Natural Language Processing in TensorFlow

by DeepLearning.AI

About this Course

If you are a software developer who wants to build scalable AI-powered algorithms, you need to understand how to use the tools to build them. This Specialization will teach you best practices for using TensorFlow, a popular open-source framework for machine learning.

In Course 3 of the DeepLearning.AI TensorFlow Developer Specialization, you will build natural language processing systems using TensorFlow. You will learn to process text, including tokenizing and representing sentences as vectors, so that they can be input to a neural network. You'll also learn to apply RNNs, GRUs, and LSTMs in TensorFlow. Finally, you'll get to train an LSTM on existing text to create original poetry!

The Machine Learning course and Deep Learning Specialization from Andrew Ng teach the most important and foundational principles of Machine Learning and Deep Learning. This new DeepLearning.AI TensorFlow Developer Specialization teaches you how to use TensorFlow to implement those principles so that you can start building and applying scalable models to real-world problems. To develop a deeper understanding of how neural networks work, we recommend that you take the Deep Learning Specialization.

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Taught by:
Laurence Moroney, Instructor

Basic Info	Course 3 of 4 in the DeepLearning.AI TensorFlow Developer Specialization
Level	Intermediate
Commitment	4 weeks of study, 4-5 hours/week
Language	English, **Subtitles:** Arabic, French, Bengali, Ukrainian, Chinese (Simplified), Greek, Italian, Portuguese (Brazil), Vietnamese, Dutch, Korean, German, Pashto, Urdu, Russian, Thai, Indonesian, Swedish, Turkish, Azerbaijani, Spanish, Dari, Hindi, Japanese, Kazakh, Hungarian, Polish
How To Pass	Pass all graded assignments to complete the course.
User Ratings	Average User Rating 4.6

Syllabus

Week 1

Sentiment in text

The first step in understanding sentiment in text, and in particular when training a neural network to do so is the tokenization of that text. This is the process of converting the text into numeric values, with a number representing a word or a character. This week you'll learn about the Tokenizer and pad_sequences APIs in TensorFlow and how they can be used to prepare and encode text and sentences to get them ready for training neural networks!

13 videos, 7 readings

1. **Video:** Introduction: A conversation with Andrew Ng
2. **Reading:** Welcome to the course!
3. **Video:** Introduction
4. **Video:** Word based encodings
5. **Video:** Using APIs
6. **Reading:** [IMPORTANT] Have questions, issues or ideas? Join our Forum!
7. **Reading:** About the notebooks in this course
8. **Ungraded Lab:** Check out the code! (Lab 1)
9. **Video:** Notebook for lesson 1
10. **Video:** Text to sequence
11. **Video:** Padding
12. **Video:** Out-of-Vocabulary Words
13. **Ungraded Lab:** Check out the code! (Lab 2)
14. **Video:** Notebook for lesson 2
15. **Video:** Sarcasm, really?
16. **Video:** Preprocessing the Sarcasm dataset
17. **Reading:** News headlines dataset for sarcasm detection
18. **Ungraded Lab:** Check out the code! (Lab 3)
19. **Video:** Notebook for lesson 3
20. **Video:** Week 1 Wrap up
21. **Reading:** Lecture Notes Week 1
22. **Reading:** Assignment Troubleshooting Tips
23. **Reading:** (Optional) Downloading your Notebook and Refreshing your Workspace

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Graded: Week 1 Quiz

Graded: Explore the BBC news archive

Week 2

Word Embeddings

Last week you saw how to use the Tokenizer to prepare your text to be used by a neural network by converting words into numeric tokens, and sequencing sentences from these tokens. This week you'll learn about Embeddings, where these tokens are mapped as vectors in a high dimension space. With Embeddings and labelled examples, these vectors can then be tuned so that words with similar meaning will have a similar direction in the vector space. This will begin the process of training a neural

More

12 videos, 4 readings

1. **Video:** A conversation with Andrew Ng
2. **Video:** Introduction
3. **Video:** The IMDB dataset
4. **Reading:** IMDB reviews dataset
5. **Video:** Looking into the details
6. **Video:** How can we use vectors?
7. **Video:** More into the details
8. **Ungraded Lab:** Check out the code! (Lab 1)
9. **Video:** Notebook for lesson 1
10. **Video:** Remember the sarcasm dataset?
11. **Video:** Building a classifier for the sarcasm dataset
12. **Video:** Let's talk about the loss
13. **Ungraded Lab:** Check out the code! (Lab 2)
14. **Video:** Subword tokenization
15. **Video:** Diving into the code
16. **Reading:** Subword tokenization
17. **Ungraded Lab:** Check out the code! (Lab 3)
18. **Reading:** Week 2 Wrap up
19. **Reading:** Lecture Notes Week 2

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Graded: Week 2 Quiz

Graded: Diving deeper into the BBC News archive

Week 3

Sequence models

In the last couple of weeks you looked first at Tokenizing words to get numeric values from them, and then using Embeddings to group words of similar meaning depending on how they were labelled. This gave you a good, but rough, sentiment analysis – words such as 'fun' and 'entertaining' might show up in a positive movie review, and 'boring' and 'dull' might show up in a negative one. But sentiment can also be determined by the sequence in which words appear. For example, you could have 'not

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10 videos, 4 readings

1. **Video:** A conversation with Andrew Ng
2. **Video:** Introduction
3. **Reading:** Link to Andrew's sequence modeling course
4. **Video:** LSTMs
5. **Reading:** More info on LSTMs
6. **Video:** Implementing LSTMs in code
7. **Ungraded Lab:** Check out the code! (Lab 1)
8. **Ungraded Lab:** Check out the code! (Lab 2)
9. **Video:** Accuracy and loss
10. **Video:** A word from Laurence
11. **Video:** Looking into the code
12. **Video:** Using a convolutional network
13. **Ungraded Lab:** Check out the code! (Lab 3)
14. **Video:** Going back to the IMDB dataset
15. **Ungraded Lab:** Check out the code! (Lab 4)
16. **Video:** Tips from Laurence
17. **Ungraded Lab:** Exploring a Bidirectional LSTM (Lab 5)
18. **Ungraded Lab:** Exploring a Convolutional Network (Lab 6)
19. **Reading:** Week 3 Wrap up
20. **Reading:** Lecture Notes Week 3

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Graded: Week 3 Quiz

Graded: Exploring overfitting in NLP

Week 4

Sequence models and literature

Taking everything that you've learned in training a neural network based on NLP, we thought it might be a bit of fun to turn the tables away from classification and use your knowledge for prediction. Given a body of words, you could conceivably predict the word most likely to follow a given word or phrase, and once you've done that, to do it again, and again. With that in mind, this week you'll build a poetry generator. It's trained with the lyrics from traditional Irish songs, and can be used to produce

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14 videos, 5 readings

1. **Video:** A conversation with Andrew Ng
2. **Video:** Introduction
3. **Video:** Looking into the code
4. **Video:** Preparing the training data
5. **Video:** More on the training data
6. **Video:** Finding what the next word should be
7. **Video:** Example
8. **Video:** Predicting a word
9. **Ungraded Lab:** Check out the code! (Lab 1)
10. **Video:** Notebook for lesson 1
11. **Video:** Poetry!
12. **Reading:** Link to the dataset
13. **Video:** Looking into the code
14. **Video:** Laurence the poet!
15. **Ungraded Lab:** Check out the code! (Lab 2)
16. **Video:** Your next task
17. **Ungraded Lab:** (optional) Generating text using a character-based RNN
18. **Reading:** Lecture Notes Week 4
19. **Reading:** [IMPORTANT] Reminder about end of access to Lab Notebooks
20. **Reading:** Wrap up
21. **Video:** A conversation with Andrew Ng
22. **Reading:** Acknowledgments

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Graded: Week 4 Quiz

Graded: Predicting the next word

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How It Works

General

How do I pass?

To earn your Certificate, you'll need to earn a passing

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Programming assignments

Programming assignments require you to write and run a computer program to solve a problem.

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Course 3 of Specialization

Learn to build AI apps with Tensorflow

Build, train, and optimize deep neural networks and dive deep into Computer Vision, Natural Language Processing, and Time Series Analysis, along with best practices and hands-on experience in one of the most in-demand deep learning frameworks.

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View the course in catalog

Related Courses

Natural Language Processing with Classification and Vector Spaces
DeepLearning.AI