Thomas Laloë

Professional address :
ISFA
50 avenue Tony Garnier
69007 Lyon
FRANCE

Personal address :
Résidence enclos aux fontaines
Batiment E - Appt 200
134 rue du Curat
34090 Montpellier
FRANCE

Phone : 33(0)6.88.83.22.09
E-mail : thomas.laloe@math.univ-montp2.fr
http ://www.math.univ-montp2.fr/~laloe/

26 years old
Nationality : French

Professional Situation :

Temporary teaching and research position at Université Lyon 1, ISFA graduate school of actuarial studies.

Academic background :

2006 - 2009 : **PhD Thesis in Statistics, under direction of Gérard Biau and Benoît Cadre.**
On some problems of supervised and unsupervised learning.
Université Montpellier 2, Department of statistics.

2006 : **Master of science degree in statistics**, Université Montpellier 2.

2004 : **Bachelor degree in mathematics**, Université Montpellier 2.

Teaching :

2006 - 2009 : **Université Montpellier 2, Department of mathematical teaching.**

Introduction to the Statistic, Exercise Session and Practical Session (2nd year of bachelor degree).

Differential calculation, Exercise Session and Practical Session (1st year of bachelor degree).

Bio-mathematics, Course and Exercise Session (1st year of bachelor degree).

Statistics, Course (3rd year of bachelor degree).

2009 - 2010 : **Université Lyon 1, ISFA graduate school of actuarial studies.**

Statistics (2nd year of master degree).

Inferential statistics, Exercise Session and Practical Session (1st year of master degree).

Research Activities :

02 - 06/2006 : **Temporary teaching and research position** at Université Lyon 1, ISFA graduate school of actuarial studies.
Regression and statistical learning.

2006 - 2009 : **PhD in Statistics** at Université Montpellier 2, Department of probability and statistics
On some problems of supervised and unsupervised learning.
Directed by Gérard Biau and Benoît Cadre.

02 - 06/2006 : **Master internship** at Université Montpellier 2, Department of probability and statistics.
Regression and statistical learning.
Directed by Gérard Biau and Laurent Rouvière.

Communications :

Conferences :

05/2009 : *A k-nearest neighbor approach for functional regression.*
Meeting of the French Statistical Society, Bordeaux, France.

04/2009 : *A k-nearest neighbor approach for functional regression.*
Doctiss 2009, Montpellier, France.

05/2008 : *L_1 Quantization in Banach Spaces.*
Joint meeting of the Canadian Statistical Society and the French Statistical society, Ottawa, Canada.

08/2007 : *High dimensional Quantization.*
Second Meeting of the young Statistician, Aussois, France.

Seminary and working group :

09/2008 : *L_1 Quantization in Banach Spaces.*
Seminary of the department of Statistics, Université Montpellier 2, France.

02/2008 : *L_1 Quantization in Banach Spaces.*
PhD students' working group, Université Paris 6, France.

01/2008 : *L_1 Quantization in Banach Spaces.*
PhD students' seminary, Université Montpellier 2, France.

10/2007 : *High dimensional Quantization.*
Inra, Montpellier, France.

Research activities :

A k-nearest neighbor approach for functional regression

Consider (X, Y) a random pair taking its values in $\mathcal{H} \times \mathbb{R}$, where $\mathcal{H}$ is an infinite dimensional Hilbert space. We study the weak consistency of a nearest neighbor estimator of the regression function of Y on X from independent observations of (X, Y). The general strategy is to reduce the dimension of $\mathcal{H}$ by considering the d first coefficients of the projection of X in a base of $\mathcal{H}$. Then we consider a k nearest neighbor regression in $\mathbb{R}^d$. Both the dimension and the number of neighbor are automatically chosen from the observations, using a data-splitting device. We adapt the results obtained in classification by Biau, Bunea and Wegkamp (2005). This work led to an article (2008) published in *Statistics and Probability letters*.

Functional clustering

Let X be a random variable with distribution μ, taking its values in a separable and reflexive Banach space $\mathcal{H}$. We can state the existence of an optimal quantization of μ, with respect to an L_1 error criterion. We then expend the results obtained by Linder (2002) for a L_2 criterion. We also propose several estimators of this optimal quantization, with associated algorithms (the development of an R package is in progress). Moreover, we have confronted our methods to simulated and real data set. This work also led to an article, submitted to *Mathematical Methods of Statistics*, and to a contribution with François Gerlotto (francois.gerlotto@ird.fr) from the Research Institute for Development (http ://en.ird.fr/the-ird/presentation) to study the behavior of schools of fishes.

Estimation of the level sets of the regression function

Let (X, Y) be a random pair taking its values in $\Lambda \times J$, with $\Lambda \subset \mathbb{R}^d$ and $J \subset \mathbb{R}$ bounded. For $t > 0$ we want to estimate the level set of the regression function r of Y on X defined by

$$\mathcal{L}(t) = \{x \in \Lambda : r(x) \geq t\}.$$

To do this, we consider a kernel estimator r_n of r, and we define the plug-in estimator

$$\mathcal{L}_n(t) = \{x \in \Lambda : r_n(x) \geq t\}.$$

We state a rate of convergence for the volume of the symmetrical difference $\mathcal{L}_n(t) \Delta \mathcal{L}(t)$, adapting the results obtained by Cadre (2006) for the density function. Besides, we have programmed our method with R, in order to confront it to a simulated data set.

Informatics and Languages skills :

Informatics	OS :	Linux, Windows.
	Languages :	R, SAS, Splus.
Languages	French	Mother tongue.
	English	Fluent.
	German	Scholar.

Publications :

Published papers

(1) T. Laloë. A k-nearest neighbor approach for functional regression, *Statistics and probability letters* (2008), 78, 1189-1193.

Submitted papers

(2) T. Laloë. L_1 quantization and clustering in Banach spaces , *Mathematical Methods of Statistics*.

References

Gérard Biau, gerard.biau@upmc.fr

Benoît Cadre, Benoit.Cadre@bretagne.ens-cachan.fr

Bruno Pelletier, bpelletier@ucsd.edu

Stéphane Loisel, stephane.loisel@univ-lyon1.fr

Other activities :

2008 : **Creation of the PhD students' seminary** jointly with Olivier Rodriguez.

2008 - 2009 : **Delegate of the non-permanent members** of the department of mathematics.