keras-pandas

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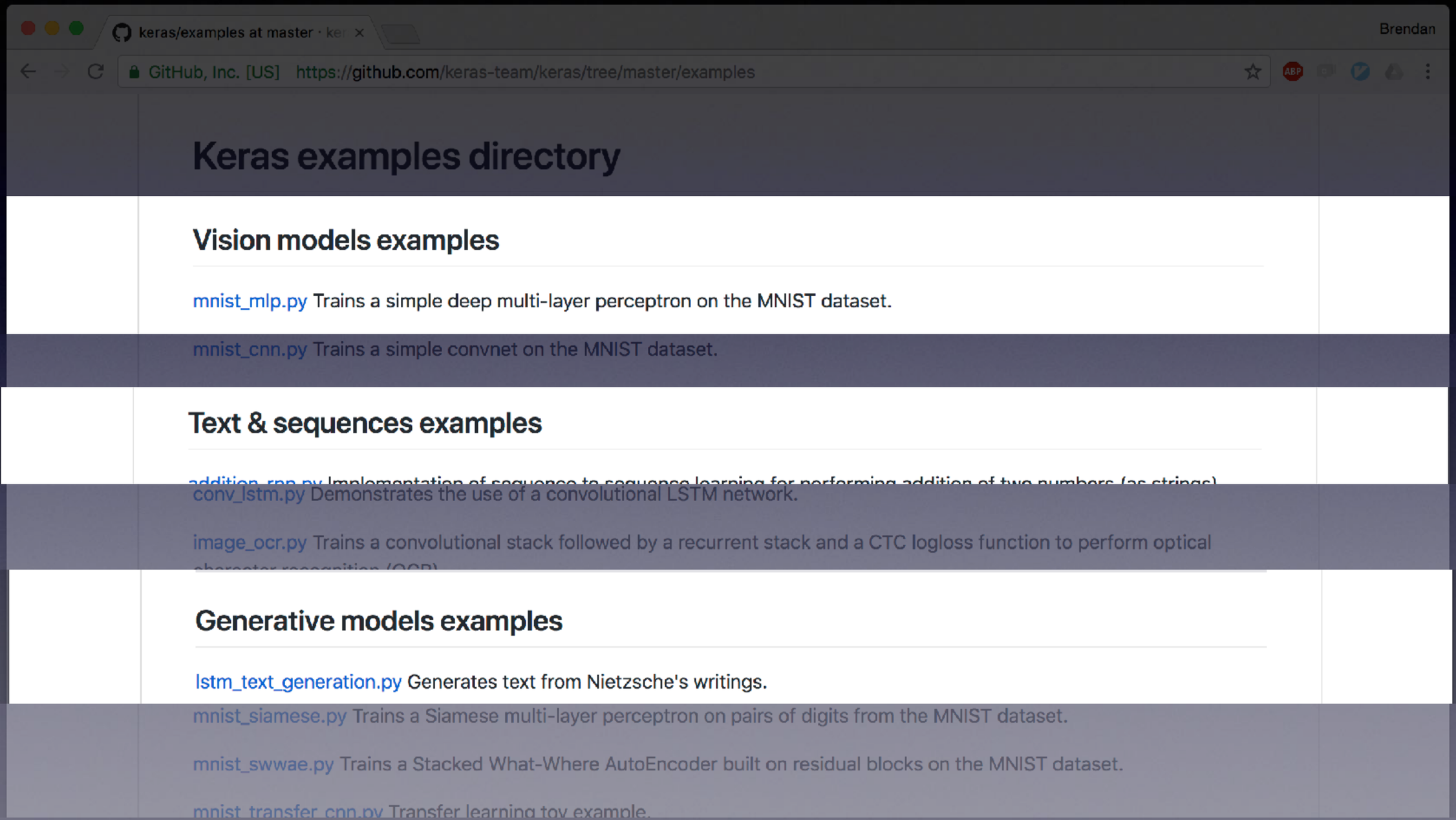
http://keras-pandas.readthedocs.io/

Slides: https://goo.gl/snzbwc


keras/examples at master · ker
Brendan
GitHub, Inc. [US] https://github.com/keras-team/keras/tree/master/examples
Keras examples directory
Vision models examples
mnist_mlp.py Trains a simple deep multi-layer perceptron on the MNIST dataset.
mnist_cnn.py Trains a simple convnet on the MNIST dataset.
Text & sequences examples
conv_lstm.py Demonstrates the use of a convolutional LSTM network.
image_ocr.py Trains a convolutional stack followed by a recurrent stack and a CTC logloss function to perform optical
Generative models examples
lstm_text_generation.py Generates text from Nietzsche's writings.
mnist_siamese.py Trains a Siamese multi-layer perceptron on pairs of digits from the MNIST dataset.
mnist_swwae.py Trains a Stacked What-Where AutoEncoder built on residual blocks on the MNIST dataset.
mnist_transfer_cnn.py Transfer learning toy example.

Intro
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Getting Started

Intro

DL is attainable. `keras-pandas` allows users to rapidly build and iterate on deep learning models.

- **New users:** Lowering the barrier to entry, good starting point.
- **Existing users:** Allows for rapid iteration, good starting point

Hands On

Old way

- **Highly customizable:** Data transformations, data format, input layers
- **Heuristic driven:** Involves high amount of domain expertise, neural network theory, and heuristics
- **Repetitive:** Time consuming & repetitive to create similarly formatted layers

keras-pandas way

- **Less customizable:** Batteries included defaults for each data type
- **Rapid:** Ability to build and iterate on models with a few function calls
- **Maintainable:** More consistent code base, with less redundancy

jupyter keras-pandas_example Last Checkpoint: 9 minutes ago (autosaved)

Logout

File Edit View Insert Cell Kernel Widgets Help

Trusted Python 2

Run Code

Getting started

We'll install `keras-pandas`

```
pip install -U keras-pandas
```

In [1]:
```
from keras import Model
from keras.layers import Dense

from keras_pandas.Automater import Automater
from keras_pandas.lib import load_titanic
```

Demo!

```
/Users/brendanherger/anaconda2/lib/python2.7/site-packages/h5py/__init__.py:36: FutureWarning: Conversion of the second argument of issubdtype from `float` to `np.floating` is deprecated. In future, it will be treated as `np.float64 == np.dtype(float).type`.
  from ._conv import register_converters as _register_converters
Using TensorFlow backend.
```

Data

Let's say we want to look at the the titanic data set

In [2]:
```
observations = load_titanic()
observations.head(2)
```

Out[2]:

	survived	pclass	name	sex	age	siblings_spouses_aboard	parents_children_aboard	fare
0	0	3	Mr. Owen Harris Braund	male	22.0	1	0	7.2500

Under the hood

What's under the hood?

Every data type has three handlers:

- **Transformations:** A pipeline of SKLearn transformers, to process & format the data
- **Input layers:** Layers that are correctly formatted to accept the input, and learn it
- **Output layer & loss:** A layer that is correctly formatted to accept the output variable, and an appropriate loss

Numerical

- **Transformations:** Imputer (null filling) & StandardScaler (normalization / whitening)
- **Input layers:** Standard input layer
- **Output layer & loss:** Single neuron output layer

Categorical

- **Transformations:** CategoricalImputer (null filling) & LabelEncoder (One hot encoding equivalent)
- **Input layers:** Input, Embedding, Flatten
- **Output layer & loss:** One neuron per categorical level

Binary

(Same as categorical)

- **Transformations:** CategoricalImputer (null filling) & LabelEncoder (One hot encoding equivalent)
- **Input layers:** Input, Embedding, Flatten
- **Output layer & loss:** One neuron per categorical level

Text

- **Transformations:** EmbeddingVectorizer (custom pre-processing step with text preprocessing and indexing)
- **Input layers:** Input, Embedding, Bi-directional LSTM, Flatten
- **Output layer & loss:** Unsupported

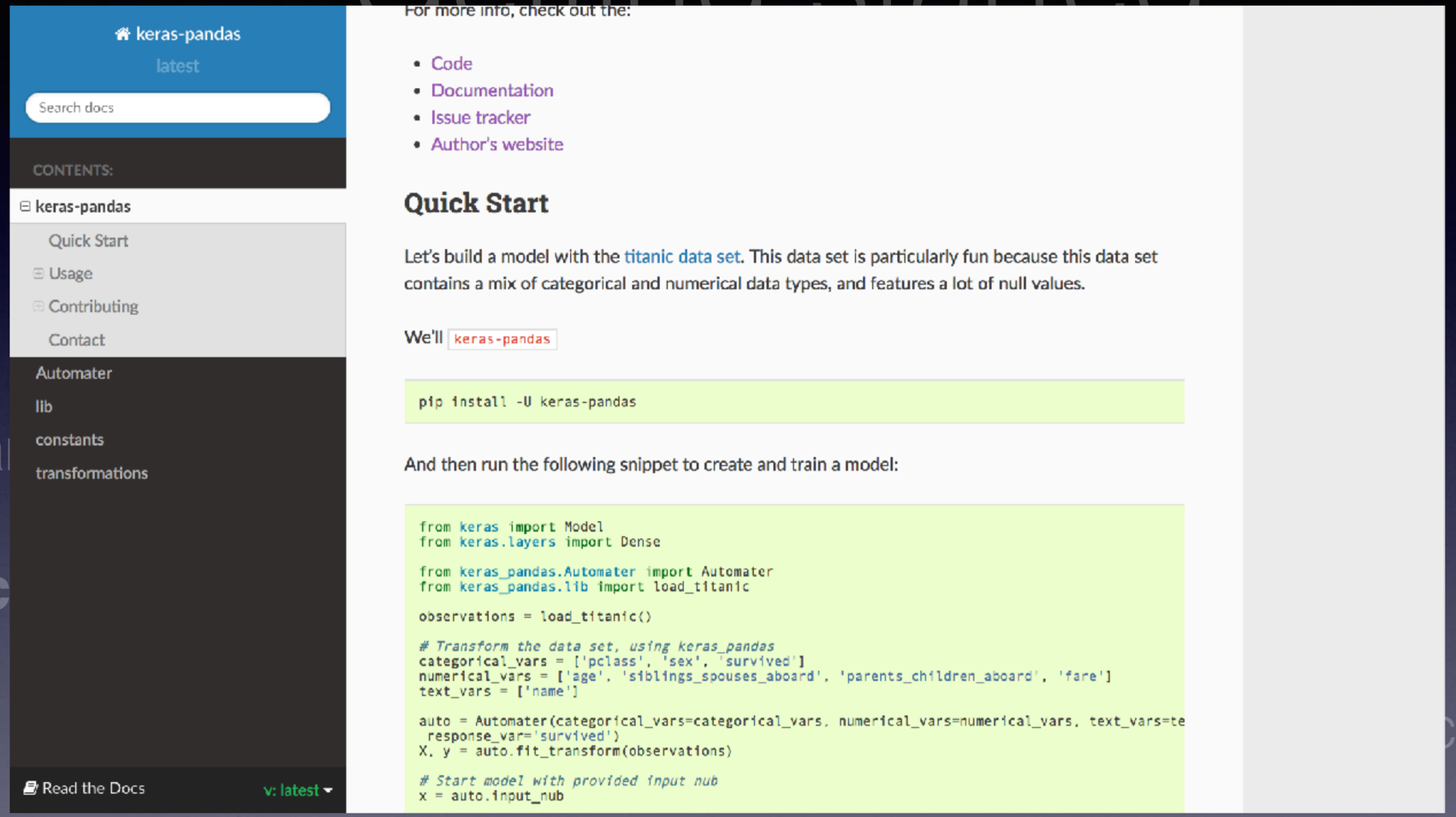
Getting Started

Getting started

- **Example:** Try the titanic example in README.md
- **Docs:** Near total coverage, dive deeper than this talk
- **Get involved:** Actively looking for collaborators & feedback

Getting started

- Exa
- Doc
- Get ck



keras-pandas

latest

Search docs

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- keras-pandas
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  - Usage
  - Contributing
  - Contact
- Automater
- lib
- constants
- transformations

Read the Docs v: latest

For more info, check out the:

- Code
- Documentation
- Issue tracker
- Author's website

Quick Start

Let's build a model with the titanic data set. This data set is particularly fun because this data set contains a mix of categorical and numerical data types, and features a lot of null values.

We'll `keras-pandas`

```
pip install -U keras-pandas
```

And then run the following snippet to create and train a model:

```
from keras import Model
from keras.layers import Dense

from keras_pandas.Automater import Automater
from keras_pandas.lib import load_titanic

observations = load_titanic()

# Transform the data set, using keras_pandas
categorical_vars = ['pclass', 'sex', 'survived']
numerical_vars = ['age', 'siblings_spouses_aboard', 'parents_children_aboard', 'fare']
text_vars = ['name']

auto = Automater(categorical_vars=categorical_vars, numerical_vars=numerical_vars, text_vars=te
 response_var='survived')
X, y = auto.fit_transform(observations)

# Start model with provided input nub
x = auto.input_nub
```

Next steps

- **Time series:** Smart defaults for time series models
- **Time stamps:** Sine / cosine decomposition, etc
- **Iterate:** Hear and respond to user feedback
- **Examples:** Find interesting data sets w/ mixed data types

Thanks!

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Appendix

Appendix

Lessons learned

- See the blog: https://www.hergertarian.com/cheat-sheet-publishing-a-python-package

Pipelines

- **Text:** String -> tokens -> embedding -> bidirectional LSTM -> Flatten
- **Numerical:** Whiten -> Dense
- **Categorical:** OHE -> Entity Embedding -> Flatten
- **Boolean:** OHE -> Entity Embedding -> Flatten