Special Issue

Deep Learning with Differential Equations

Message from the Guest Editor

As artificial intelligence makes progress, deep neural nets are being applied to increasingly complex problem setups. In response to the emerging difficulties of these new setups, deep learning research explores new modeling tools to enhance the predictive power of neural nets. Differential equations are among the new tools that are being incorporated into deep neural net models in various ways. While some approaches use differential equations to build continuous depth into feed-forward neural networks, some others use them to induce a desired regularity or a conservation law into the dynamical system under investigation.

This Special Issue publishes original algorithmic, methodological, and theoretical contributions to artificial intelligence research regarding the incorporation of differential equations into the design of deterministic deep neural networks or the inference of probabilistic deep neural networks. **Keywords:**

- Neural Ordinary Differential Equations
- Neural Stochastic Differential Equations
- Neural Processes
- Normalizing Flows
- Physics-Informed Neural Networks

Guest Editor

Dr. Melih Kandemir

Department of Mathematics and Computer Science, University of Southern Denmark, 5230 Odense, Denmark

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Applied Sciences
Editorial Office
MDPI, Grosspeteranlage 5
4052 Basel, Switzerland
Tel: +41 61 683 77 34
applsci@mdpi.com

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Message from the Editor-in-Chief

As the world of science becomes ever more specialized, researchers may lose themselves in the deep forest of the ever increasing number of subfields being created. This open access journal Applied Sciences has been started to link these subfields, so researchers can cut through the forest and see the surrounding, or quite distant fields and subfields to help develop his/her own research even further with the aid of this multi-dimensional network.

Editor-in-Chief

Prof. Dr. Giulio Nicola Cerullo
Dipartimento di Fisica, Politecnico di Milano, Piazza L. da Vinci 32, 20133 Milano, Italy

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