

Algorithms and Applied Optimization for Environmental Data Science

- AODS 2018 -



Learning and Intelligent Optimization Conference LION 12, Kalamata, Greece, June 10-15, 2018

MAIN ORGANIZERS (in alphabetical order)

Francesco Archetti

Francesco Archetti is a Professor with Università degli Studi di Milano Bicocca, Italy, where he teaches courses in Computer Science (with courses in Financial Systems Analysis and Decision Support Systems) and in Biotechnology (with the Bioinformatics course). His research activities include participation in projects in partnership with companies at various levels: regional, national and European. Currently he is a delegate of the rector for research, innovation and technology transfer and chairman of the patent and spin-off commission. He is involved on these issues at national level as a member of the MIUR commission, art.11, for the financing of university spin-offs and as a board member, representing CNR, of Quantica s.g.r. He participated in the foundation of the start-up of the University of Milan Bicocca Bionsil, active in the lifesciences sector, in particular for molecular diagnostics of drug resistance in economics, of which he is a board member (non-executive).

Ciprian Dobre

Ciprian Dobre is Professor with the University Politehnica of Bucharest, Computer Science Department. He received his PhD in Computer Science at the University Politehnica of Bucharest in 2008. His research interests are wired and wireless networks, mobile pervasive services, context-awareness, and people-centric sensing. He participated in over 20 national and international research grants. Projects such as MonALISA and FDT led to world-wide record transfers over high speed networks during the Super Computing conferences between 2006 and 2009. He was awarded a PhD scholarship from California Institute of Technology (Caltech, USA), and another one from Oracle. His results received two Innovations in Networking Awards for Experimental Applications (2006 and 2008) by the Corporation for Education Network Initiatives (CENIC), three Best Paper Awards, an IBM Faculty Award, and were published in over 100 papers in well-established international journals and conferences. He was part of organizing committee for many well-established scientific events in his areas of expertise.

WORKSHOP DESCRIPTION

Technical issues addressed

The impact of information technology and the data deluge today led to the appearing of a fourth paradigm of science, namely Data Science. Nowhere this direction led to more impact than in case of Environmental studies. In face of modern challenges faced by our planet, to better understand root causes and research means to help our sustainable future, Environmental scientists in particular rely today more and more on factual data. As such, more environmental data are available now than ever before. Sensors are used to understand phenomena as complex as the Global Warming, to help wildlife better deal with human-induced conditions, to improve crops and farming, and even to deal with causes of pollution in case of cities of

tomorrow (in the face of an increasingly more dense population moving to cities worldwide, information technology can automate many of the municipality policies, leading to what today are known as Smart Cities).

Except for data collected by sensors, environmental data come in many shapes and sizes, like public disclosures, compliance reporting, results from past investigations, internal organizational data and many others. While careful thought usually goes into collection of such data, the workshop is a venue for experts and specialists interested in finding out answers on how to properly analyze the data once it has been generated. Such data can, in fact, generate true information, but for this we need to research innovative approaches, classical statistics, and modern analytical tools. The AODS workshop invites prospective authors to disseminate original contributions on algorithms, machine learning and intelligent optimization, thus the tools to answer questions such as:

- What are the intended uses of the data set?
- What else can you learn from the data?
- How do you optimally manage the data?
- How do you understand and use the data most effectively?
- Who needs to use these data? Who else could use it and how?
- How defensible and legally admissible are the data?

AODS will thus focus on the following research issues around the tools and ideas in the Environmental Data Scientist's toolbox, including but not limited to:

- Mechanisms for data clearing and make data tidy (to speed downstream data analysis tasks), by optimizing the process of data gathering.
- Exploratory data analysis, to support the development of complex statistical models, or to eliminate or sharpen potential hypotheses about the world that can be addressed by the data.
- Concepts and tools behind reporting modern data analyses in a reproducible manner.
- Statistical inference tools, mechanisms and methods, including statistical modelling, data oriented strategies and use of designs and randomization in analyses, and others.
- Linear models, including model selection and uses of models.
- Prediction and machine learning, including building and applying prediction functions with an emphasis on practical applications.
- Data products to automate complex analysis tasks or use technology to expand the utility of a data informed model, algorithm or inference.
- Practical approaches to deal with data protection and data access models.

TECHNICAL PROGRAM COMMITTEE

Constandinos Mavromoustakis, University of Nicosia, Cyprus

Adrian Paschke, FOKUS Fraunhofer, Germany

Antonio Candelieri, University of Milano Bicocca, Italy

Ioana Popescu, IHE Delft Institute for Water Education, the Netherlands

Florin Pop, University Politehnica of Bucharest, Romania

George Mastorakis, Technological Educational Institute of Crete, Greece

Kuan-Ching Li, Providence University, Taiwan

Ioan Salomie, Technical University of Cluj-Napoca, Romania

Sergio L. Toral Mar?n, University of Seville, Spain

Jordi Mongay Batalla, Warsaw, University of Technology, Poland

Mariana Mocanu, University Politehnica of Bucharest, Romania

Simon Caton, National College of Ireland, Ireland

Xiaomin Zhu, National University of Defense Technology, Changsha, China

Marc Frincu, West University of Timisoara, Romania

Alexandru Costan, IRISA / INSA Rennes, France

LIKELY CONTRIBUTORS AND TARGETED AUDIENCE

It's nature and the anticipated papers to be submitted are interdisciplinary, and the cross-layer nature make Environmental Data Science and related topics an ideal theme for bringing together people working on different topics that are all addressed by the main conference, including hard optimization problems, algorithm configuration, parameter tuning processes, steep learning curve and many others. The AODS workshop aims to maintain an outstanding reputation and it targets to be very successful in motivating many authors to submit their top quality work to the workshop. AODS aims to develop a wider community of prospective authors, TPC members and reviewers all over the world.

Three types of contributors and targeted audience can be identified.

First, due to *AODS*'s obvious link with environmental sciences, we expect to have several contributions from people in both information science with algorithms and technique for dealing with learning, optimization and the general extraction of knowledge from raw data, and also from scientists dealing with environmental monitoring and support in many disciplinary fields (e.g., oceanography, biology, wild-life preservation, and others). This target audience is thus a subset of the LION community. The second potential group of contributors are researchers in the field of applications of data statistics, machine learning and intelligent optimization, who are particularly working on solutions related to the AODS context (e.g., Smart Cities, Sustainable Energy, Smart Agriculture, and others). The third and final group of contributors are researchers from the European H2020 Data4Water project (<http://data4water.eu/>), who is main organizer of the workshop. Bringing together this different communities offers an investigation of this interdisciplinary topic from different perspectives and thus may provide new insights for the different participants. Additionally it may foster community building between the LION community and the H2020 Data4Water participants.

WORKSHOP FORMAT

AODS 2018 targets to accept 8-9 full papers, which will be grouped in sessions of 2-3 papers. Each paper will have a presentation slot of 20 minutes, plus 10 minutes for questions. One top researcher in the field will be contacted to serve as keynote speaker. We also aim at presenting awards to the best paper and to the best student paper at the workshop. Accepted papers will be published in the conference proceedings. There is a length limitation of 6 pages (including title, abstract, all figures, tables, and references) for regular conference workshop papers (IEEE double column format). We will also consider organizing a short paper or a poster session to stimulate discussions.

PUBLICITY STRATEGY

Our goal is to have at least 20 submissions of which, at maximum, 8-9 full papers will be accepted. Hence, this results in an acceptance ratio of 40 – 45 %. We believe this is possible due to a number of reasons:

- Environmental Data Science is a very important topic today worldwide. We strongly believe that we can attract submissions from inter-disciplinary practitioners working on optimization problems and analytics to extract interesting information on the various facets of Environmental monitoring and support, for a sustainable future.
- The main organizers are all involved in the H2020 Data4Water project, and in other projects related to the AODS topic. Partners of these projects will be interested in contributing to this workshop.

We will adopt the following publicity strategy:

- The advertising will start right after the notification of acceptance.
- Logo + website for the workshop within a few days. A logo and look and feel of the workshop is being designed and, if accepted, a website for the workshop will be on-line in a few days.
- Selection of a TPC that features researchers from in and outside the LION community. Additionally, we are targeting a large TPC to attract more paper submissions.
- We will discuss with possible collaborators from projects to ensure a good number of submissions.
- In terms of advertising we aim at online and offline measures:
 - Website
 - Typical general mailing lists (e.g, mycolleagues) and other communication channels (for that we want to find suitable publication chairs); project internal communication channels, e.g., Knowledge Lake in case of Data4Water.
 - The CFP will be published on the Wiki CFP website.

 - Hardcopy CFPs will be printed and handed out on research project meetings and conferences.