Winter School on Deep Learning (WSDL)

From Perceptrons to Diffusion Models

January 06 - March 04, 2023 (Fridays and Saturdays)

Organized by

Electronics and Communication Sciences Unit (ECSU)

Indian Statistical Institute, Kolkata

https://sites.google.com/view/wsdl2023

Call for Participation

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eminent institutions and R&D labs.

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Web Chair
Dilip Kumar Gayen

Contacts
E-mail:
ecsu.wsdl2023@gmail.com

Mobile:
(+91) 9674853651 (Priyobrata)
(+91) 7003615040 (Anal)

The Objective: The Electronics and Communication Sciences Unit, Indian Statistical Institute, Kolkata is organizing the Winter School on Deep Learning: From Perceptrons to Diffusion Models. This winter school will focus heavily on developing solutions for **from basic to advanced real-world challenging problems with main focus on hands-on sessions**, in addition to making the associated theory easy to understand. Participants will learn from the basics of machine learning to the advanced deep learning-based approaches with application to Computer Vision and Natural Language Processing. Theoretical lectures will be delivered by renowned professors and scientists (from ISI and other esteemed organizations) who have made significant contributions in their areas of research. The lectures will be supplemented by **extremely detailed hands-on sessions** instructed by post-docs and research scholars.

Course coverage: The winter school will have the following course structure (theory and associated hands-on)

- ❖ Basics of Python
- ❖ Basics of the Deep Learning Library: PyTorch
- ❖ Essentials of Matrix Calculus and Linear Algebra for Machine Learning
- ❖ Bird's Eye View of Machine Learning
- ❖ Primer on Text, Video and Image Data Processing
- ❖ Gradients-based Optimization Techniques
- ❖ Rudiments of Artificial Neural Networks and Backpropagation of Error
- ❖ Step towards Deep Learning: Activation functions, Normalization techniques, Regularization methods and Loss functions
- ❖ Convolutional Neural Networks (CNNs)
- ❖ Recurrent Neural Networks and Backpropagation through time (BPTT)
- ❖ Attention Models and Transformer (BERT and Visual Transformer)
- ❖ Deep Generative Models (GAN and VAE)
- ❖ Weakly Supervised Deep Learning, Self-Supervised Learning
- ❖ Emerging Learning Strategies: Semi-supervised, Few-shot and Zero-shot
- ❖ Deep Reinforcement Learning
- ❖ Explainable Artificial Intelligence
- ❖ Geometric Deep Learning
- ❖ Diffusion-based Models
- ❖ Classic Real-world Application (Medical Image Analysis, Image Segmentation, Test Classification, Class Imbalanced Learning, Sports Analytics)

Mode of tutorials: Lectures and Hands-on sessions will be conducted in online mode only. All sessions will be on Fridays and Saturdays, and the recordings will be shared with all the participants.

Who can apply? Professionals from academia and industry, research/project scholars, masters and final-year bachelors students. Interested candidates must submit the online application (https://sites.google.com/view/wsdl2023/apply). Selected applicants will be informed to register for the school.

Important Dates:

Submit Application on Website	**Nov 15, 2022 – Dec 25, 2022**
Registration Opens	**Dec 01, 2022 – Dec 31, 2022**
Course Duration	**Jan 06, 2023 – Mar 04, 2023**

For application, registration fees and other details:
https://sites.google.com/view/wsdl2023