michelangelo	8	17	4	8	A
Perino del Vaga	15	16	7	6	A
Perugino	4	12	10	4	A
Raphael	17	18	12	18	A
F. Zucarro	10	13	8	8	B
Fr. Salviata	13	15	8	8	B
Parmigiano	10	15	6	6	B
Primaticcio	15	14	7	10	B
T. Zucarro	13	14	10	9	B
Volterra	12	15	5	8	B
Barocci	14	15	6	10	C

In this data table some expert evaluated from 0 to 10 the main painters of the history in Quality of Composition (`Composition`), Quality of Stroke (`Drawing`), use of Color (`Color`) and Expression (`Expression`). This table also contains a categorical variable `School` that places each of the painters in their respective painting schools: A: Renaissance; B: Mannerist; C: Seicento; D: Venetian; E: Lombard; F: Sixteenth Century; G: Seventeenth Century and H: French. With this data table, do the following:

- Build a symbolic table using the variable `School` as a concept.
- Plot the first 4 rows of the resulting table.
- Plot the complete resulting table.
- For all the variables compute the Symbolic Mean, the Symbolic Median, the Variance, the Symbolic Standard Deviation and compute the Symbolic Correlation between two pairs of variables.
- Generate a Radar Plot with the rows (concepts) 1 and 2 of the resulting table and for rows 3 through 5. Do an interpretation.

- f) Carry out an Principal Component Analysis (PCA), interpret the groupings, the correlations, the over-position of graphs, for this perform an PCA using the option `method = 'classic'` and then to interpret the variability execute the PCA with the option `method = 'centers'`.
 - g) Apply a hierarchical clustering, interpret the result.
 - h) Apply a k - means, interpret the result.
2. Using the data table example `USCrime` of the `RSDA` package select 6 variables and generate a symbolic data table of interval type using the variable `state` as a concept, then do the following:
- a) For all the variables compute the Symbolic Mean, the Symbolic Median, the Variance, the Symbolic Standard Deviation and compute the Symbolic Correlation between two pairs of variables.
 - b) Make two interesting Radar type graphs for variables of type interval, interpret the results.
 - c) Perform a Principal Component Analysis for tables with Interval Type variables, interpret the groupings, correlations, graph over-position and variability.
 - d) Perform a hierarchical clustering for tables with variables Interval Type, do an interpretation.
 - e) Make a k -means for tables with Interval Type variables, do an interpretation.
 - f) With this table execute an symbolic regression using all the methods presented in the Tutorial.
3. Using the data table example `ex_mcfa2` of the `RSDA` package select the variables `salary`, `region`, `years_worked`, `evaluation` and generate a symbolic data table of set type using the variable `employee_id` as a concept, then do the following:
- a) Plot the resulting data table.
 - b) Perform a Multiple Correspondence Analysis.



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