How Deep Learning Works

Deep Learning — Unit 2

Dr. Jon Krohn

jon@untapt.com

Slides available at jonkrohn.com/talks

March 16th, 2019

Outline

Outline

Outline

Outline

Outline

Outline

[whiteboard equations + Arsenal]

[playground]

Outline

[whiteboard equations + Arsenal]

[playground]

Take-Home Exercise I

Artificial Neural Network Language

- solve another TF Playground problem, e.g., a regression
- verbalize weights, biases & network architecture
- verbalize Arsenal items

Take-Home Exercise I

Artificial Neural Network Language

- solve another TF Playground problem, e.g., a regression
- verbalize weights, biases & network architecture
- verbalize Arsenal items

Take-Home Exercise I

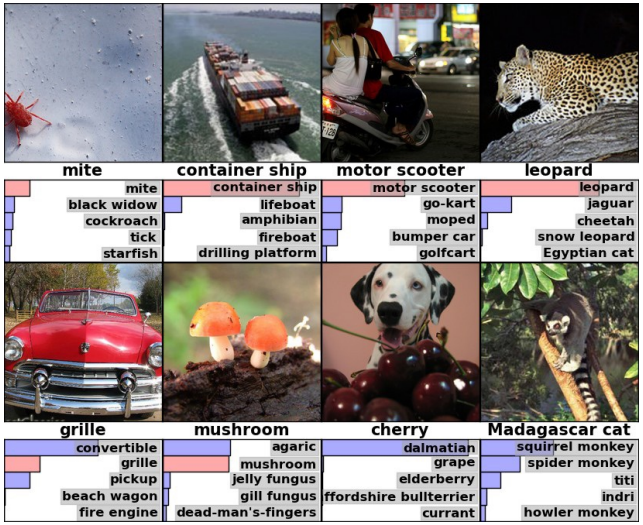
Artificial Neural Network Language

- solve another TF Playground problem, e.g., a regression
- verbalize weights, biases & network architecture
- verbalize Arsenal items

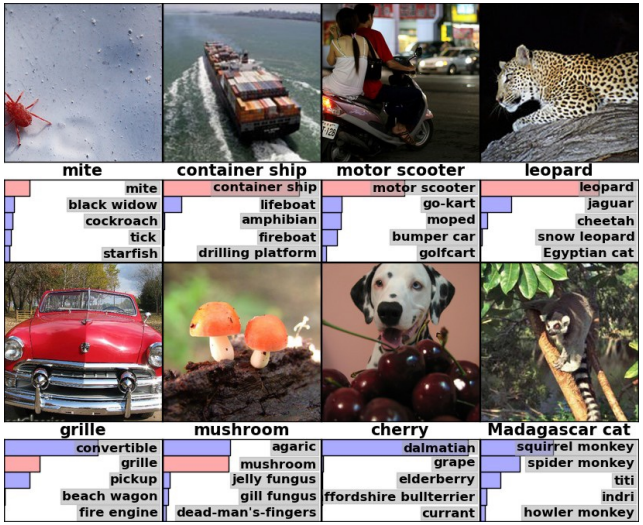
Outline

[how might you...?]

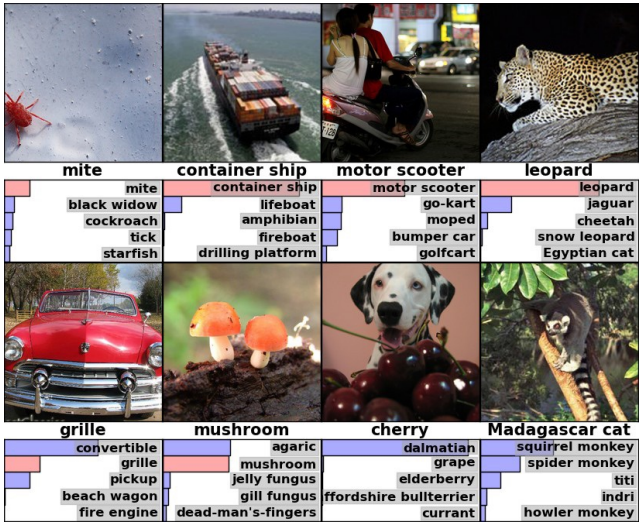
Outline



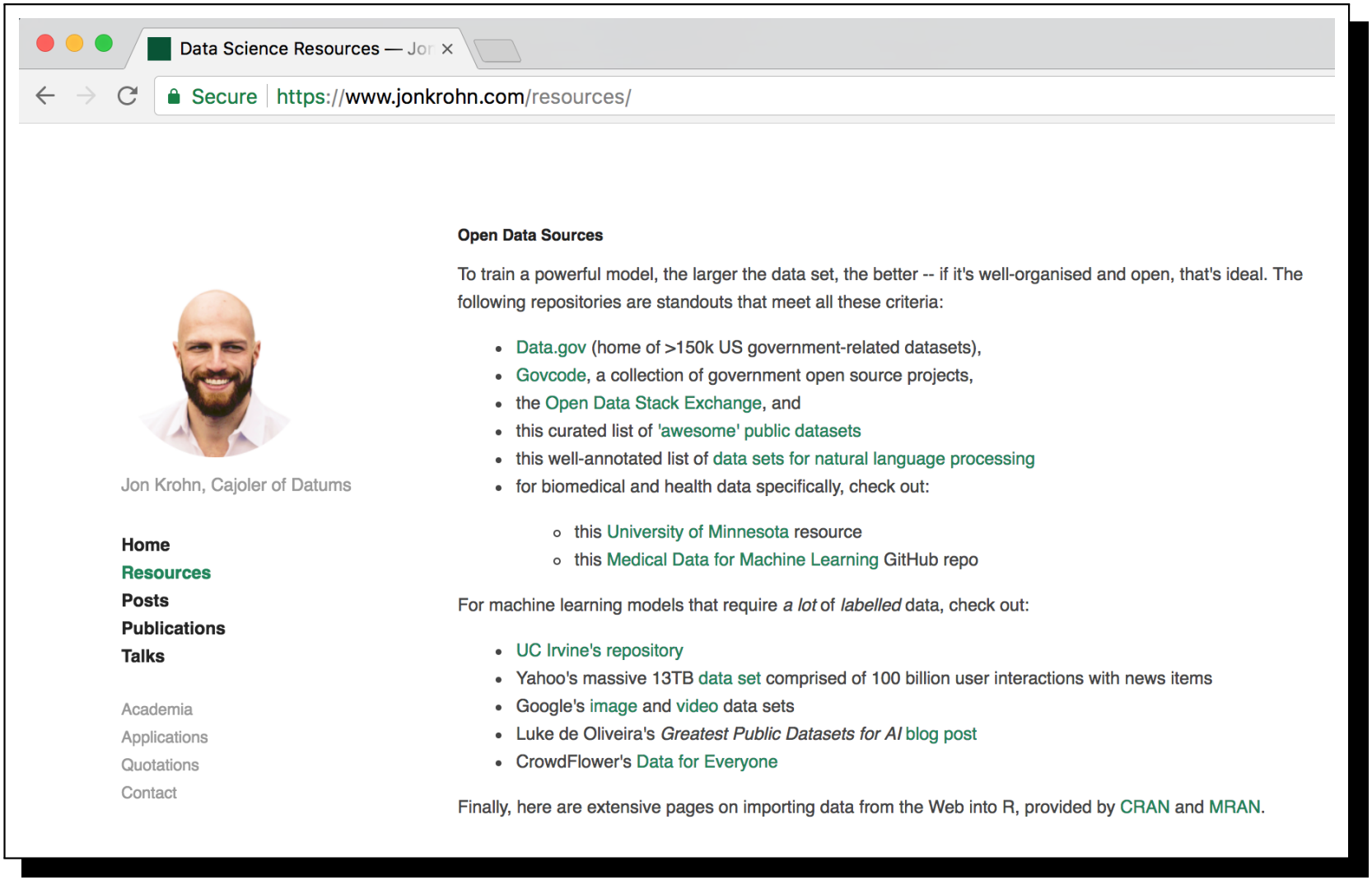
Dataset	Classes	Train Samples
AG's News	4	120,000
Sogou News	5	450,000
DBPedia	14	560,000
Yelp Review Polarity	2	560,000
Yelp Review Full	5	650,000
Yahoo! Answers	10	1,400,000
Amazon Review Full	5	3,000,000
Amazon Review Polarity	2	3,600,000



Dataset	Classes	Train Samples
AG's News	4	120,000
Sogou News	5	450,000
DBPedia	14	560,000
Yelp Review Polarity	2	560,000
Yelp Review Full	5	650,000
Yahoo! Answers	10	1,400,000
Amazon Review Full	5	3,000,000
Amazon Review Polarity	2	3,600,000



Dataset	Classes	Train Samples
AG's News	4	120,000
Sogou News	5	450,000
DBPedia	14	560,000
Yelp Review Polarity	2	560,000
Yelp Review Full	5	650,000
Yahoo! Answers	10	1,400,000
Amazon Review Full	5	3,000,000
Amazon Review Polarity	2	3,600,000



[Data Is Plural]

Outline

Your Deep Learning Project I

Ideating

Your Deep Learning Project I

Ideating

Perspectives to approach ideating from:

- Identify a data set $\Rightarrow$ use it to solve a problem
- Identify a problem that you'd like to solve $\Rightarrow$ find an appropriate data set

Your Deep Learning Project I

Ideating

Perspectives to approach ideating from:

- Identify a data set $\Rightarrow$ use it to solve a problem
- Identify a problem that you'd like to solve $\Rightarrow$ find an appropriate data set

Recommended starting points:

1. a machine-vision architecture to classify images, e.g.:
   - [Fashion MNIST]
   - one of the dozens of data sets with the keyword *image* in the title from [CrowdFlower]
   - one of the *Computer Vision* data sets (other than the MNIST data set) in Luke de Oliveira's [blog post]
2. an NLP architecture to classify text, e.g.:
   - the Yelp or Amazon sentiment [data sets] detailed in Section 4 of [Xiang Zhang et al.'s paper]
   - the Yahoo! Answers categories data set also detailed in Xiang Zhang et al.'s paper
   - one of the dozens of data sets with the keywords *sentiment* or *text* in the title from [CrowdFlower]
   - one of the *Natural Language* data sets (other than the MNIST data set) in Luke de Oliveira's [blog post]
3. a regression model

Recommended starting points:

1. a machine-vision architecture to classify images, e.g.:
   - [Fashion MNIST]
   - one of the dozens of data sets with the keyword *image* in the title from [CrowdFlower]
   - one of the *Computer Vision* data sets (other than the MNIST data set) in Luke de Oliveira's [blog post]
2. an NLP architecture to classify text, e.g.:
   - the Yelp or Amazon sentiment [data sets] detailed in Section 4 of [Xiang Zhang et al.'s paper]
   - the Yahoo! Answers categories data set also detailed in Xiang Zhang et al.'s paper
   - one of the dozens of data sets with the keywords *sentiment* or *text* in the title from [CrowdFlower]
   - one of the *Natural Language* data sets (other than the MNIST data set) in Luke de Oliveira's [blog post]
3. a regression model

Recommended starting points:

1. a machine-vision architecture to classify images, e.g.:
   - [Fashion MNIST]
   - one of the dozens of data sets with the keyword *image* in the title from [CrowdFlower]
   - one of the *Computer Vision* data sets (other than the MNIST data set) in Luke de Oliveira's [blog post]
2. an NLP architecture to classify text, e.g.:
   - the Yelp or Amazon sentiment [data sets] detailed in Section 4 of [Xiang Zhang et al.'s paper]
   - the Yahoo! Answers categories data set also detailed in Xiang Zhang et al.'s paper
   - one of the dozens of data sets with the keywords *sentiment* or *text* in the title from [CrowdFlower]
   - one of the *Natural Language* data sets (other than the MNIST data set) in Luke de Oliveira's [blog post]
3. a regression model

Recommended starting points:

1. a machine-vision architecture to classify images, e.g.:
   - [Fashion MNIST]
   - one of the dozens of data sets with the keyword *image* in the title from [CrowdFlower]
   - one of the *Computer Vision* data sets (other than the MNIST data set) in Luke de Oliveira's [blog post]
2. an NLP architecture to classify text, e.g.:
   - the Yelp or Amazon sentiment [data sets] detailed in Section 4 of [Xiang Zhang et al.'s paper]
   - the Yahoo! Answers categories data set also detailed in Xiang Zhang et al.'s paper
   - one of the dozens of data sets with the keywords *sentiment* or *text* in the title from [CrowdFlower]
   - one of the *Natural Language* data sets (other than the MNIST data set) in Luke de Oliveira's [blog post]
3. a regression model

Recommended starting points:

1. a machine-vision architecture to classify images, e.g.:
   - [Fashion MNIST]
   - one of the dozens of data sets with the keyword *image* in the title from [CrowdFlower]
   - one of the *Computer Vision* data sets (other than the MNIST data set) in Luke de Oliveira's [blog post]
2. an NLP architecture to classify text, e.g.:
   - the Yelp or Amazon sentiment [data sets] detailed in Section 4 of [Xiang Zhang et al.'s paper]
   - the Yahoo! Answers categories data set also detailed in Xiang Zhang et al.'s paper
   - one of the dozens of data sets with the keywords *sentiment* or *text* in the title from [CrowdFlower]
   - one of the *Natural Language* data sets (other than the MNIST data set) in Luke de Oliveira's [blog post]
3. a regression model

Recommended starting points:

1. a machine-vision architecture to classify images, e.g.:
   - [Fashion MNIST]
   - one of the dozens of data sets with the keyword *image* in the title from [CrowdFlower]
   - one of the *Computer Vision* data sets (other than the MNIST data set) in Luke de Oliveira's [blog post]
2. an NLP architecture to classify text, e.g.:
   - the Yelp or Amazon sentiment [data sets] detailed in Section 4 of [Xiang Zhang et al.'s paper]
   - the Yahoo! Answers categories data set also detailed in Xiang Zhang et al.'s paper
   - one of the dozens of data sets with the keywords *sentiment* or *text* in the title from [CrowdFlower]
   - one of the *Natural Language* data sets (other than the MNIST data set) in Luke de Oliveira's [blog post]
3. a regression model

Recommended starting points:

1. a machine-vision architecture to classify images, e.g.:
   - [Fashion MNIST]
   - one of the dozens of data sets with the keyword *image* in the title from [CrowdFlower]
   - one of the *Computer Vision* data sets (other than the MNIST data set) in Luke de Oliveira's [blog post]
2. an NLP architecture to classify text, e.g.:
   - the Yelp or Amazon sentiment [data sets] detailed in Section 4 of [Xiang Zhang et al.'s paper]
   - the Yahoo! Answers categories data set also detailed in Xiang Zhang et al.'s paper
   - one of the dozens of data sets with the keywords *sentiment* or *text* in the title from [CrowdFlower]
   - one of the *Natural Language* data sets (other than the MNIST data set) in Luke de Oliveira's [blog post]
3. a regression model

Recommended starting points:

1. a machine-vision architecture to classify images, e.g.:
   - [Fashion MNIST]
   - one of the dozens of data sets with the keyword *image* in the title from [CrowdFlower]
   - one of the *Computer Vision* data sets (other than the MNIST data set) in Luke de Oliveira's [blog post]
2. an NLP architecture to classify text, e.g.:
   - the Yelp or Amazon sentiment [data sets] detailed in Section 4 of [Xiang Zhang et al.'s paper]
   - the Yahoo! Answers categories data set also detailed in Xiang Zhang et al.'s paper
   - one of the dozens of data sets with the keywords *sentiment* or *text* in the title from [CrowdFlower]
   - one of the *Natural Language* data sets (other than the MNIST data set) in Luke de Oliveira's [blog post]
3. a regression model

Recommended starting points:

1. a machine-vision architecture to classify images, e.g.:
   - [Fashion MNIST]
   - one of the dozens of data sets with the keyword *image* in the title from [CrowdFlower]
   - one of the *Computer Vision* data sets (other than the MNIST data set) in Luke de Oliveira's [blog post]
2. an NLP architecture to classify text, e.g.:
   - the Yelp or Amazon sentiment [data sets] detailed in Section 4 of [Xiang Zhang et al.'s paper]
   - the Yahoo! Answers categories data set also detailed in Xiang Zhang et al.'s paper
   - one of the dozens of data sets with the keywords *sentiment* or *text* in the title from [CrowdFlower]
   - one of the *Natural Language* data sets (other than the MNIST data set) in Luke de Oliveira's [blog post]
3. a regression model

Recommended starting points:

1. a machine-vision architecture to classify images, e.g.:
   - [Fashion MNIST]
   - one of the dozens of data sets with the keyword *image* in the title from [CrowdFlower]
   - one of the *Computer Vision* data sets (other than the MNIST data set) in Luke de Oliveira's [blog post]
2. an NLP architecture to classify text, e.g.:
   - the Yelp or Amazon sentiment [data sets] detailed in Section 4 of [Xiang Zhang et al.'s paper]
   - the Yahoo! Answers categories data set also detailed in Xiang Zhang et al.'s paper
   - one of the dozens of data sets with the keywords *sentiment* or *text* in the title from [CrowdFlower]
   - one of the *Natural Language* data sets (other than the MNIST data set) in Luke de Oliveira's [blog post]
3. a regression model