

# Transfer Learning in TensorFlow

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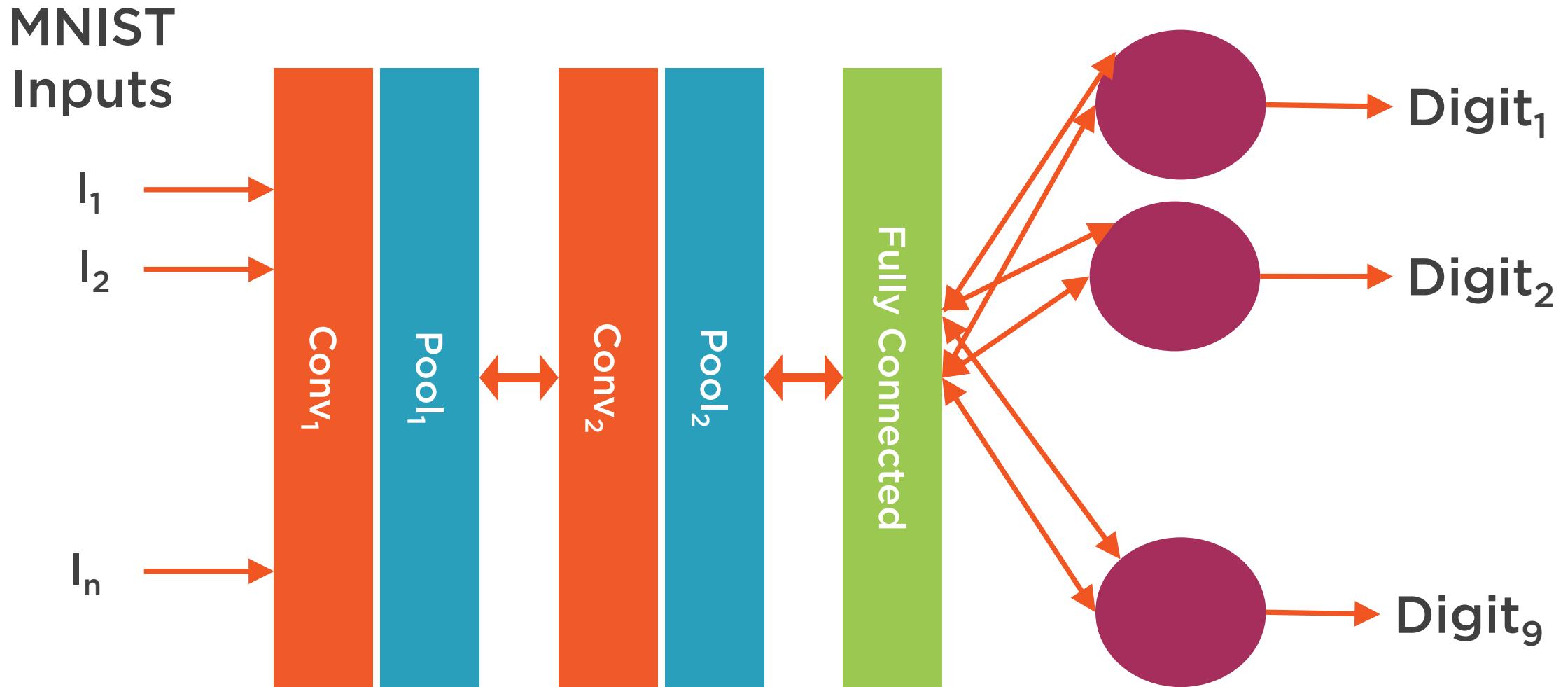
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# Deep MNIST Neural Network



# Deep MNIST

**5 hidden layers**

**Easy to implement in TensorFlow**

**98% Accuracy**

**Only works with MNIST images**



# Inception v3

**Provided with TensorFlow**

**Superhuman image classification**

- Human - 5.1% error
- Inception v3 - 3.46% error

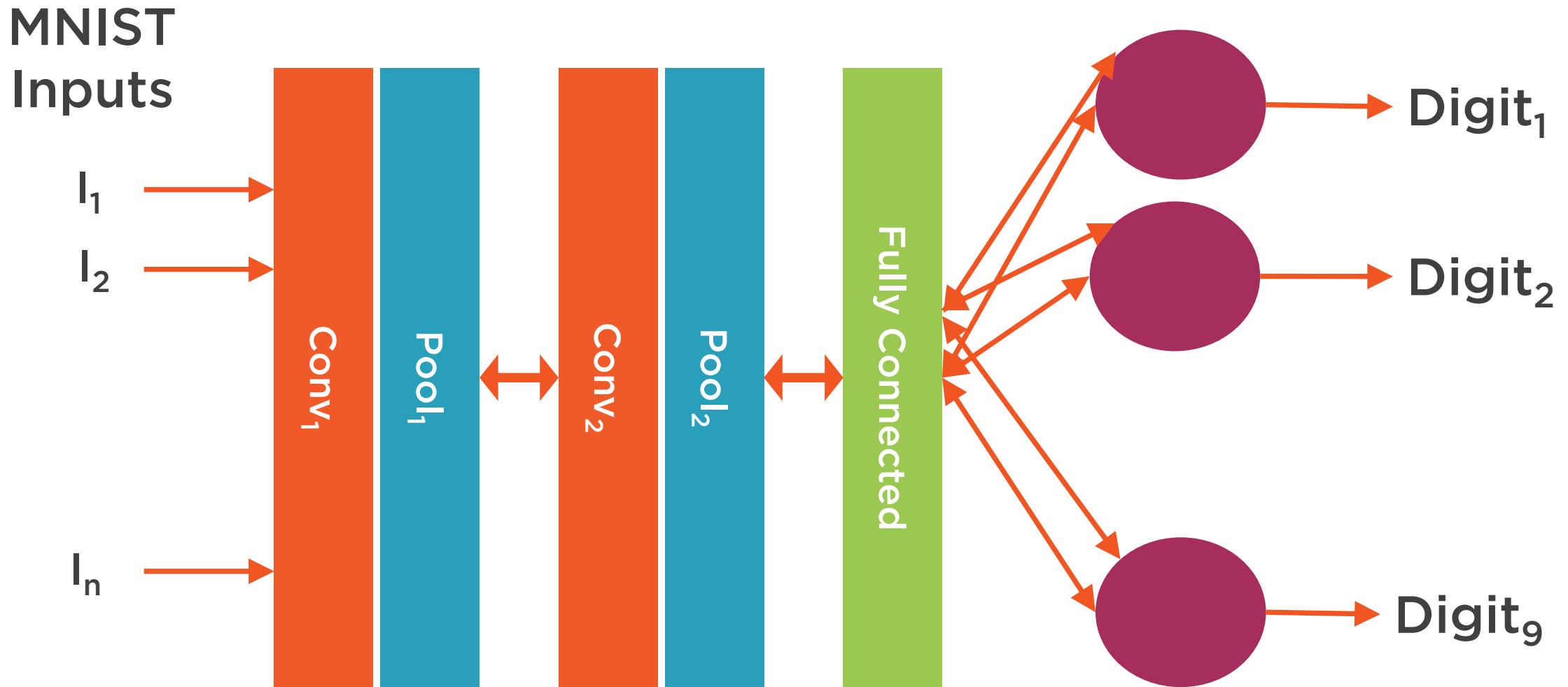
**Training takes a long time**

- 2 weeks
- 8 NVIDIA K40 processors (GPUs designed for computation)

**Trained on ImageNet dataset**



# Deep MNIST Neural Network



# Deep MNIST vs. Inception

Deep MNIST

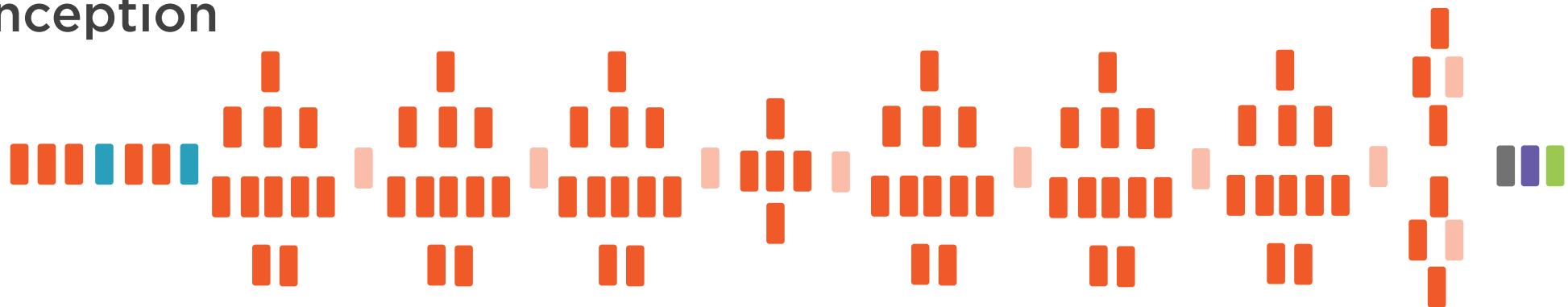


# Deep MNIST vs Inception

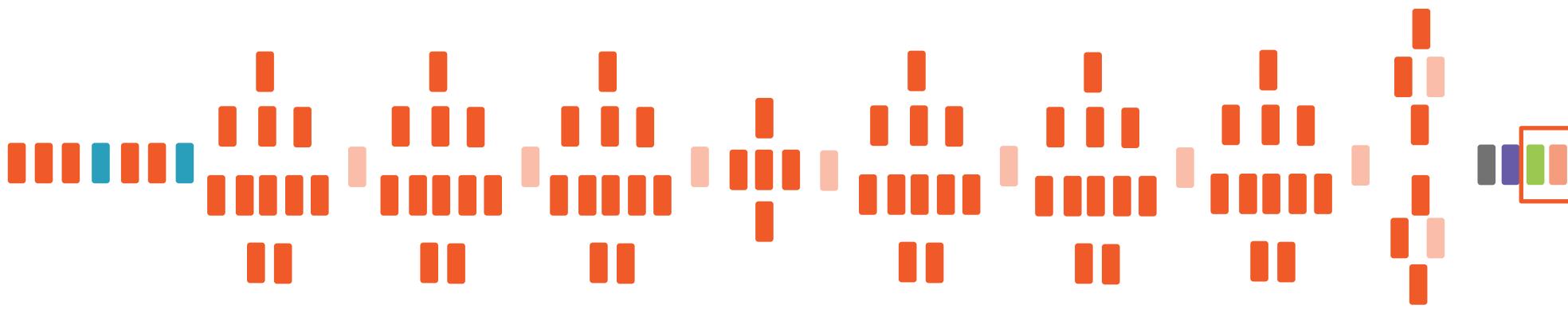
Deep MNIST



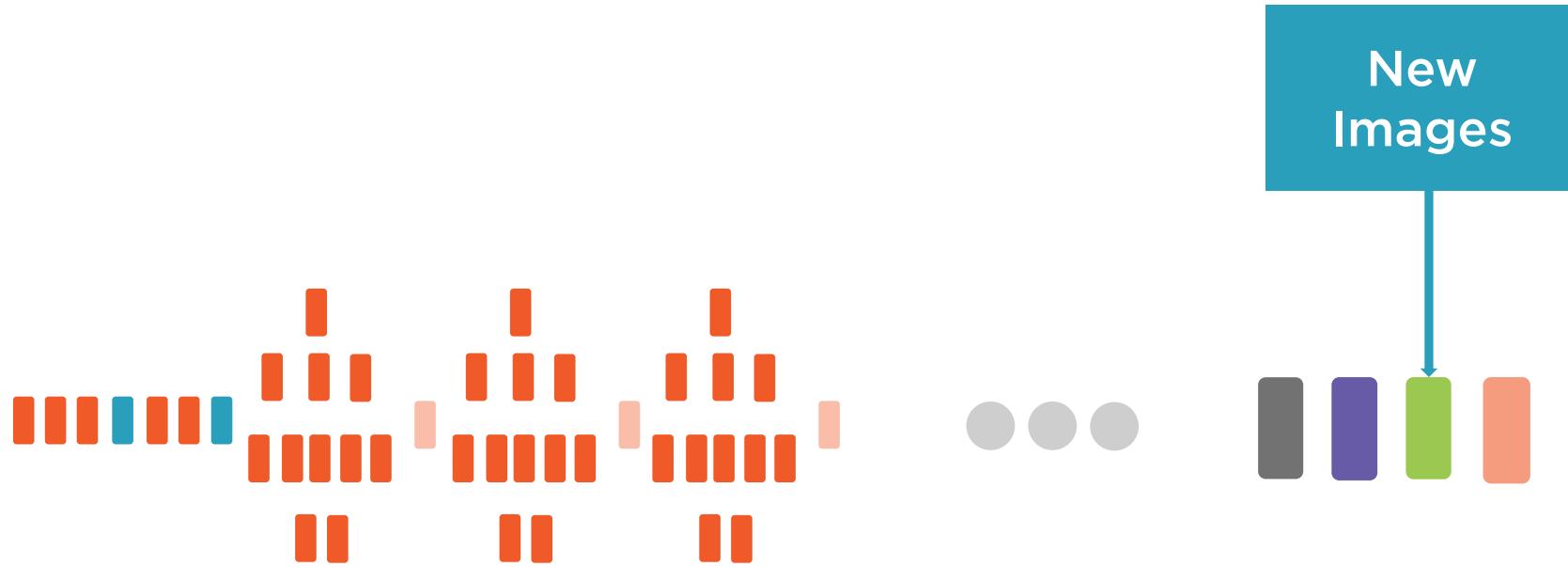
Inception



# Transfer Learning



# Transfer Learning Coding



# Implementing Transfer Learning

**Get our data**

**Load Inception**

**Retrain next to last (Bottleneck) layer**

**Replace last layer to output of our classes**



[https://www.tensorflow.org/  
tutorials/image\\_retraining](https://www.tensorflow.org/tutorials/image_retraining)



# Implementing Transfer Learning

**Get our data**

**Load Inception**

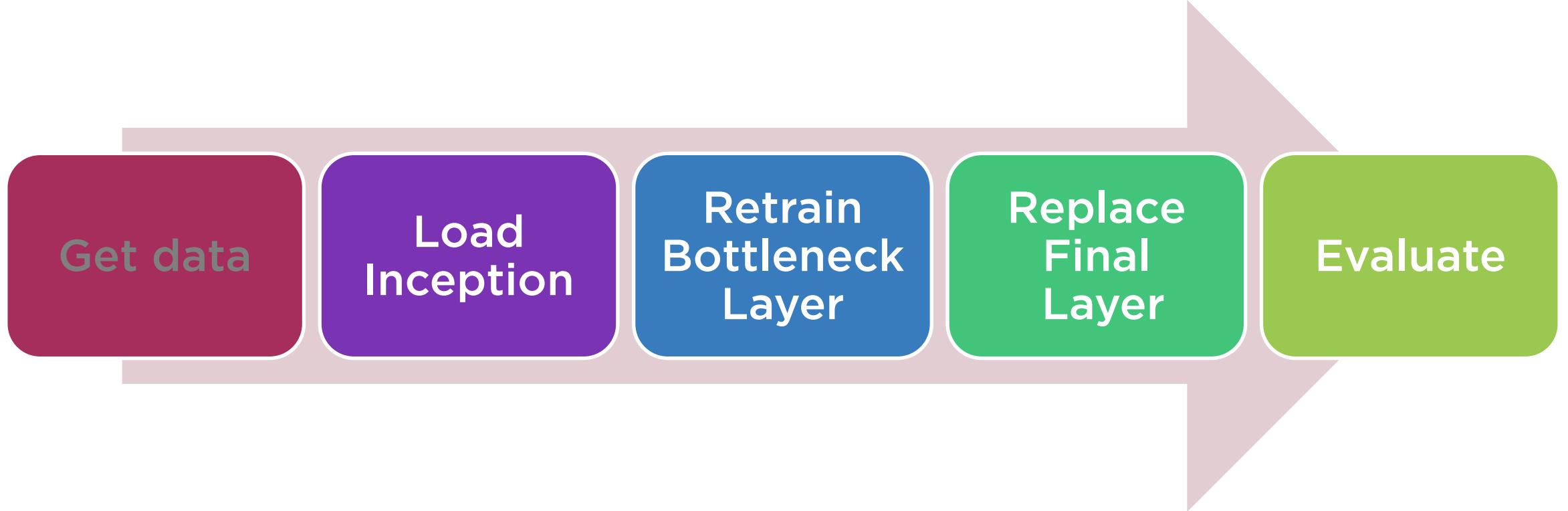
**Retrain next to last (Bottleneck) layer**

**Replace last layer to output of our classes**

**Evaluate the retrained model**



# Transfer Learning Steps



# Summary



**Transfer Learning is easy in TensorFlow**

**Transfer Learning is practical**

**Works in more than image recognition**

**Give it a try**

