2018-00556 - Estimation of extreme risk measures with covariate information- Post-Doctorant Inria Grenoble Research center

Contract type: Public service fixed-term contract
Level of qualifications required: PhD or equivalent
Fonction: Post-Doctoral Research Visit

About the research centre or Inria department

Grenoble Rhône-Alpes Research Center groups together a few less than 800 people in 35 research teams and 9 research support departments.

Staff is localized on 5 campuses in Grenoble and Lyon, in close collaboration with labs, research and higher education institutions in Grenoble and Lyon, but also with the economic players in these areas.

Present in the fields of software, high-performance computing, Internet of things, image and data, but also simulation in oceanography and biology, it participates at the best level of international scientific achievements and collaborations in both Europe and the rest of the world.

Context

Team Mistis, LJK & Inria Grenoble Rhone-Alpes; team leader: Florence Forbes.

Research topics: extreme-value analysis, nonparametric statistics, Bayesian statistics, graphical models.

Advisors:
1. Stéphane Girard (DR) Mistis, Inria Grenoble, Rhone-Alpes, France.
Webpage: http://mistis.inrialpes.fr/people/girard/
2. Gilles Stupfler, Assistant Professor, University of Nottingham, UK.
Webpage: https://www.maths.nottingham.ac.uk/personal/pmzgs/

Location: Inria Grenoble Rhone-Alpes, 38330 Montbonnot, France.

Assignment

Extreme value theory is a branch of probability and statistics dealing specifically with the behaviour of a probability distribution in its tails. More precisely, it focuses on the asymptotic behaviour of the largest, or lowest, observations in a collection of random observations from the same distribution. In extreme value statistics, the main problems are typically the estimation of the extreme value index and extreme quantiles associated to a random variable of interest Y with unknown underlying distribution. The extreme value index drives the behaviour of the distribution of Y in its right tail. We refer to [1,2] for a general account on extreme value statistics.

From the perspective of risk analysis, the estimation of an extreme quantile of Y, generally referred to as a Value at Risk (VaR), has been extensively studied. When a covariate X, representing valuable information on Y, is recorded alongside Y, the associated VaR may depend on X and is interpreted as a conditional extreme quantile. In this framework, and without any further information on the structure in the pair (X,Y), the estimation of the conditional extreme quantile is generally based on a combination of nonparametric smoothing techniques with extreme value statistics (see [3]). In parallel, recent efforts have focused on defining and studying alternative extreme risk measures based either on expectiles, Lp quantiles, or extensions of the Expected Shortfall; see for instance [4,5].

The goal of this project is to contribute to the estimation of measures of extreme risk in the situation of a covariate X is available, bridging the gap between the two previous lines of work. The project will in particular consider the case where X is high-dimensional, motivated by several real data examples from the financial and economic world.

References:

General Information

- Theme/Domain: Optimization, machine learning and statistical methods
  Scientific computing (BAP E)
- Town/city: Montbonnot
- Inria Center: CRI Grenoble - Rhône-Alpes
- Starting date: 2018-11-01
- Duration of contract: 1 year, 4 months
- Deadline to apply: 2018-04-04

Contacts

- Inria Team: MISTIS
- Recruiter: Girard Stephane / stephane.girard@inria.fr

Conditions for application

Starting date: 1st November 2018, duration: 16 months.

Applicants should hold a PhD (defended between 1st September 2016 and 31st October 2018) in Systems and Control or Applied Mathematics.

Applications have to be made on-line on the Inria web site before end of March.

Contact:

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gham.ac.uk

Defence Security:

This position is likely to be situated in a restricted area (ZRR), as defined in Decree No. 2011-1425 relating to the protection of national scientific and technical potential (PPST). Authorisation to enter an area is granted by the director of the unit, following a favourable Ministerial decision, as defined in the decree of 3 July 2012 relating to the PPST. An unfavourable Ministerial decision in respect of a position situated in a ZRR would result in the cancellation of the appointment.

Recruitment Policy:

As part of its diversity policy, all Inria positions are accessible to people with disabilities.

Warning: you must enter your e-mail address in order to save your application to Inria. Applications must
Main activities

Skills

Conditions for applicants:

We look for candidates strongly motivated by challenging statistical research with application to real world data. The applicant should have a solid background in mathematics, and more specifically in probability and statistics. He/she will also ideally have experience in either extreme value analysis or nonparametric statistics (or both of these fields). The applicant will have significant experience in programming with either C/C++, Matlab, Python or R.

Benefits package

- Subsidised catering service
- Partially-reimbursed public transport
- Social security
- Paid leave
- Flexible working hours
- Sports facilities

Remuneration

Gross salary: 2650 Euros per month