MathWorks® TECHSQURCE

What's New in MATLAB for Deep Learning?

R2020a

Experiment Manager App :

Manage multiple deep learning experiments, keep track of training parameters, and analyze and compare results and code

Data Preparation and Labeling

Video Labeler: Label ground-truth data in a video or image sequences

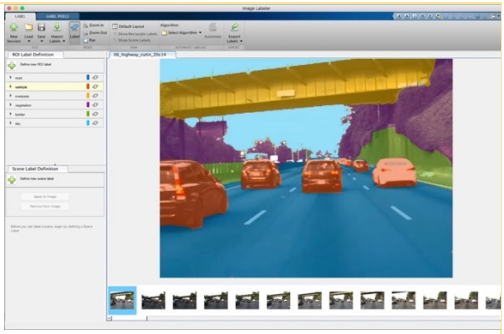
Audio Labeler: Interactively define and visualize ground-truth labels for audio datasets

New Signal Labeler: Visualize and label signals interactively

New Pixel label datastore: Store pixel information for 2D and 3D semantic segmentation data

New Audio datastore: Manage large collections of audio recordings

New Image datastore: Support for 3D data



Network Architectures

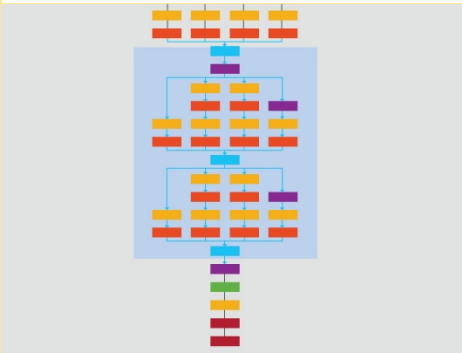
New Build advanced network architectures like GANs, Siamese networks, attention networks, and variational autoencoders

Train a "you-only-look-once" (YOLO) v2 deep learning object detector and generate C and CUDA code

Deep Network Designer: Graphically design and analyze deep networks and generate MATLAB code

Custom layers support: Define new layers with multiple inputs and outputs, and specify loss functions for classification and regression

Combine LSTM and convolutional layers for video classification and gesture recognition



Deep Learning Interoperability

Import and export models with other deep learning frameworks using the ONNX model format and generate CUDA code

New Ability to work with MobileNet-v2, ResNet-101, Inception-v3, SqueezeNet, NASNet-Large, and Xception

Import TensorFlow-Keras models and generate C, C++ and CUDA code

Import DAG networks in Caffe model importer

Gartner

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MathWorks Is a Leader in the Gartner Magic Quadrant **for Data Science and Machine Learning Platforms 2020**

Network Training

Automatically validate network performance, and stop training when the validation metrics stop improving

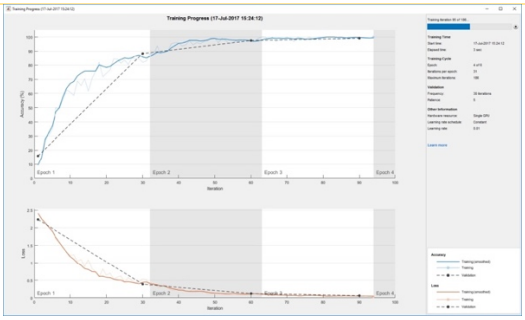
New Train deep learning networks on 3D image data

Perform hyperparameter tuning using Bayesian optimization

Additional optimizers for training: Adam and RMSProp

Train DAG networks in parallel and on multiple GPUs

Train deep learning models on NVIDIA DGX and cloud platforms



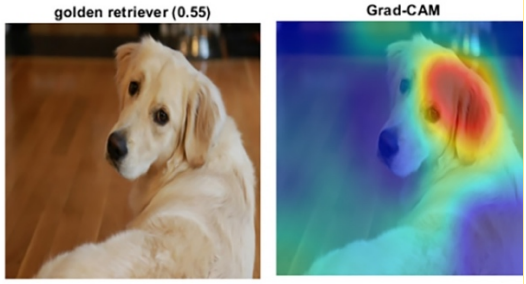
Debugging and Visualization

DAG activations: Visualize intermediate activations for networks like ResNet-50, ResNet-101, GoogLeNet, and Inception-v3

Monitor training progress with plots for accuracy, loss, and validation metrics

Network Analyzer: Visualize, analyze, and find problems in network architectures before training

New Visualize activations of LSTM networks and use Grad-CAM to understand classification decisions



Deployment

New Generate code for networks such as YOLO V2 object detector, DeepLab-v3+, MobileNet-v2, Xception, DenseNet-201, and recurrent networks

New Deploy deep learning networks to ARM Mali GPUs

New Automated deployment to Jetson AGX Xavier and Jetson Nano platforms

Apply CUDA optimized transposes using shared memory for improved performance

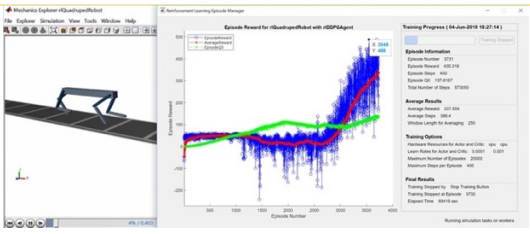
Reinforcement Learning

New Reinforcement Learning Algorithms: Train deep neural network policies using DQN, DDPG, A2C, PPO, and other algorithms

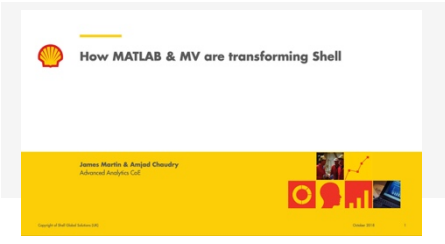
Environment Modeling: Create MATLAB and Simulink models to represent environments and provide observation and reward signals for training policies

Training Acceleration: Parallelize policy training on GPUs and multicore CPUs

New Reference Examples: Implement policies for automated driving, robotics, and control design applications

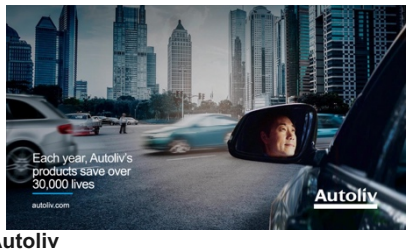


Customer Stories



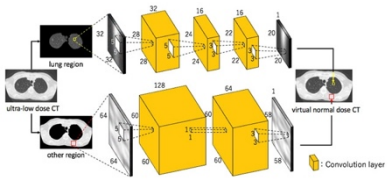
Shell

Uses semantic segmentation for terrain recognition in hyperspectral satellite data.



Autoliv

Labels LIDAR for verification of a radar-based automated driving system.



Ritsumeikan University

Trains convolutional neural networks on CT images to reduce radiation exposure risk.