

DEPARTMENT OF STATISTICS AND BIOSTATISTICS

Piotr FryzlewiczDepartment of Statistics
London School of Economics*Recent advances in multiple change-point
detection***November 16, 2016****3:20 – 4:20pm**

Light refreshments will be served

**110 Frelinghuysen Road
Hill Center, Room 552**

Abstract: The talk will summarize some recent results in multiple change-point detection. In the first part of the talk, we discuss a new, generic methodology for nonparametric function estimation, in which we first estimate the number and locations of any features that may be present in the function. The method is general in character due to the use of a new multiple generalised change-point detection device, termed Narrowest-Over-Threshold (NOT). The key ingredient of NOT is its focus on the smallest local sections of the data on which the existence of a feature is suspected. The NOT estimators are easy to implement and rapid to compute. Importantly, the NOT approach is easy to extend by the user to tailor to their own needs. We also review our earlier work on Wild Binary Segmentation, which inspired NOT.

In the second part, we introduce the concept of "tail-greediness" and discuss a new tail-greedy, bottom-up transform for one-dimensional data, which results in a nonlinear but conditionally orthonormal, multiscale decomposition of the data with respect to an adaptively chosen Unbalanced Haar basis. The resulting agglomerative change-point detection method avoids the disadvantages of the classical divisive binary segmentation, and offers very good practical performance.

References:

* Wild Binary Segmentation for multiple change-point detection. P. Fryzlewicz (2014). *Annals of Statistics*, [42, 2243-2281](https://doi.org/10.1214/13-AOS1181). Available at: <http://stats.lse.ac.uk/fryzlewicz/wbs/wbs.pdf>

* Narrowest-Over-Threshold detection of multiple change-points and change-point-like features. R. Baranowski, Y. Chen and P. Fryzlewicz (2016). In submission. Available at: <http://stats.lse.ac.uk/fryzlewicz/not/not.pdf>

* Tail-greedy bottom-up data decompositions and fast multiple change-point detection. P. Fryzlewicz (2016). Under revision. Available at <http://stats.lse.ac.uk/fryzlewicz/tguh/tguh.pdf>

Piotr Fryzlewicz is a Professor of Statistics at the London School of Economics, UK, having previously worked at Winton Capital Management, University of Bristol and Imperial College London (all UK) and obtained his PhD degree from the University of Bristol in 2003. His research interests lie in multiscale modelling and estimation, time series (especially nonstationary time series), change-point detection, high-dimensional statistical inference and dimension reduction, statistical learning, networks, functional programming in data science, statistics in finance, statistics in the social sciences, and statistics in neuroscience. He currently serves as Joint Editor of the *Journal of the Royal Statistical Society Series B*.

