MathWorks
Accelerating the pace of engineering and science

What's New in MATLAB R2021b for Deep Learning?

Deep Learning

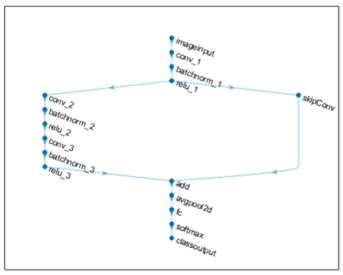
Network Architecture

Networks

[Residual Networks](#)
Easily create 2-D and 3-D residual networks

Layers

[Function Layer](#)
Create layers that apply a function to the input
[Custom Layers](#)
Define stateful custom layers
[Graph Layers](#)
Create layer graphs without specifying layer names
Create a layer graph from a series network using the `layerGraph` function



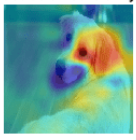
Visualization

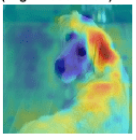
[Network Analyzer](#)
Provide example network inputs when you use the `analyzeNetwork` function to analyze networks for custom training workflow

Examples

Explore new and updated workflows

- [Build & Train Networks with Deep Network Designer](#)
- [Use Bayesian Optimization in Custom Training Experiments](#)
- [Deep Learning Visualization Methods for Interpretability](#)





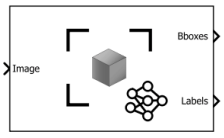
Simulink

Apps

[Deep Network Designer](#)
Export trained network in Deep Network Designer to Simulink

Code Generation

[Deep Learning Object Detector](#)
Simulate and generate code for deep learning object detectors in Simulink



Deep Learning Object Detector

Training

Computation

[Custom training loop](#)
- Apply neural ODE operations
- Calculate L1 and L2 loss
- Compute gradients of loss functions involving complex numbers

Apps

[Experiment Manager](#)
- Run deep learning experiments in your web browser using MATLAB Online
- Stop experiments faster by discarding the results of running trials
- Use Bayesian optimization in custom training experiments

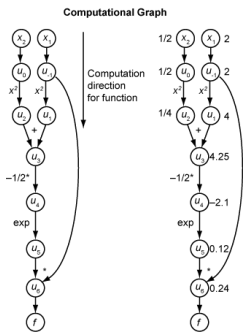
Computation

Parallel computation

[Parallel Inference](#)
Predict, classify and extract features in parallel with `DAGNetwork` & `SeriesNetwork`
[Parallel Training](#)
Improved instructions in the cloud

Custom architecture

[Automatic Differentiation](#)
Use complex numbers
[Custom training loop](#)
- Improved instructions for running custom training loops on GPU and in parallel
- Improved performance for `dlnetwork` training and inference



Acceleration & code generation

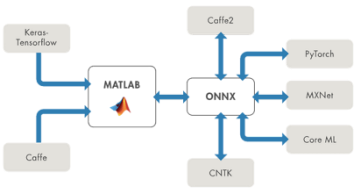
[Mex acceleration with DAG networks](#)
Use MEX acceleration with multi-input and multi-output networks

Interoperability

ONNX and TensorFlow

[ONNX Network](#)
- Automatic generation of custom layers when unsupported layers
- Constant folding optimization
- Import ONNX network as a `dlnetwork` object
- Export networks that include 1-D convolution and pooling layers to ONNX

[TensorFlow Support](#)
- Import networks that include Square operations
- Import networks with TensorFlow-Keras 1-D convolution and pooling layers



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