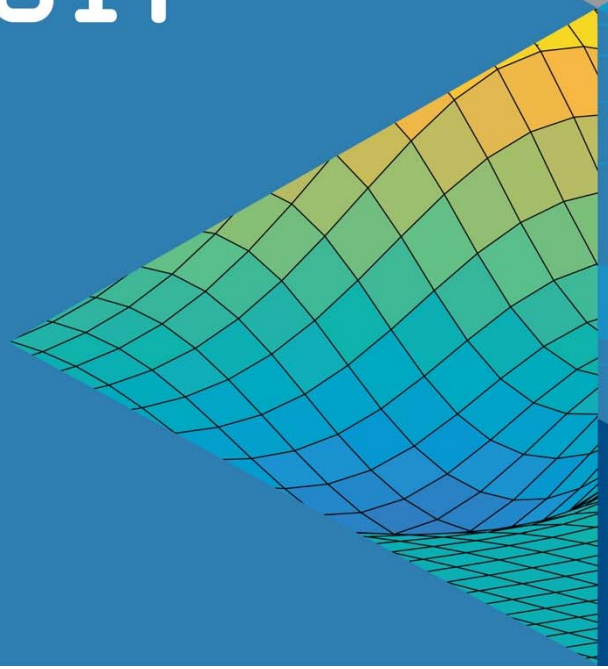
MATLAB EXPO 2017

Computer Vision System Design



Computer Vision

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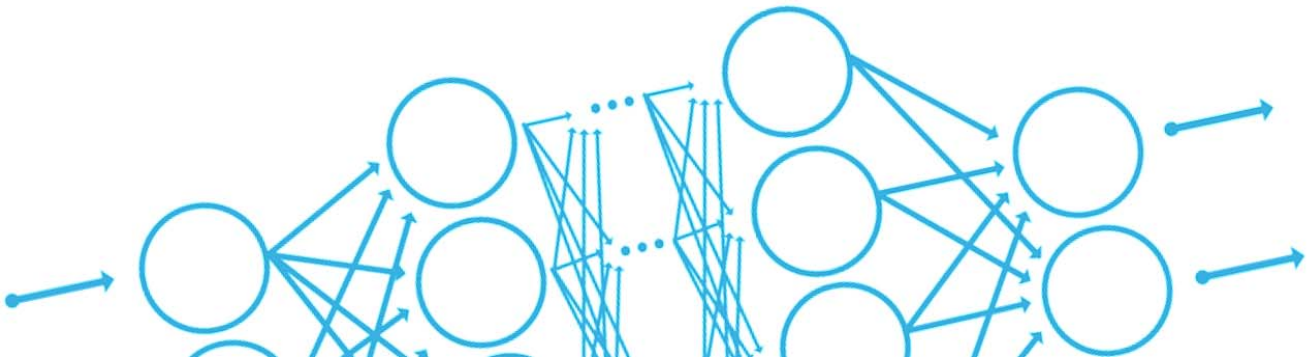
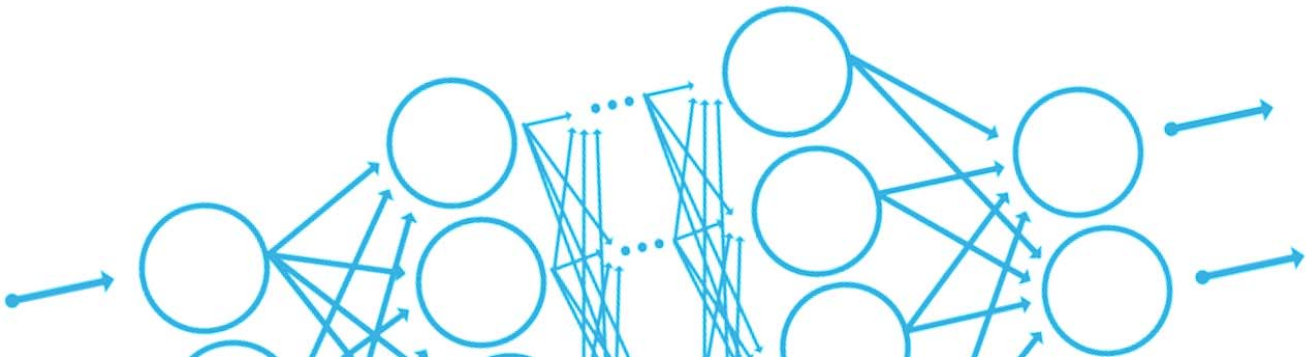


Computer Vision
for
Autonomous Systems



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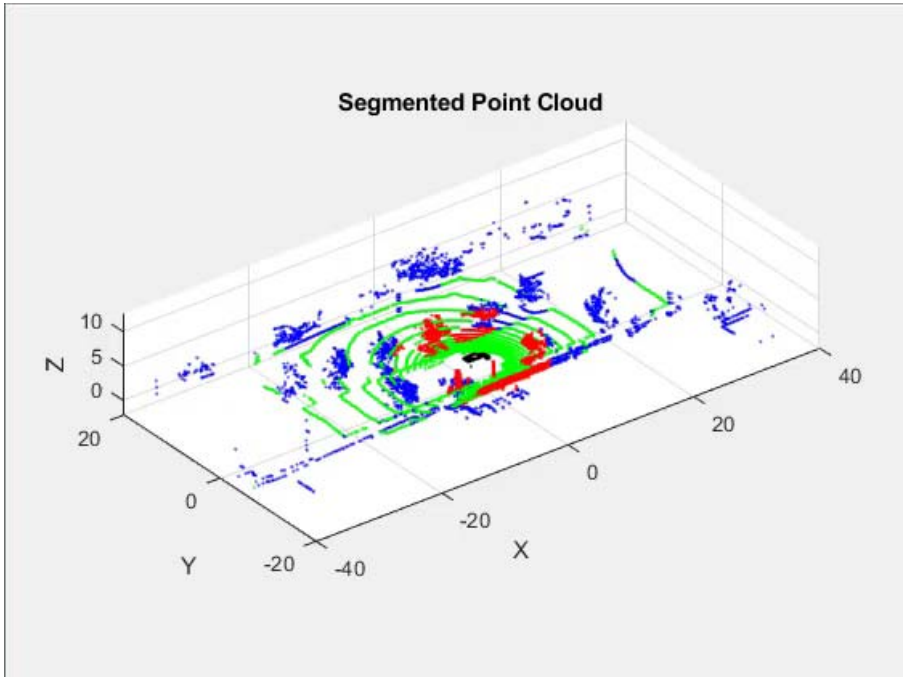
Computer vision for autonomous systems

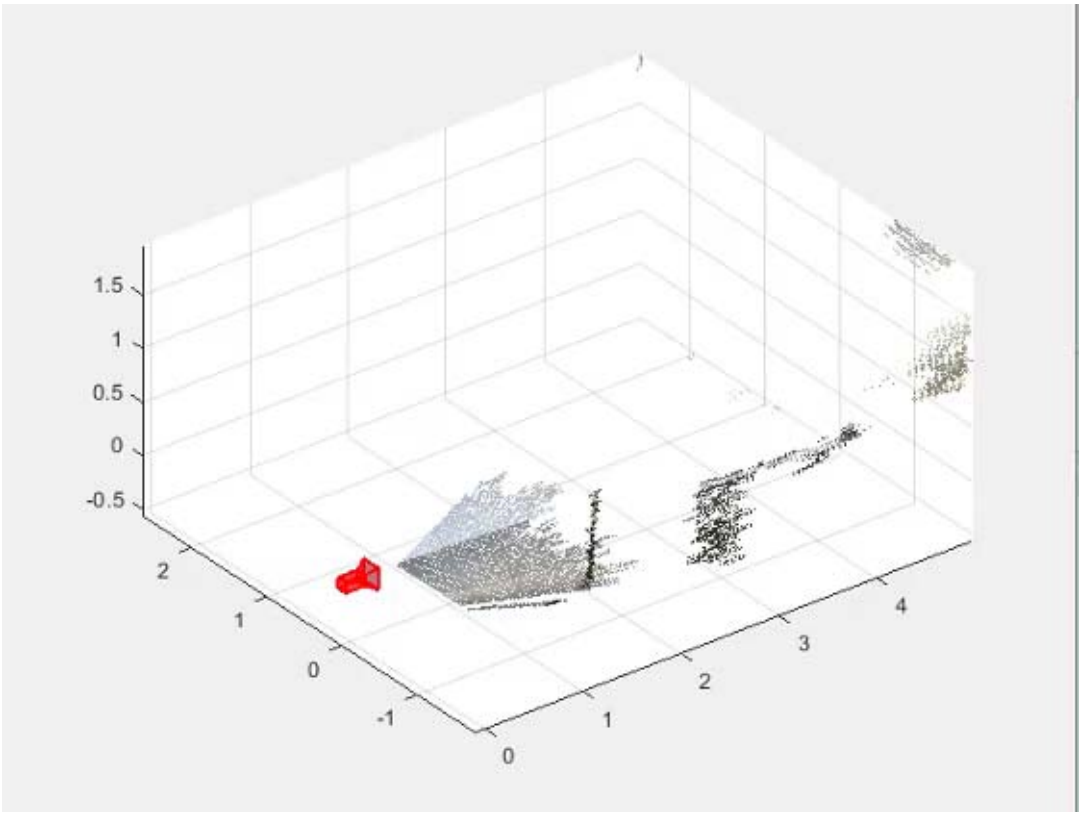
- An increasingly important part of the pipeline
- One of the key sensors in many applications is the camera
- Other sensors also provide vision
  - Depth sensors
  - Infrared
  - LiDAR
  - RADAR



More Sensors

Infrared

Depth

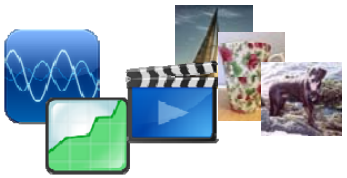


Multi sensor fusion

Computer vision system design

Access and Explore Data

Files

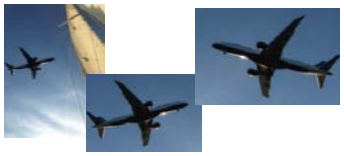


Databases

Sensors

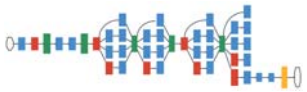
Label and Preprocess Data

Data Augmentation/ Transformation



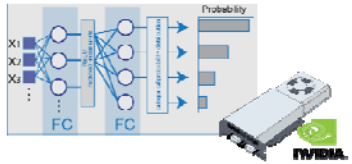
Labeling Automation

Integrate Existing Research

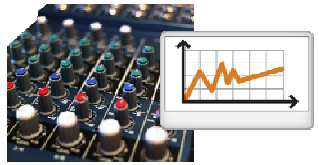


Develop and Test Algorithms

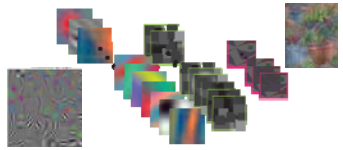
Hardware-Accelerated Training



Parameter Tuning

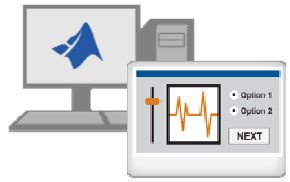


Visualization



Integrate Models with Systems

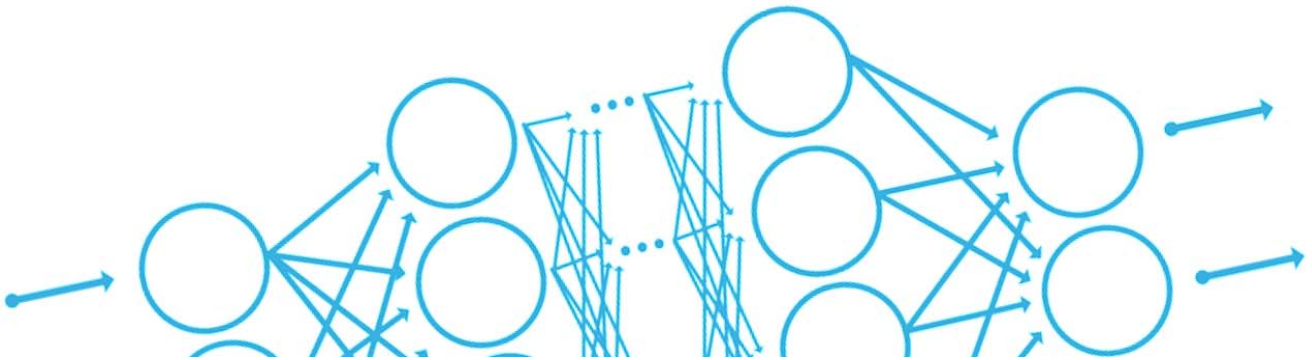
Desktop Apps



Enterprise Scale Systems

Embedded Devices and Hardware

Full System Design Example



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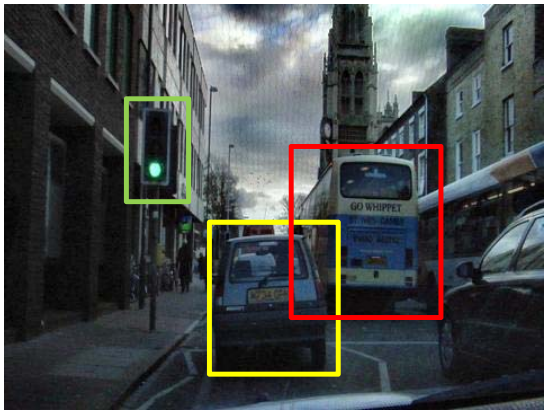
Original Image

ROI detection



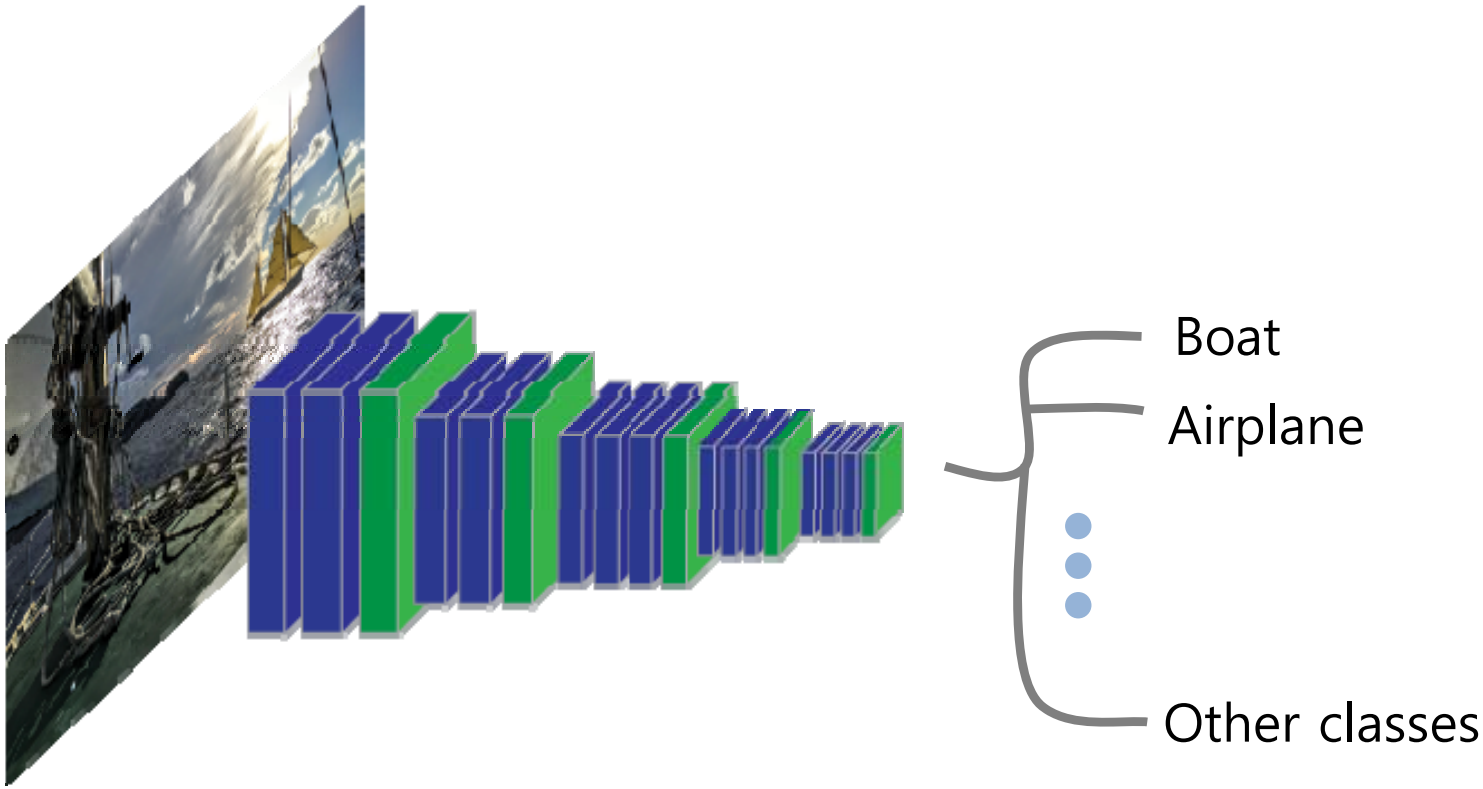
Pixel classification

Semantic Segmentation

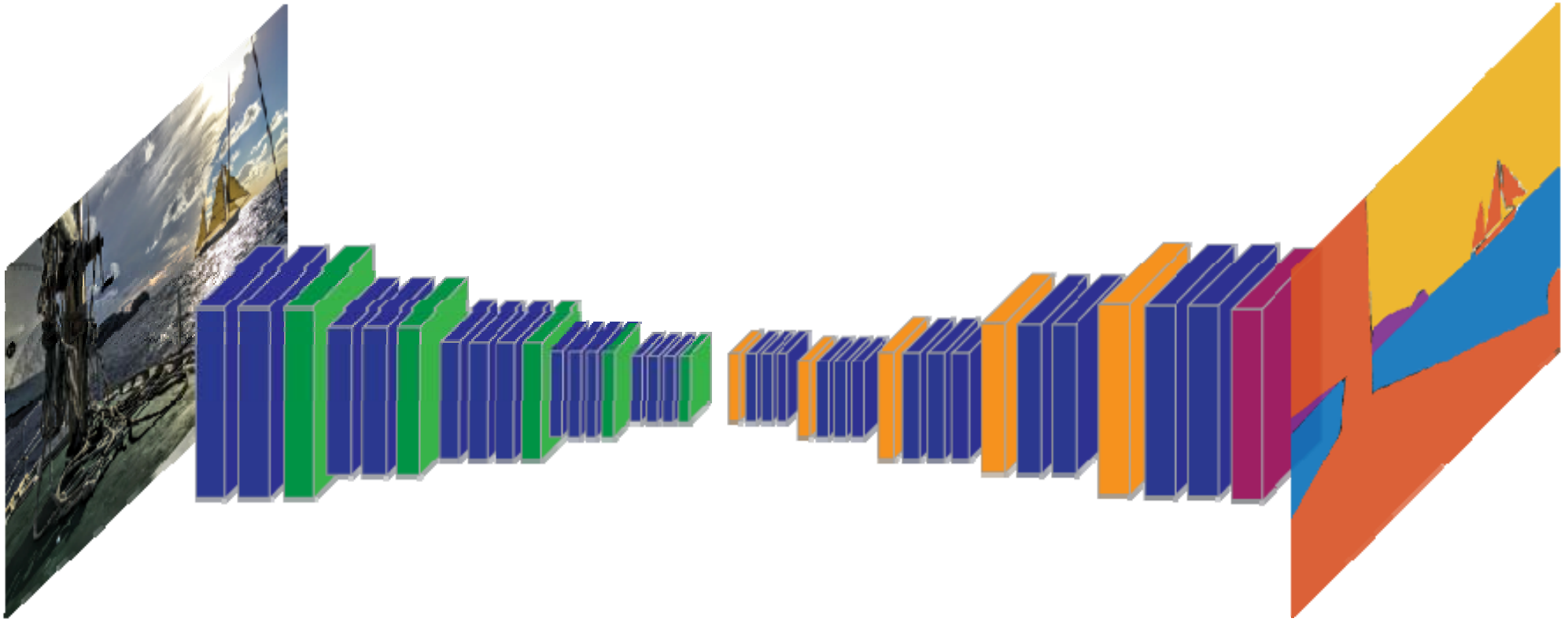
CamVid Dataset

1. *Segmentation and Recognition Using Structure from Motion Point Clouds, ECCV 2008*
2. *Semantic Object Classes in Video: A High-Definition Ground Truth Database ,Pattern Recognition Letters*

Image Classification Network

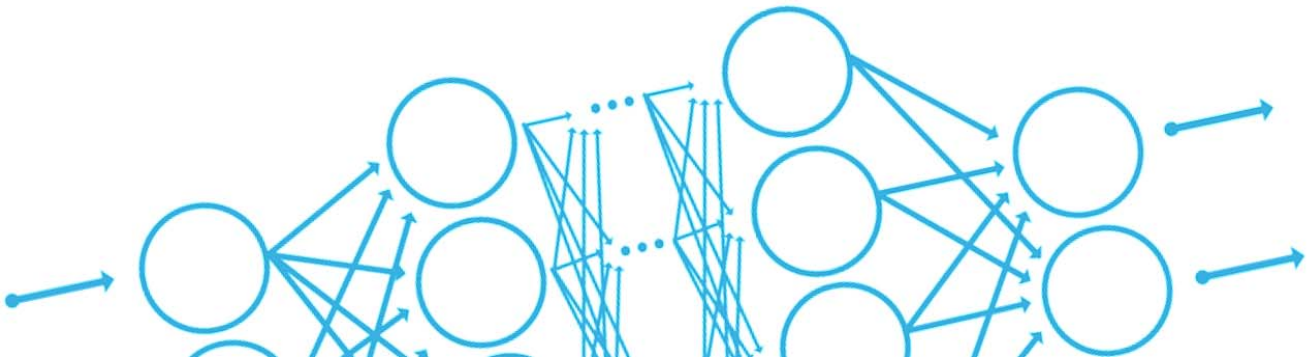


Semantic Segmentation Network

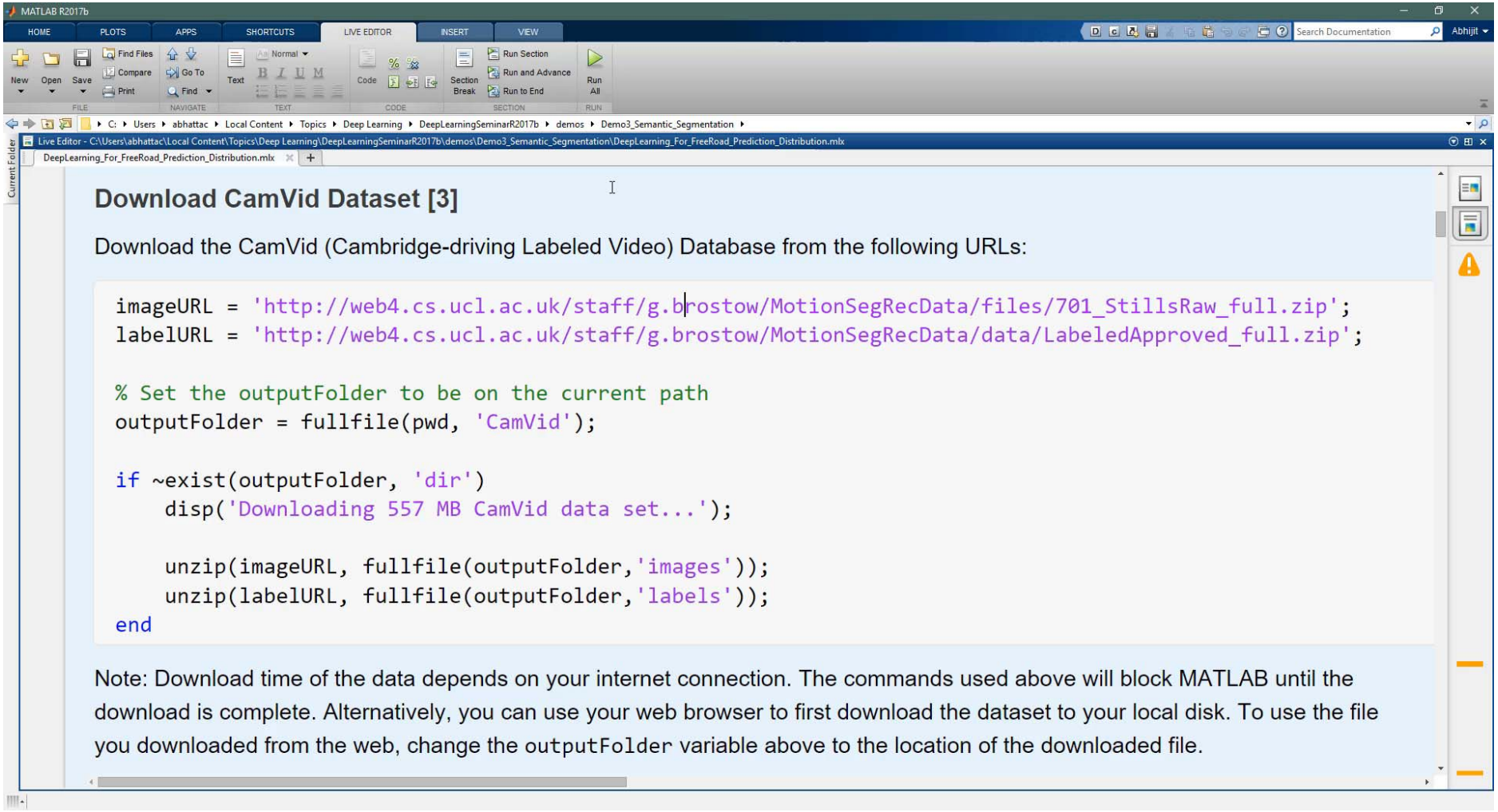


Access and Explore Data

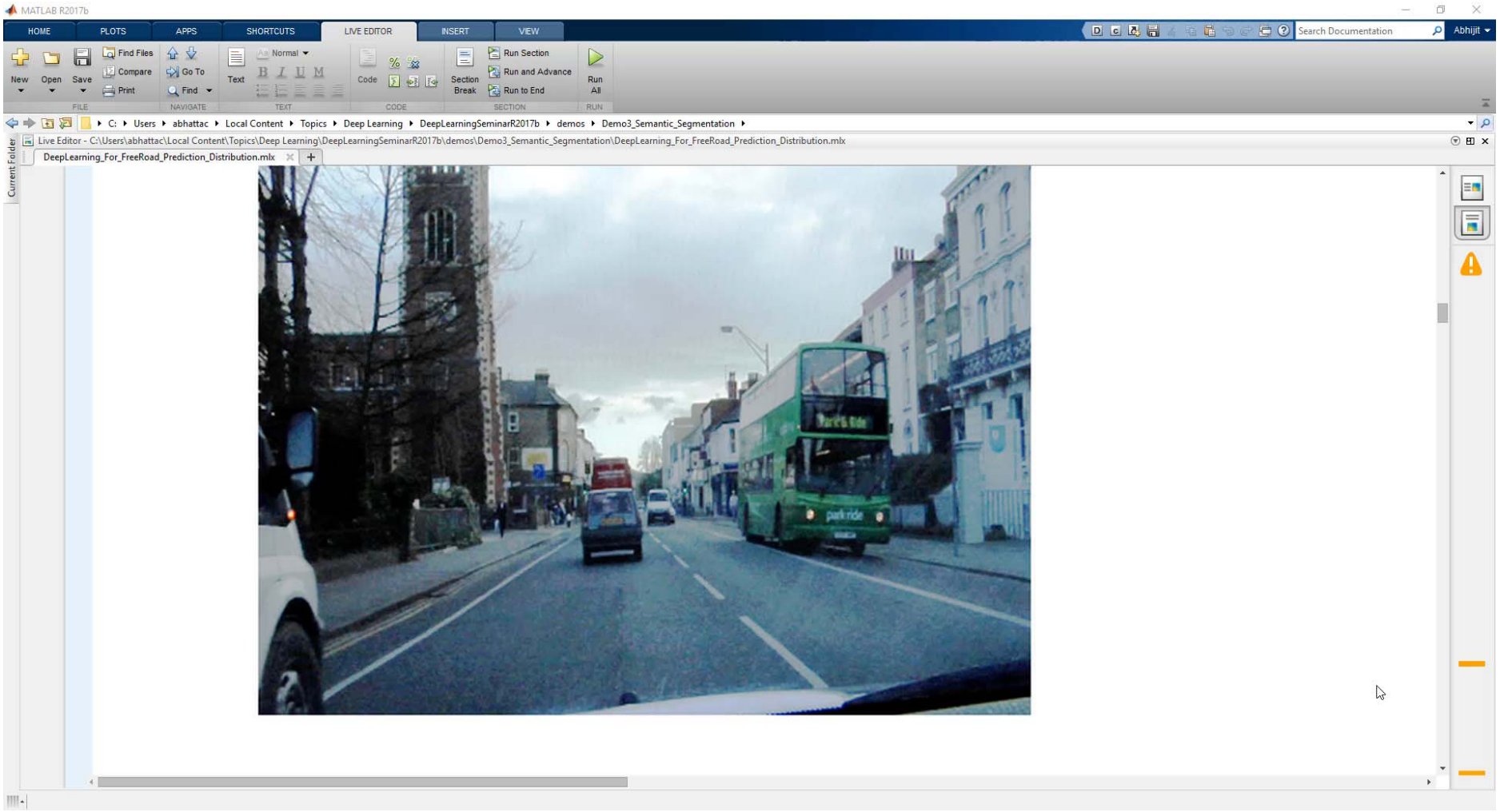
MATLAB EXPO 2017



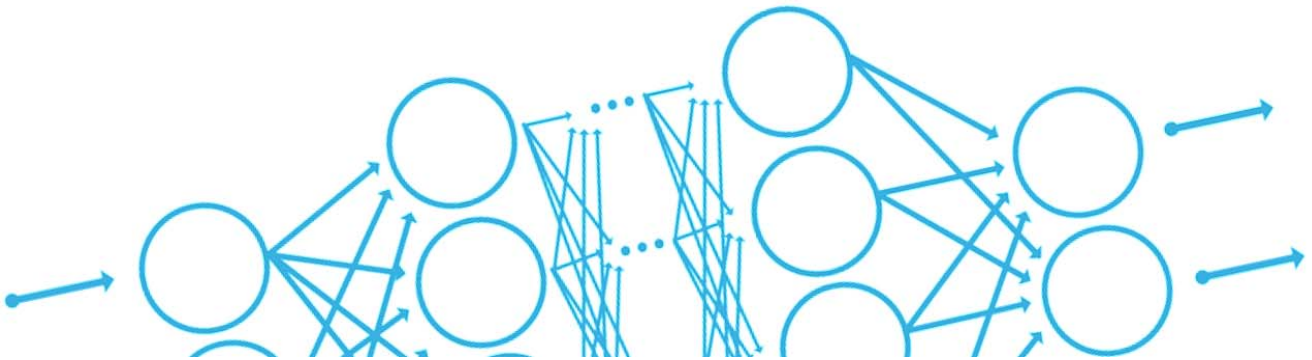
Access image/video data



Access pixel label data



Label and Preprocess Data



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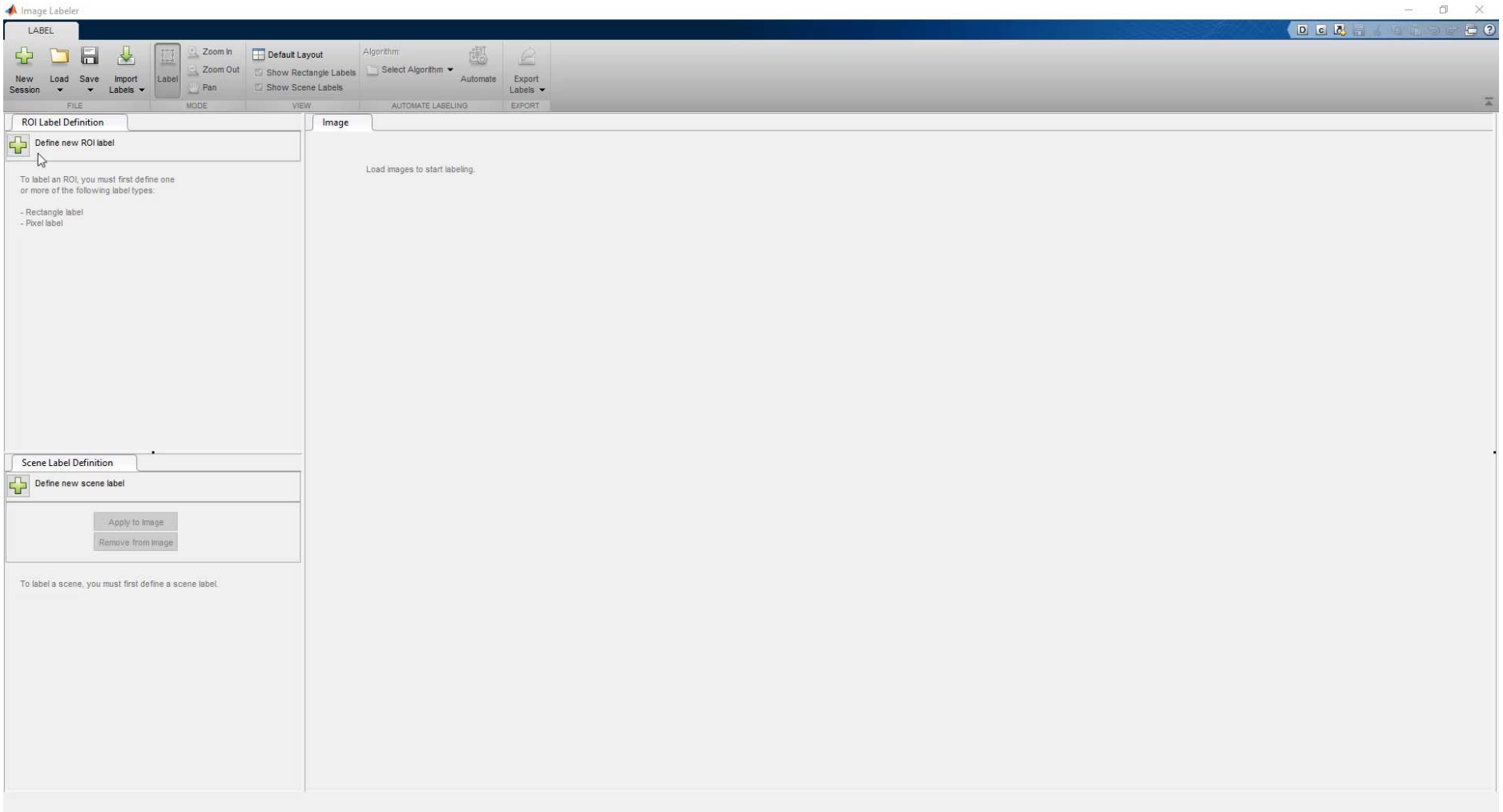
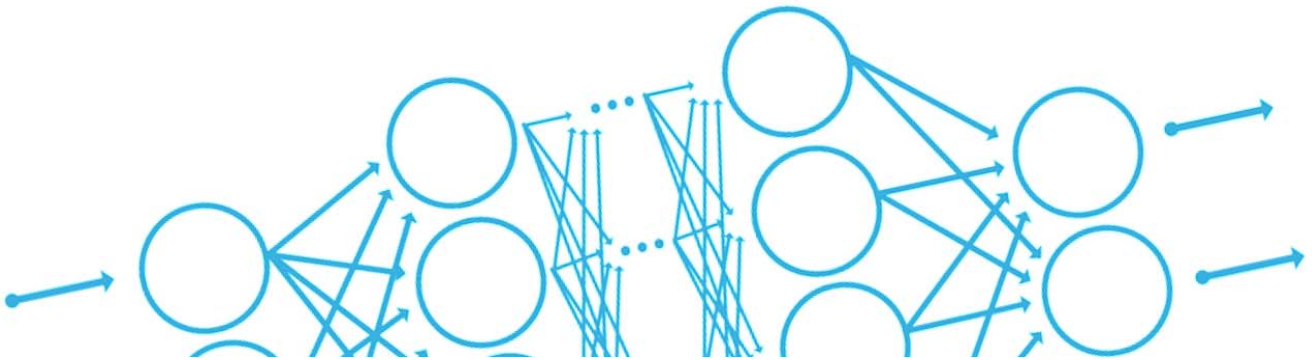
Using image labeling tools



Develop and Test Algorithms



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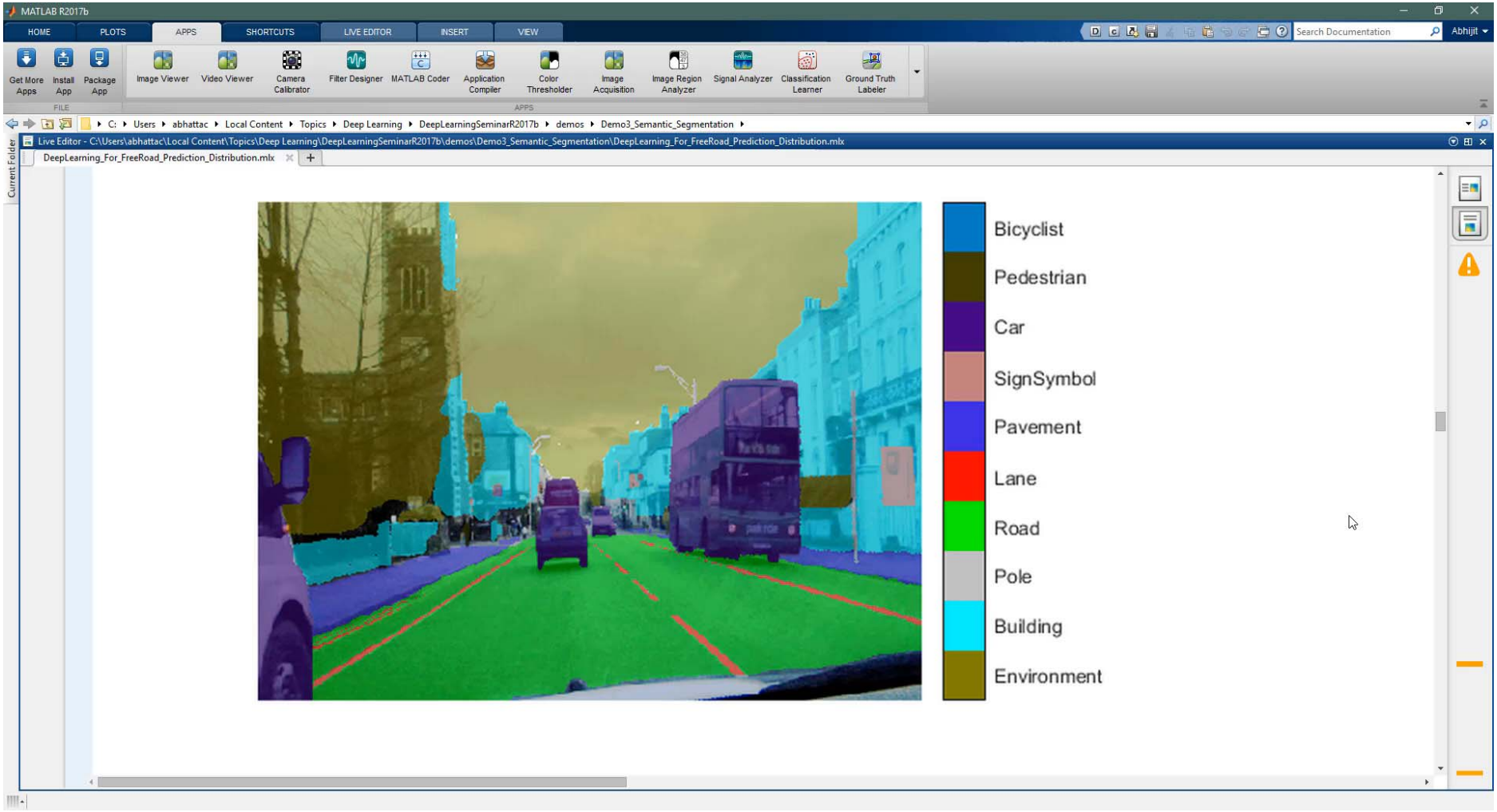
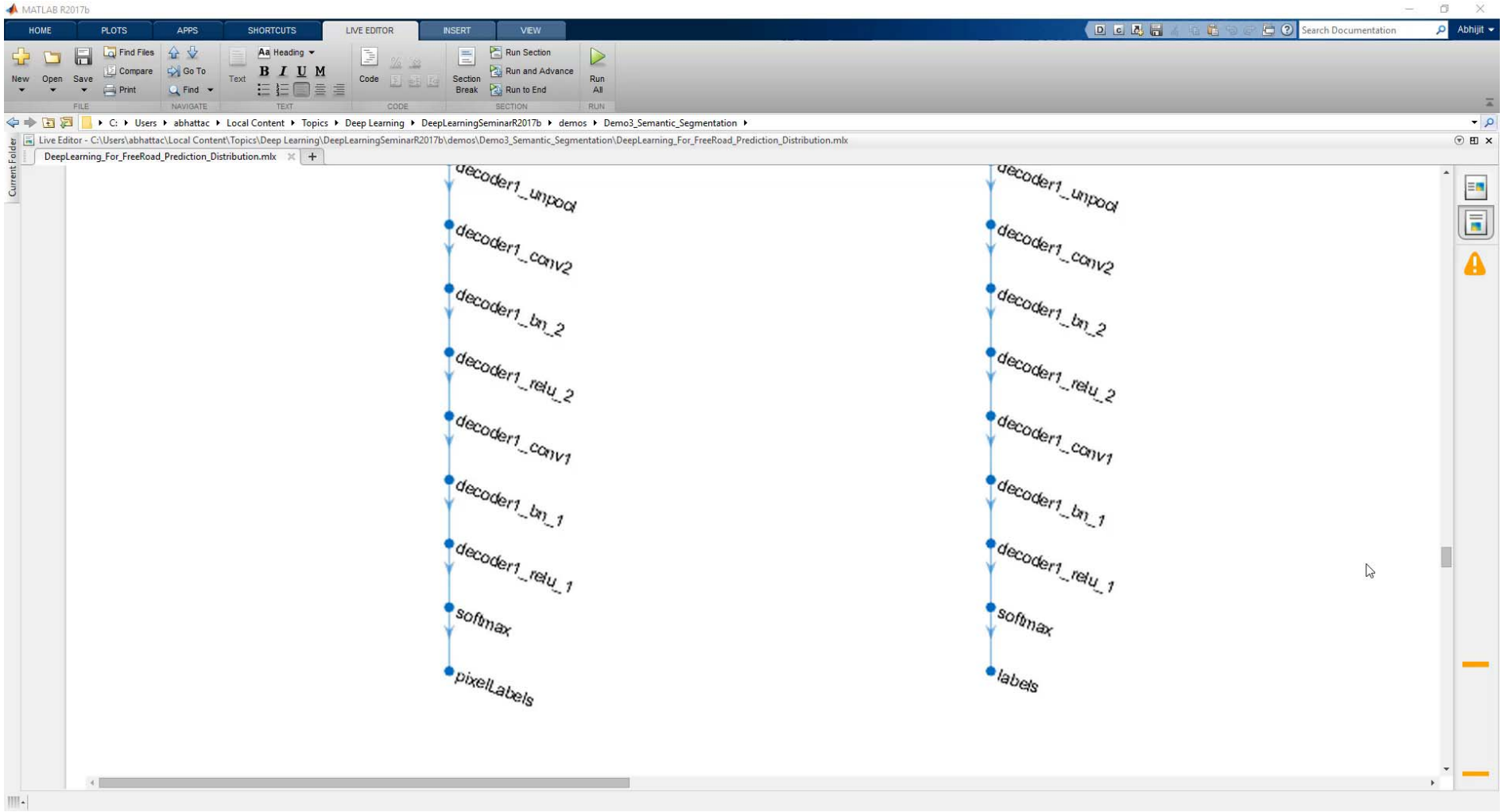
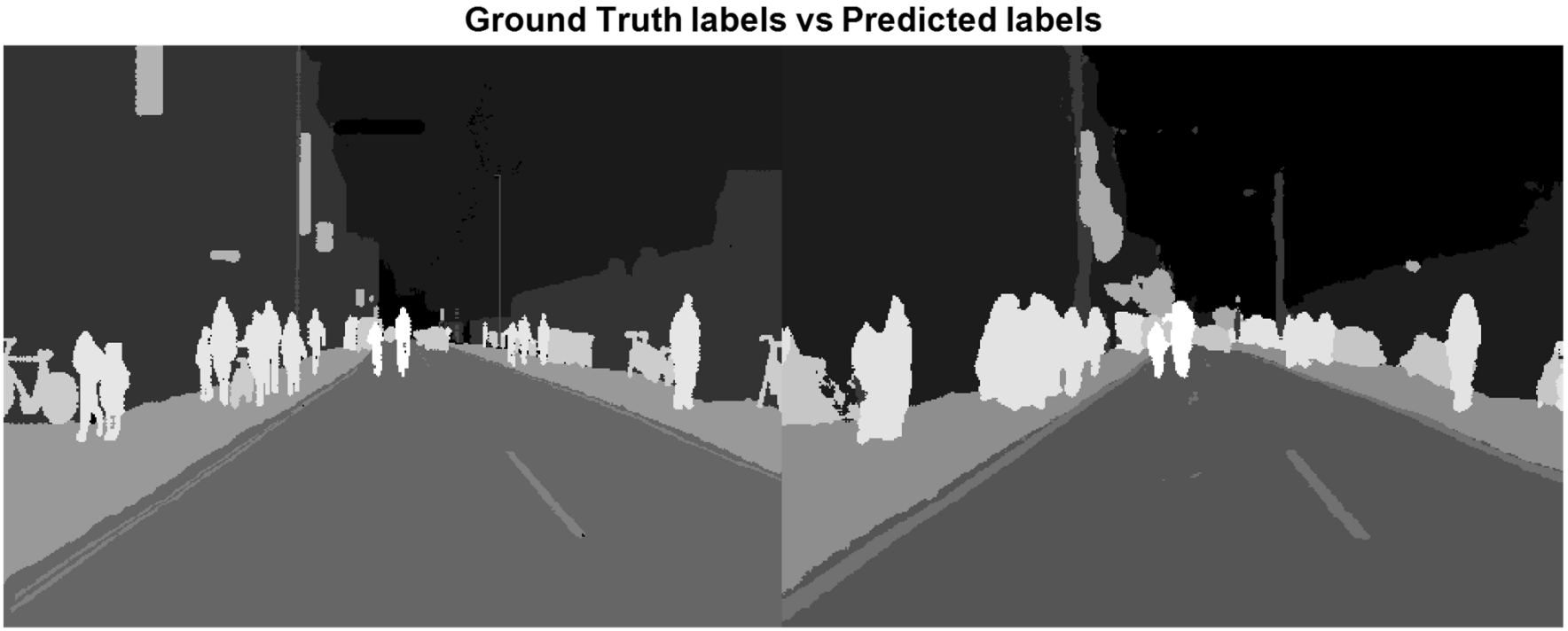
Prepare the network for training



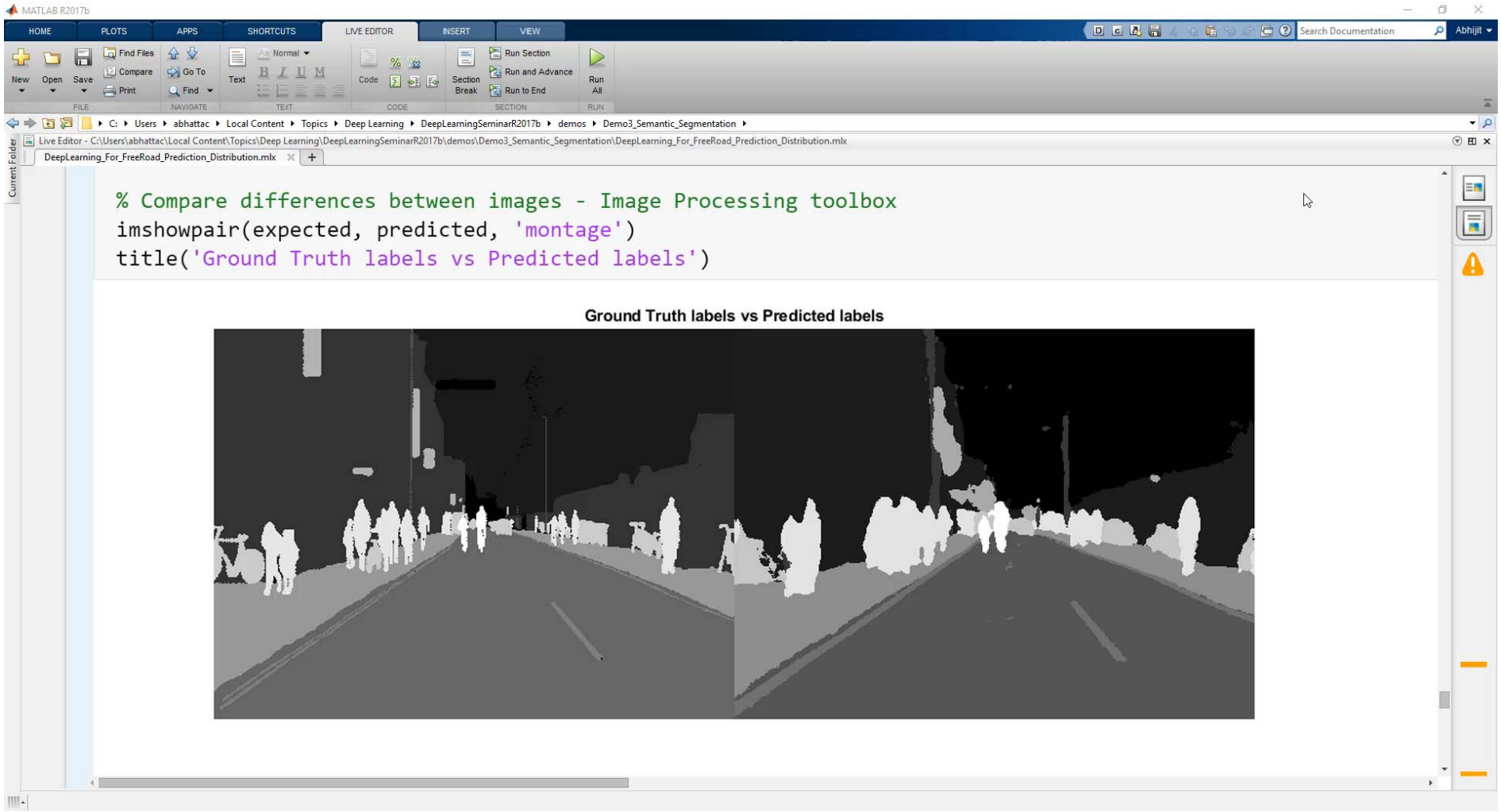
Train and test the network



Evaluate algorithm performance



More evaluation



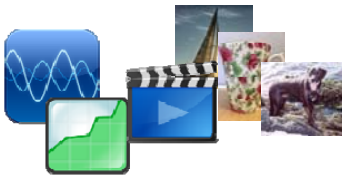
Challenges we addressed

- Accessing data
- Labeling and preprocessing
- Using previous research
- Developing an algorithm
- Evaluating the algorithm
- **What's next?**

Computer vision system design

Access and Explore Data

Files



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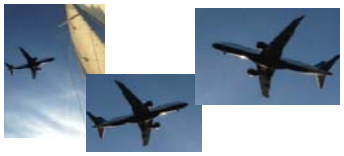

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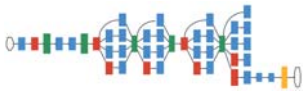

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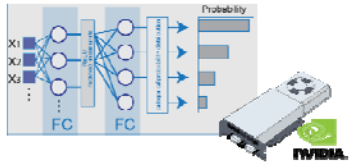

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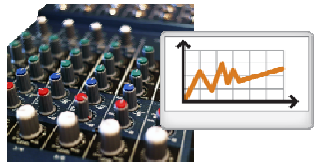

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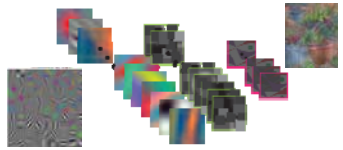

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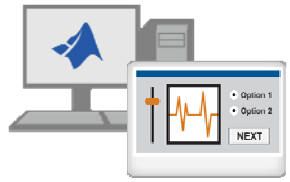

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