

Tensor Arrays and Shapes	33
Names	37
Variables, Placeholders, and Simple Optimization	38
Variables	38
Placeholders	39
Optimization	40
Summary	49
4. Convolutional Neural Networks.....	51
Introduction to CNNs	51
MNIST: Take II	53
Convolution	54
Pooling	56
Dropout	57
The Model	57
CIFAR10	61
Loading the CIFAR10 Dataset	62
Simple CIFAR10 Models	64
Summary	68
5. Text I: Working with Text and Sequences, and TensorBoard Visualization.....	69
The Importance of Sequence Data	69
Introduction to Recurrent Neural Networks	70
Vanilla RNN Implementation	72
TensorFlow Built-in RNN Functions	82
RNN for Text Sequences	84
Text Sequences	84
Supervised Word Embeddings	88
LSTM and Using Sequence Length	89
Training Embeddings and the LSTM Classifier	91
Summary	93
6. Text II: Word Vectors, Advanced RNN, and Embedding Visualization.....	95
Introduction to Word Embeddings	95
Word2vec	97
Skip-Grams	98
Embeddings in TensorFlow	100
The Noise-Contrastive Estimation (NCE) Loss Function	101
Learning Rate Decay	101
Training and Visualizing with TensorBoard	102
Checking Out Our Embeddings	103
Pretrained Embeddings, Advanced RNN	105

Pretrained Word Embeddings	106
Bidirectional RNN and GRU Cells	110
Summary	112
7. TensorFlow Abstractions and Simplifications.....	113
Chapter Overview	113
High-Level Survey	115
contrib.learn	117
Linear Regression	118
DNN Classifier	120
FeatureColumn	123
Homemade CNN with contrib.learn	128
TFLearn	131
Installation	131
CNN	131
RNN	134
Keras	136
Pretrained models with TF-Slim	143
Summary	151
8. Queues, Threads, and Reading Data.....	153
The Input Pipeline	153
TFRecords	154
Writing with TFRecordWriter	155
Queues	157
Enqueuing and Dequeuing	157
Multithreading	159
Coordinator and QueueRunner	160
A Full Multithreaded Input Pipeline	162
1. tf.train.string_input_producer() and tf.TFRecordReader()	164
2. tf.train.shuffle_batch()	164
3. tf.train.start_queue_runners() and Wrapping Up	165
Summary	166
9. Distributed TensorFlow.....	167
Distributed Computing	167
Where Does the Parallelization Take Place?	168
What Is the Goal of Parallelization?	168
TensorFlow Elements	169
tf.app.flags	169
Clusters and Servers	170
Replicating a Computational Graph Across Devices	171

Managed Sessions	171
Device Placement	172
Distributed Example	173
Summary	179
10. Exporting and Serving Models with TensorFlow.....	181
Saving and Exporting Our Model	181
Assigning Loaded Weights	182
The Saver Class	185
Introduction to TensorFlow Serving	191
Overview	192
Installation	193
Building and Exporting	194
Summary	201
A. Tips on Model Construction and Using TensorFlow Serving.....	203
Index.....	221