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Machine Learning, Optimization, and Data Science

5th International Conference, LOD 2019
Siena, Italy, September 10–13, 2019
Proceedings

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Preface

LOD is the international conference embracing the fields of machine learning, optimization, and data science. The fifth edition, LOD 2019, was organized during September 10–13, 2019, in Certosa di Pontignano (Siena) Italy, a stunning medieval town dominating the picturesque countryside of Tuscany.

The International Conference on Machine Learning, Optimization, and Data Science (LOD) has established itself as a premier interdisciplinary conference in machine learning, computational optimization, and big data. It provides an international forum for the presentation of original multidisciplinary research results, as well as the exchange and dissemination of innovative and practical development experiences.

The LOD Conference Manifesto is the following:

The problem of understanding intelligence is said to be the greatest problem in science today and “the” problem for this century – as deciphering the genetic code was for the second half of the last one. Arguably, the problem of learning represents a gateway to understanding intelligence in brains and machines, to discovering how the human brain works, and to making intelligent machines that learn from experience and improve their competences as children do. In engineering, learning techniques would make it possible to develop software that can be quickly customized to deal with the increasing amount of information and the flood of data around us.

The Mathematics of Learning: Dealing with Data

Tomaso Poggio and Steve Smale

LOD 2019 attracted leading experts from industry and the academic world with the aim of strengthening the connection between these institutions. The 2019 edition of LOD represented a great opportunity for professors, scientists, industry experts, and post-graduate students to learn about recent developments in their own research areas and to learn about research in contiguous research areas, with the aim of creating an environment to share ideas and trigger new collaborations.

As chairs, it was an honor to organize a premiere conference in these areas and to have received a large variety of innovative and original scientific contributions.

During LOD 2019, nine plenary talks were presented:

“Deep Learning on Graphs and Manifolds: Going Beyond Euclidean Data”

Michael Bronstein, Imperial College London, UK

“Backpropagation and Lagrangian Multipliers - New Frontiers of Learning”

Marco Gori, University of Siena, Italy

“A Kernel Critic for Generative Adversarial Networks”

Arthur Gretton, UCL, UK

“Rethinking Planning in Reinforcement Learning”

Arthur Guez, Google DeepMind, UK

“Interactive Multiobjective Optimization in Decision Analytics with a Case Study”
Kaisa Miettinen, University of Jyväskylä, Finland

“Sustainable Interdependent Networks”
Panos Pardalos, Center for Applied Optimization, University of Florida, USA

“Biased Random-Key Genetic Algorithms - Learning Intelligent Solutions from Random Building Blocks”
Mauricio G. C. Resende, Amazon.com Research and University of Washington
Seattle, USA

“Building Iride: How to Mix Deep Learning and Ontologies Techniques to Understand Language”
Raniero Romagnoli and Vincenzo Sciacca, Almalwave, Italy

“Extending the Frontiers of Deep Learning Using Probabilistic Modelling”
Richard E. Turner, University of Cambridge, UK

LOD 2019 received 158 submissions from 54 countries in 5 continents, and each manuscript was independently reviewed by a committee formed by at least 5 members. These proceedings contain 64 research articles written by leading scientists in the fields of machine learning, artificial intelligence, reinforcement learning, computational optimization, and data science presenting a substantial array of ideas, technologies, algorithms, methods, and applications.

At LOD 2019, Springer LNCS generously sponsored the LOD Best Paper Award. This year, the paper by Sean Tao titled “Deep Neural Network Ensembles” received the LOD 2019 Best Paper Award.

This conference could not have been organized without the contributions of exceptional researchers and visionary industry experts, so we thank them all for participating. A sincere thank you goes also to the Program Committee, formed by more than 450 scientists from academia and industry, for their valuable and essential work of selecting the scientific contributions.

Finally, we would like to express our appreciation to the keynote speakers who accepted our invitation, and to all the authors who submitted their research papers to LOD 2019.

September 2019

Giuseppe Nicosia
Panos Pardalos
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