CALL FOR PAPERS

ESANN 2017: European Symposium on Artificial Neural Networks, Computational Intelligence and Machine Learning
Bruges, Belgium, 26-27-28 April 2017
http://www.esann.org/

Special session on Deep and Kernel methods: best of two worlds

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Multilayer neural networks have experienced a rebirth in the data analysis field, displaying impressive results, extending even to classical artificial intelligence domains, such as game playing, computer vision, natural language and speech processing. The versatility of such methods have lead deep (semi)-parametric models to get over well-established learning methods, like kernel machines or classical statistical techniques. However, their training is a delicate and costly optimization problem that raises many practical challenges. On the other hand, kernel methods usually involve solving a tractable convex problem and are able to handle non-vectorial data directly, leading to a higher expressive power. Their main drawback is arguably their complexity being dependent on the number of data points, both at training and model evaluation times. A natural and emerging field of research is given by their hybridization, which can done in many fruitful ways. Many ideas from the deep learning field can be transferred to the kernel framework and viceversa.

This special session aims at all aspects of deep architectures, be theoretical or methodological developments, comparative analyses, or applications. A special emphasis is given to new ideas to bridge the gap between the fields of deep and kernel learning, as well as the understanding of their respective weak and strong points.

The **topics** of the session include, but are not limited to:

- Applications of deep architectures in data representation and analysis, including structured or non-vectorial inputs or outputs
- Natural language and speech processing; structured relationships among data; scalability/efficiency of deep neural networks and large-scale kernel machines
- Heterogeneous data and meta-data; applications in neuroscience, computer vision, (bio)acoustic signals and mechanisms
- Stability analysis, visualization of learning, generalization bounds. Randomized (approximate) feature maps to scale-up kernel methods
- Novel deep(er) architectures/algorithms for data representation and learning (using kernels or not)
- Recursive or iterative kernels and their relation to deep neural network architectures
- Emulation of multilayer machines by shallow architectures and vice versa. Comparisons of deep architectures to shallow architectures
- Derivation of efficient layer-by-layer algorithms for training such networks; reductions in the computational complexity

SUBMISSION INFORMATION Submitted papers will be reviewed according to the ESANN reviewing process and evaluated on their scientific value: originality, technical correctness, and clarity. Tutorial-like contributions are also welcome provided they add a new perspective on the field.

IMPORTANT DATES

- Paper submission deadline : **19 November 2016**
- Notification of acceptance : **31 January 2017**

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