

INTERFACE PROGRAMME

TRANSFERRING KNOWLEDGE ACQUIRED IN ACADEMIC DEPARTMENTS TO THE SOCIO-ECONOMIC WORLD IN ORDER TO PROMOTE SCIENTIFIC INNOVATION IN INDUSTRY

CIRM
LUMINY
2019

CIRM - LUMINY
www.cirm-math.fr

KNOWLEDGE EXCHANGE



STOCHASTIC OPTIMIZATION FOR LARGE-SCALE SYSTEMS

From Monday 4 November 2019 to Friday 8 November 2019

Sensors and data abound. This spatial and temporal information is supposed to allow a better management in new energy systems, transport or eco-industrial parks, to quote a few examples. This leads to problems of large-scale optimization, the formulation of which is delicate. Indeed, one needs to take into account at least three dimensions: temporal (stages of decision, dynamics, inertia), spatial (different decision units connected by flows), stochastic (various possible scenarios) and thus risk. This leads to multi-stage stochastic optimization problems which enter the class of large-scale systems.

The 4-Day session entitled 'Interface 2019 Stochastic Optimization for Large-Scale Systems' will present tools and methods to formulate and solve such problems. To this end, various types of activities will take place including courses, computing sessions and interactive sessions.

The session addresses a mixed public, both from academia and from industry. These four days in immersion at CIRM will make discussions and exchanges possible, during and outside training sessions. Institutional organizers are ENSTA ParisTech and École des Ponts ParisTech.

Organizing Team / Speakers :

Pierre Carpentier
(ENSTA ParisTech)
Jean-Philippe Chancelier
(ENPC ParisTech)
Michel De Lara
(ENPC ParisTech)
Vincent Leclère
(ENPC ParisTech)

Scientific committee :

R. Tyrrell Rockafellar
(University of Washington, Seattle)
Alexander Shapiro
(Georgia Tech)
Roger Wets
(UC Davis)



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MATHEMATICS BEHIND BLOCKCHAIN

From Monday 30 September 2019 to Wednesday 2 October 2019

The « blockchain » technology appeared with the « Bitcoin » crypto-currency in 2008, whose principles are described in the founding article of Satoshi Nakamoto (Nakamoto). This breakthrough innovation was seen as an opportunity to revisit the relationship of trust in digital services, first in the financial sector and then in different business verticals of the industry. Today, the initial model has generated a diversity of « blockchain » technologies as well as a wide variety of use cases that are no longer confined to cryptocurrencies. This diversity opens up new subjects of investigation at the crossroads of mathematics, computer science and society's digital transformation.

During the 3-Day of this session of the Interface programme, academics and industry will meet to share a common understanding of these « blockchain » technologies, starting from basic concepts to go to advanced cryptographic primitives that allow to manage the confidentiality of data in particular in a distributed environment. The main objective is to discuss mathematical issues and techniques specific to trust management in a distributed environment, based in particular on industrial use cases (identity, energy, internet of things, etc.).

Organizing Team :

Daniel Augot
(INRIA Saclay
LIX, École polytechnique)
Louis Goubin
(Université de Versailles
Saint-Quentin-en-Yvelines)
Aline Gouget
(Gemalto)
Jacques Patarin
(Université de Versailles
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MACHINE LEARNING

9 >12 December

SESSION 1

Day 1 and Day 2: Introduction to Machine Learning

This training course will be carried out by teachers/researchers with over 15 years experience in machine learning, from the theoretical and practical sides. Instructors have experience of beginners' levels, in-service and professional training.

SESSION 2

Day 3 and Day 4: Advanced course

Machine learning is at the heart of the advances currently being made in Artificial Intelligence for digital data processing. In particular, deep neural networks (deep learning) are amazing in their ability to accurately solve classification and prediction tasks. There are other approaches in machine learning, sometimes more effective depending on the real issues to be addressed. This course provides an overview of the methods available "on the shelf", with underlying mathematical considerations.

The objective of this training course is to present the fundamentals of machine learning, from the algorithmic, theoretical and practical points of view. It is divided into two phases, each lasting two days: the first phase of is an introduction to the core concepts, while the second phase consists in an advanced course.

These two parts will present the major algorithms of machine learning based on the underlying mathematical concepts, with supervised classification as the central issue (regression will also be discussed). This pedagogical approach makes it possible not only to explore machine learning from the perspective of the experimental hypotheses that explain the proper functioning of the algorithms presented, but also to promote an understanding of these algorithms of others not presented.

The practical workshops focus on the practical application of the algorithms studied on artificial and real data: implementation of these algorithms, practice of the comparison protocols of these algorithms on the basis of several performance measurements, discovery of the impact of their hyper-parameters with perspective in relation to theoretical hypotheses.



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MATHEMATICS BEHIND BLOCKCHAIN
30 SEPTEMBER > 2 OCTOBER

STOCHASTIC OPTIMIZATION FOR LARGE-SCALE SYSTEMS
4 NOVEMBER > 8 NOVEMBER

INTRODUCTION TO MACHINE LEARNING
9 & 10 DECEMBER

MACHINE LEARNING ADVANCED COURSE
11 & 12 DECEMBER

TRANSFERRING KNOWLEDGE ACQUIRED IN ACADEMIC DEPARTMENTS TO THE SOCIO-ECONOMIC WORLD IN ORDER TO PROMOTE SCIENTIFIC INNOVATION IN INDUSTRY.

INTERFACE is an original programme of acquisition & discussion of tools and concepts in mathematical, computer and digital sciences, that are pertinent to potential users in industry: modelling, simulation, optimization. Sessions last 2 to 4 days, in full on-site immersion at CIRM-Luminy (Marseille, France).

INFO/BOOKING:
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Connect with CIRM:

