MATLAB EXPO 2016

MATLAB - die vielseitige Programmier- und Entwicklungsumgebung

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New Key Features in the Areas of…

- Analysis and Visualization
- Testing and Performance
- Sharing and Collaboration

...Make MATLAB Even Easier and More Productive
Live Editor

- Accelerate exploratory programming and analysis
- Create interactive narratives
- Use live scripts to teach
MATLAB Graphics

- New MATLAB graphics system introduced in R2014b
  - Improved look *(anti-aliased fonts and lines)* with new default colormap and line colors
  - Easier to customize
  - Many new features

- Steady stream of new graphics features in subsequent releases
  - R2015b – increased control for customizing plot axes
  - R2016a – new functions for polar plots, multiple y-axis plots, and functions for plotting mathematical expressions and equations
Deep Learning for Object Classification

- Deep learning for face detection, autonomous robotics, ADAS, etc.

- Convolutional neural network (CNN) algorithm added to Neural Network Toolbox

- Uses cuDNN (a GPU-accelerated library from NVIDIA) (requires Parallel Computing Toolbox)
3D Vision

- 3D vision enables autonomous systems to see
  - ADAS, autonomous robotics, self-driving cars

- New advanced algorithms added to Computer Vision System Toolbox
  - Structure from motion
  - Bundle adjustment
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Effectively Test Your Code in MATLAB

- **Testing** **improves quality** and **saves development time**
  - Ensures that your code functions properly
  - Enables you to easily identify problems
  - Allows you to improve or rewrite your code without fear of breaking it

- **The MATLAB unit testing framework**:  
  - Includes a set of readily available qualification methods  
  - Supports automation, and provides easy reuse of test-cases  
  - Includes script-based, function-based, and object-oriented interfaces

```matlab
%% Test Class Definition
classdef MyComponentTest < matlab.unittest.TestCase

%% Test Method Block
methods (Test)

  %% Test Function
  function testASolution(testCase)
    %% Exercise function under test
    act = the value from the function under test

    %% Verify using test qualification
    testCase.<qualification method>(act, exp);  
  end
end
```
Pause Long Running Programs

- New feature allows you to troubleshoot problems without specifying breakpoints in advance
  - Pause execution of a program from the Editor
  - Enter debug mode
  - Resume program execution
MATLAB Execution Engine

- Redesigned **execution engine** runs MATLAB code faster
  - All MATLAB code can be JIT compiled
  - A platform for future improvements
- Average performance improvement of **40%** on 76 performance-sensitive user applications
- Performance testing framework
  - Measure MATLAB code performance
  - Interface leverages the unit testing framework

www.mathworks.com/products/matlab/matlab-execution-engine/
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App Designer
Integrates the Primary Tasks of App Building

- Apps are interactive applications for performing common tasks

- App Designer makes app building more efficient by letting you quickly move between visual design and code development

- App Designer includes:
  - Enhanced design environment
  - Expanded UI component set
  - Code integration
Add-On Explorer

- Add capabilities to MATLAB, including **community-authored** and **MathWorks** toolboxes, apps, functions, models, and hardware support
  
  - Browse and install add-ons directly from MATLAB
  
  - Access **community-authored** content from File Exchange
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