Panel performances thanks to the SensoBase

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A database of descriptive sensory data

WHY ?

- Document the variety of practices in sensory analysis
- Benchmark panel and panelist performances
- Compare sensometrics techniques on a large number of datasets

HOW ?

- Offering a free statistical analysis of each dataset provided

www.sensobase.fr

SENSOBASE Program - Microsoft Internet Explorer

Fichier Edition Affichage Favoris Outils ?

Précédente Rechercher Favoris

Adresse https://liris.cesg.cnrs.fr/English/index.html OK Liens

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SENSOBASE Program Ajouter un onglet

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SENSOBASE

Home

User Identification :

Login :

Password :

Enter

What is SENSOBASE ?

Methods of exchange

Extract of statistical results and their meaning (French)

Register

Send us your suggestions

SENSOBASE

A sensory profiling database

At Centre Européen des Sciences du Goût, a project is conducted to build a database of sensory profiling datasets in which the data providers can exchange their sensory profiling data for statistical analyses.

New !

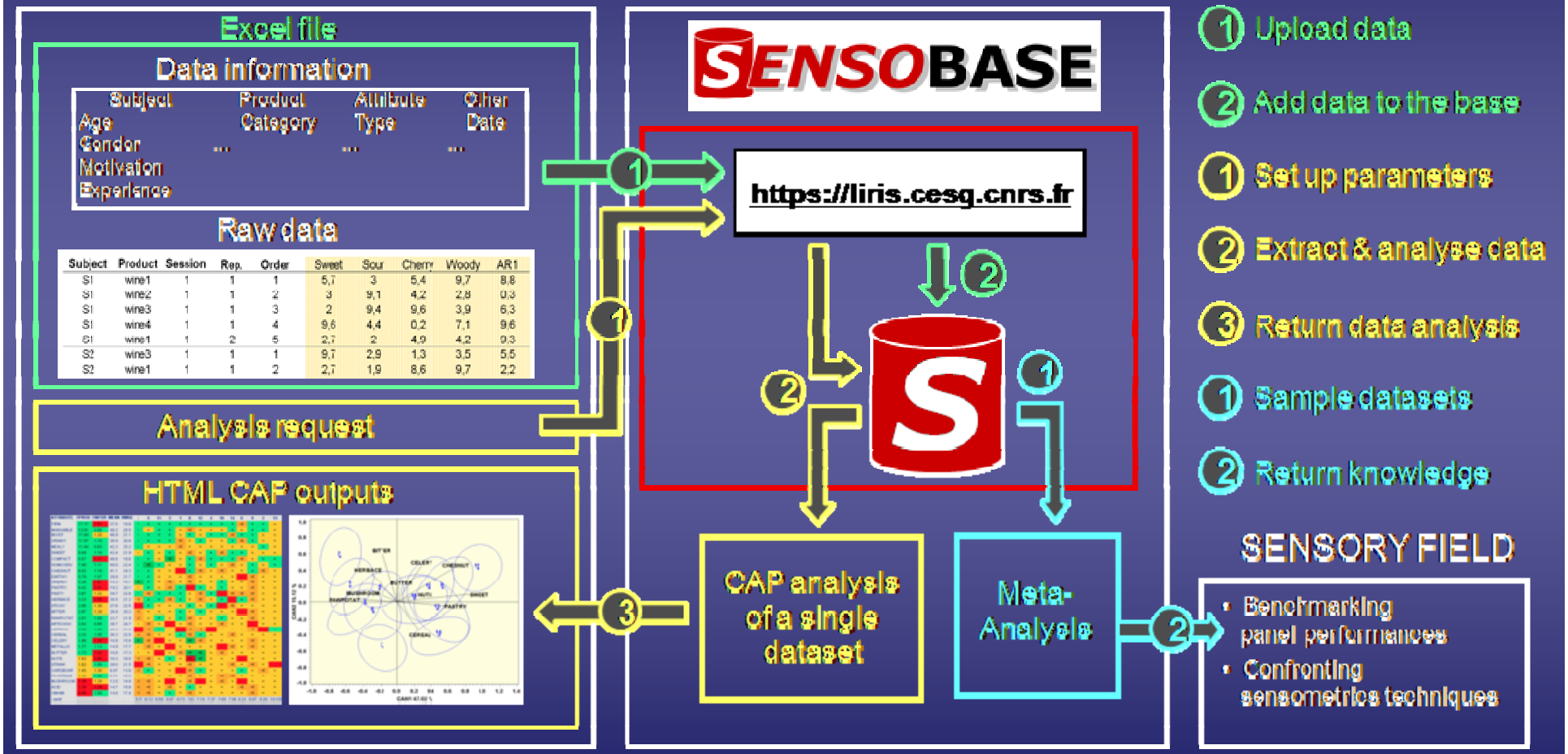
The SensoBase Excel files have been modified (precisions on the modifications).

You should download and use the new versions of the Excel files for the next studies ! (Files are available on your personal account)

Datasets sent with an older version of an Excel file will be rejected.

Send your sensory profiling data...

Working flow chart of the SensoBase



Current contents of the SensoBase

About 3-4 years after having started the project, SensoBase is composed of :

- 683 datasets (sensory studies)
- 83 sensory labs from 17 countries (48 data providers)
- 2 731 panellists
- 4 367 products
- 12 558 sensory attributes
- 4 044 923 scores

What is in the offered analysis ?

- Just pick an example randomly : **Wines from INRA Montpellier**

Using the SensoBase to better understand panelist performances

Indexes of performance

Agreement = Pearson correlation coefficient (panelist versus others)

Discrimination = $MS_{product} / (MS_{product} + MS_{residual})$ (from indivudal one-way ANOVA)

Repeatability = Root $MS_{residual}$ (from a 0-10 scale)

Weighted ANOVA of a performance index

- Index first averaged over attributes to get a single value per panelist
- Model: Index = Factor + Dataset + Factor*Dataset (for instance: Factor=AGE)
- Dataset is considered as a random effect
- Experimental unit: the panelist (n from 267 to 3,202 depending on the factor analyzed)
- Each dataset has a weight proportional to the balance of the factor level frequencies and to the total number of panelists in this dataset

Level of performances by age, gender, panelist education and sensory experience

AGE (n=3,202)	F-tests in ANOVA			AGE Level	Mean
	AGE	Dataset	AGE*Dataset		
Agreement	2.35	**14.10**	1.12	All	0.387
Discrimination	**9.52**	**8.80**	1.09	30-	**0.615 b**
				30-45	**0.627 a**
				45+	**0.612 b**
Repeatability	2.31	**13.22**	0.99	All	1.207

EDUCATION (n=267)	F-tests in ANOVA			EDU Level	Mean
	EDU	Dataset	EDU*Dataset		
Agreement	1.72	**5.27**	1.01	All	0.363
Discrimination	**4.02**	**2.76**	**1.99**	Secondary	**0.582 b**
				Higher	**0.619 a**
Repeatability	0.05	**6.60**	0.60	All	1.353

GENDER (n=2,381)	F-tests in ANOVA			GEN Level	Mean
	GEN	Dataset	GEN*Dataset		
Agreement	0.24	**14.86**	1.16	All	0.385
Discrimination	0.10	**8.39**	1.22	All	0.616
Repeatability	0.01	**12.96**	0.84	All	1.185

EXPERIENCE (n=486)	F-tests in ANOVA			EXP Level	Mean
	EXP	Dataset	EXP*Dataset		
Agreement	**3.13**	**13.65**	0.99	none	**0.372 b**
				1-3 years	**0.402 a**
				>3 years	**0.424 a**
Discrimination	**4.11**	**13.70**	0.87	none	**0.616 b**
				1-3 years	**0.620 b**
				>3 years	**0.645 a**
Repeatability	1.60	**11.76**	0.97	All	1.361

When significant (p=0.05), the F statistic is in yellow and the levels of the factor are compared. Otherwise, just the grand mean (All) is given.

Learning about panel performances

- Ability to discriminate products increase:

  - with level of education,

  - with level of expertise in sensory analysis,

  - in 30-45 years old subjects.

- However, these effects do not extend to repeatability

- Regarding types of descriptors:

  - appearance has got the best performances,

  - panel agreement is better on texture,

  - individual repeatability and discrimination are better on taste, flavor and odor compared to texture.

- Women are not better tasters than men !

- A huge variability of the levels of performances was observed across the sensory labs

Learning about panel heterogenity in terms of repeatability and scaling

Usual ANOVA Model

$$Y_{jir} = a_j + b_i + c_{ji} + \varepsilon_{jir}$$

a_j : judge effect. b_i : product effect
c_{ij} : judge by product interaction

Brockhoff's Assessor Model

$$Y_{jir} = \alpha_j + \beta_j \nu_i + \varepsilon'_{jir}$$

α_j : judge effect. ν_i : product effect
β_j : scaling coefficient of judge j

Covariance Assessor Model (CAM)

$$Y_{jir} = a_j + \beta_j \nu_i + b_i + c_{ji} + \varepsilon''_{jir}$$

A mixture of both models allowing for a product effect adjusted to the scaling effect

- Usual ANOVA assumes panel homogeneity towards both repeatability and scaling
- Based on hundreds of datasets sampled from the Sensobase :
  - The tests of panel homogeneity provided by the Assessor model were significant in 73 and 76 % of the attributes for repeatability and scaling, questioning strongly the validity of ANOVA with sensory data
  - The use of a data transformation removing scaling did not result in more product effect significance
  - The use of CAM resulted in an increase of the percentage of attributes with a significant product effect from 59 % in classical ANOVA to 68 % with CAM

Conclusion

Regarding Sensobase :

- To get more data providers before using our results for benchmarking panel performances
- To use Sensobase data for comparing multivariate techniques

www.prefbase.fr ... is ongoing !