



Deep Learning for Signals in MATLAB



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Deep Learning for Signals in MATLAB

This one-day course provides a comprehensive introduction to practical deep learning for signals. Attendees will learn how to create, train, and evaluate different kinds of deep neural networks for signal processing using MATLAB.

Prerequisites

MATLAB Fundamentals, and some knowledge of signal processing and machine learning concepts. No prior knowledge of deep learning is needed for this course.

DURATION	LEVEL
1 Day	Medium
	

TOPICS

Day 1

- Signal Importing, Labeling and Management
- Time-Frequency Transforms & Convolutional Neural Networks
- Custom Networks and Feature Extraction

Signal Importing, Labeling and Management

OBJECTIVE: Import and organize signal data in MATLAB and preprocess it for analysis, including: handling missing values; labeling; and extracting regions of interest.

- Store data using MATLAB data types (e.g. timetable)
- Import data with signal datastore
- Use the Signal Labeler App
- Label region-of-interest based on time and time-frequency representations
- Automate signal labeling with custom functions

Time-Frequency Transforms & Convolutional Neural Networks

OBJECTIVE: Use convolution neural networks and transfer learning to classify observations based on their time-frequency content.

- Visualize Deep Learning Networks
- Create time-frequency images using the spectrogram
- Create training and validation sets
- Signal augmentation
- Transfer Learning

Custom Networks and Feature Extraction

OBJECTIVE: Use Long Short-Term Memory networks and autoencoders to perform classification and anomaly detection.

- Use Wavelet Scattering to automatically generate features
- Classify Signals using LSTMs
- Anomaly Detection using autoencoders
- Use GPU to speed up signal processing functions
- Experiment Manager App



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