November 22, 2010
Schedule

Morning sessions:	Afternoon sessions:
Talk 1- 10h00 - 10h30. Discussion: 10h30-10h40	Talk 5- 14h30 - 15h00 Discussion 15h00-15h10
Talk 2- 10h40 - 11h10. Discussion: 11h10-11h20	Coffee Break: 15h10-15h30
Coffee Break: 11h 20-11h40	Talk 6- 15h30 - 16h00 Discussion 16h00-16h10
Talk 3- 11h40 - 12h10 Discussion: 12h10-12h20	Talk 7- 16h10 - 16h40 Discussion 16h40-16h50
Talk 4- 12h20 - 12h50 Discussion: 12h50-13h00	
Lunch Break: 13h00 -14h30	General Discussion: 16h50-17h15

Abstracts

Spatial and anatomical regularization of SVM for brain image analysis

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Support vector machines (SVM) are increasingly used in brain image analyses since they allow capturing complex multivariate relationships in the data. Moreover, when the kernel is linear, SVMs can be used to localize spatial patterns of discrimination between two groups of subjects. However, the features' spatial distribution is not taken into account. As a consequence, the optimal margin hyperplane is often scattered and lacks spatial coherence, making its anatomical interpretation difficult. This paper introduces a framework to spatially regularize SVM for brain image analysis. We show that Laplacian regularization provides a flexible framework to integrate various types of constraints and can be applied to both cortical surfaces and 3D brain images. The proposed framework is applied to the classification of MR images based on gray matter concentration maps and cortical thickness measures from patients with Alzheimer's disease and elderly controls. The results demonstrate that the proposed method enables natural spatial and anatomical regularization of the classifier.

Conditional inference and simulation

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The role of sufficiency is considered in a number of cases; when nuisance parameters are involved, this concept nproves to be inadequate even in simple cases (for example mixtures) and also in contexts which are seemingly fitted for it (obviously exponential models). On the other hand approximation of theconditional density of a sample given an observed statistics provides a tool for adaptive procedures in the field of conditional inference. The talk will focus on sharp approximations of the conditional density of large samples, simulation according to those proxies, and subsequent procedures for inference and tests; handling with nuisance parameters is discussed in this respect.

Investigation of goodness-of-fit test statistic distributions by random censored samples

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Modified Kolmogorov, Cramer-von Mises-Smirnov and Anderson-Darling goodness-of-fit tests for random censored samples have been considered. By means of computer simulation technique statistic distributions and the power of tests have been analyzed for various sample sizes, censoring degrees as well as for different lifetime distributions under test and distributions of censoring times.

Longitudinal Mixed-Membership Models for Survey Data on Disability

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We describe a new family of models to analyze longitudinal data by combining features from a version of the cross-sectional Grade of Membership Model and from the longitudinal Multivariate Latent Trajectory Model. These models assume the existence of a small number of “typical” or “extreme” classes of individuals and model their evolution over time. We regard individuals as belonging to all of these classes in different degree, by

considering them as convex weighted combinations of the extreme classes. In this way, we are able to describe distinct general tendencies (the extreme cases) while accounting for the individual variability. We propose a full Bayesian specification and estimation methods based on Markov Chain Monte Carlo sampling. We apply our method to data the National Long Term Care Survey (NLTCS), a longitudinal survey with six completed waves aimed to assess the state and characteristics of disability among U.S. citizens age 65 and above. A simple extension of our methods allows us to answer some relevant questions about the changes in disability across generations.

Threshold Analysis of Survival Data and Comparisons with Proportional Hazard Models

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Proportional hazards (PH) regression is a standard methodology for analyzing survival and time-to-event data. The proportional hazards assumption of PH regression, however, is not always appropriate. In addition, PH regression focuses mainly on hazard ratios and thus does not offer many insights into underlying determinants of survival. Threshold regression (TR) is an alternative methodology (see Lee and Whitmore, 2006, for a review). In this talk, we discuss the connections between these two regression methodologies in depth and show that PH regression is, for most purposes, a special case of TR. We show two methods of construction by which TR models can yield PH functions for survival times, one based on altering the TR time scale and the other based on varying the TR boundary. A case demonstration is used to highlight the greater understanding of scientific foundations that TR can offer in comparison to PH regression. Finally, we discuss the potential benefits of positioning PH regression within the first-hitting-time context of TR regression.

Discrimination measures for survival outcomes: connection between AUC and the predictiveness curve.

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Finding out biomarkers and building risk scores to predict the occurrence of survival outcomes is a major concern of clinical epidemiology, and so is the evaluation of prognostic models. In this paper, we are concerned with the estimation of the time-dependent AUC ? area under the receiver operating curve ? which naturally extends standard AUC to the setting of survival outcomes and enables to evaluate the discriminative power of prognostic models. We establish a simple and useful relation between the predictiveness curve and the time-dependent AUC ? AUC(t). This relation confirms that the predictiveness curve is the key concept for evaluating calibration and discrimination of prognostic models. It also highlights that accurate estimates of the conditional absolute risk function should yield accurate estimates for AUC(t). From this observation, we derive several estimators for AUC(t) relying on distinct estimators of the conditional absolute risk function. An empirical study was conducted to compare our estimators with existing ones and assess the effect of model misspecification ? when estimating the conditional absolute risk function? on the AUC(t) estimation. We further illustrate the methodology on the Mayo PBC and the VA lung cancer data sets.

Modified Chi-Squared Tests and Their Applications

Mikhail Nikulin, Vilijandas Bagdonavicius, Léo Gerville-Réach and Ramzan Tahir; University Victor Segalen Bordeaux 2. mikhail.nikouline@u-bordeaux2.fr

While the famous chi-squared test of Pearson is well know, its various improved versions are not. Following the historical paper of Karl Pearson, the theory of chi-squared tests was developped very actively till nowadays. We can cite a long list of names to see how much efforts were done to find good statistics used to build good chi-squared type tests. Today one can find easely different interesting applications of this theory in reliability, survival analysis, demography, insurance, sport. We shall discuss different problems in applications of modificatins of the standard statistic of Pearson, in particular, for censored data and in presence of covariates.

1. Bagdonavicius,V., Kruopis, J., Nikulin,M. (2010). *Nonparametric tests for complete data*. Wiley. London.
2. Drost, F. *Asymptotics for Generalized Chi-Squared Goodness-of-fit Tests*. Center for Mathematics and Computer Sciences. CWI Tracts,vol.48, Amsterdam.
3. Greenwood, P.E. and Nikulin, M.S. (1996). *A Guide to chi-squared testing*. Wiley: New York.
4. Huber, C., Balakrishnan, M., Nikouline, M. and Mesbah, M. (2002). *Goodness of fit tests and validity of models*. Birkhauser. Boston.
5. Van der Vaart, A. (1998). Asymptotic statistics, Cambridge University Press.