

lstm

May 6, 2021

```
[1]: from google.colab import drive
import numpy as np
import pandas as pd
from sklearn.preprocessing import LabelBinarizer
from keras.preprocessing import text, sequence
from keras.preprocessing.text import Tokenizer
from sklearn.model_selection import train_test_split
from keras.models import Sequential
from keras.layers import Dense, LSTM, Flatten
from keras.layers.embeddings import Embedding
from collections import Counter

drive.mount('/content/drive')
```

Mounted at /content/drive

```
[2]: pdb_data_no_dups = pd.read_csv('/content/drive/MyDrive/599/pdb_data_no_dups.
    ↪ csv')
pdb_data_seq = pd.read_csv('/content/drive/MyDrive/599/pdb_data_seq.csv')
df = pdb_data_no_dups.merge(pdb_data_seq, how='inner', on='structureId')

# Drop rows with missing labels
df = df[[type(c) == type('') for c in df.classification.values]]
df = df[[type(c) == type('') for c in df.sequence.values]]
# select proteins
df = df[df.macromoleculeType_x == 'Protein']
#df.reset_index()

# count numbers of instances per class
cnt = Counter(df.classification)
top_classes = 10
# sort classes
sorted_classes = cnt.most_common()[:top_classes]
classes = [c[0] for c in sorted_classes]
counts = [c[1] for c in sorted_classes]
df = df[[c in classes for c in df.classification]]
```

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seqs = df.sequence.values
# Transform labels to one-hot
lb = LabelBinarizer()
Y = lb.fit_transform(df.classification)

max_length = 256

#create and fit tokenizer
tokenizer = Tokenizer(char_level=True)
tokenizer.fit_on_texts(seqs)
#represent input data as word rank number sequences
X = tokenizer.texts_to_sequences(seqs)
X = sequence.pad_sequences(X, maxlen=max_length)

```

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[3]: embedding_dim = 8

# model
model = Sequential()
model.add(Embedding(len(tokenizer.word_index)+1, embedding_dim,
    ↳input_length=max_length))
model.add(LSTM(128,return_sequences=True))
model.add(LSTM(128))
model.add(Dense(top_classes, activation='softmax'))
model.compile(loss='categorical_crossentropy', optimizer='adam',
    ↳metrics=['accuracy'])
print(model.summary())

```

Model: "sequential"

Layer (type)	Output Shape	Param #
embedding (Embedding)	(None, 256, 8)	208
lstm (LSTM)	(None, 256, 128)	70144
lstm_1 (LSTM)	(None, 128)	131584
dense (Dense)	(None, 10)	1290

Total params: 203,226
 Trainable params: 203,226
 Non-trainable params: 0

None

```

[4]: # train
X_train, X_test, y_train, y_test = train_test_split(X, Y, test_size=0.2)

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model.fit(X_train, y_train, validation_data=(X_test, y_test), epochs=50,  
→batch_size=256)
```

Epoch 1/50

589/589 [=====] - 67s 57ms/step - loss: 2.0277 -
accuracy: 0.2456 - val_loss: 2.0575 - val_accuracy: 0.2467

Epoch 2/50

589/589 [=====] - 34s 57ms/step - loss: 2.0552 -
accuracy: 0.2489 - val_loss: 2.0529 - val_accuracy: 0.2492

Epoch 3/50

589/589 [=====] - 34s 58ms/step - loss: 1.9723 -
accuracy: 0.2649 - val_loss: 1.9258 - val_accuracy: 0.2831

Epoch 4/50

589/589 [=====] - 34s 57ms/step - loss: 1.8258 -
accuracy: 0.3140 - val_loss: 2.2482 - val_accuracy: 0.2362

Epoch 5/50

589/589 [=====] - 34s 58ms/step - loss: 1.7910 -
accuracy: 0.3248 - val_loss: 1.6373 - val_accuracy: 0.3644

Epoch 6/50

589/589 [=====] - 34s 58ms/step - loss: 1.6032 -
accuracy: 0.3870 - val_loss: 1.5429 - val_accuracy: 0.4176

Epoch 7/50

589/589 [=====] - 34s 57ms/step - loss: 1.5931 -
accuracy: 0.4034 - val_loss: 1.9238 - val_accuracy: 0.2841

Epoch 8/50

589/589 [=====] - 34s 58ms/step - loss: 1.8942 -
accuracy: 0.2909 - val_loss: 1.9881 - val_accuracy: 0.2589

Epoch 9/50

589/589 [=====] - 34s 58ms/step - loss: 1.8530 -
accuracy: 0.3013 - val_loss: 1.6756 - val_accuracy: 0.3582

Epoch 10/50

589/589 [=====] - 34s 58ms/step - loss: 1.6467 -
accuracy: 0.3718 - val_loss: 1.5567 - val_accuracy: 0.4092

Epoch 11/50

589/589 [=====] - 34s 58ms/step - loss: 1.5367 -
accuracy: 0.4224 - val_loss: 1.4838 - val_accuracy: 0.4449

Epoch 12/50

589/589 [=====] - 34s 58ms/step - loss: 1.4530 -
accuracy: 0.4625 - val_loss: 1.4341 - val_accuracy: 0.4699

Epoch 13/50

589/589 [=====] - 34s 58ms/step - loss: 1.3594 -
accuracy: 0.5042 - val_loss: 1.3076 - val_accuracy: 0.5326

Epoch 14/50

589/589 [=====] - 34s 58ms/step - loss: 1.2751 -
accuracy: 0.5473 - val_loss: 1.2867 - val_accuracy: 0.5408

Epoch 15/50

589/589 [=====] - 34s 58ms/step - loss: 1.2261 -

accuracy: 0.5678 - val_loss: 1.1801 - val_accuracy: 0.5884
 Epoch 16/50
 589/589 [=====] - 34s 58ms/step - loss: 1.1196 -
 accuracy: 0.6132 - val_loss: 1.0942 - val_accuracy: 0.6305
 Epoch 17/50
 589/589 [=====] - 34s 58ms/step - loss: 1.0507 -
 accuracy: 0.6433 - val_loss: 1.0481 - val_accuracy: 0.6494
 Epoch 18/50
 589/589 [=====] - 34s 58ms/step - loss: 1.0000 -
 accuracy: 0.6654 - val_loss: 1.0246 - val_accuracy: 0.6551
 Epoch 19/50
 589/589 [=====] - 34s 58ms/step - loss: 0.9400 -
 accuracy: 0.6900 - val_loss: 0.9441 - val_accuracy: 0.6929
 Epoch 20/50
 589/589 [=====] - 34s 58ms/step - loss: 0.8879 -
 accuracy: 0.7093 - val_loss: 0.9108 - val_accuracy: 0.7025
 Epoch 21/50
 589/589 [=====] - 34s 58ms/step - loss: 0.8375 -
 accuracy: 0.7295 - val_loss: 0.8675 - val_accuracy: 0.7188
 Epoch 22/50
 589/589 [=====] - 34s 58ms/step - loss: 0.8036 -
 accuracy: 0.7423 - val_loss: 0.8138 - val_accuracy: 0.7433
 Epoch 23/50
 589/589 [=====] - 34s 58ms/step - loss: 0.7587 -
 accuracy: 0.7587 - val_loss: 0.8036 - val_accuracy: 0.7477
 Epoch 24/50
 589/589 [=====] - 34s 57ms/step - loss: 0.7195 -
 accuracy: 0.7723 - val_loss: 0.7671 - val_accuracy: 0.7603
 Epoch 25/50
 589/589 [=====] - 34s 57ms/step - loss: 0.6717 -
 accuracy: 0.7869 - val_loss: 0.7283 - val_accuracy: 0.7733
 Epoch 26/50
 589/589 [=====] - 34s 57ms/step - loss: 0.6401 -
 accuracy: 0.7977 - val_loss: 0.7050 - val_accuracy: 0.7811
 Epoch 27/50
 589/589 [=====] - 34s 58ms/step - loss: 0.6246 -
 accuracy: 0.8031 - val_loss: 0.7050 - val_accuracy: 0.7837
 Epoch 28/50
 589/589 [=====] - 34s 58ms/step - loss: 0.5873 -
 accuracy: 0.8174 - val_loss: 0.6864 - val_accuracy: 0.7897
 Epoch 29/50
 589/589 [=====] - 34s 58ms/step - loss: 0.5618 -
 accuracy: 0.8244 - val_loss: 0.6674 - val_accuracy: 0.7954
 Epoch 30/50
 589/589 [=====] - 34s 58ms/step - loss: 0.5249 -
 accuracy: 0.8377 - val_loss: 0.6322 - val_accuracy: 0.8096
 Epoch 31/50
 589/589 [=====] - 34s 58ms/step - loss: 0.5150 -

accuracy: 0.8405 - val_loss: 0.6157 - val_accuracy: 0.8160
Epoch 32/50
589/589 [=====] - 34s 58ms/step - loss: 0.4873 -
accuracy: 0.8507 - val_loss: 0.5988 - val_accuracy: 0.8228
Epoch 33/50
589/589 [=====] - 34s 58ms/step - loss: 0.4659 -
accuracy: 0.8569 - val_loss: 0.5846 - val_accuracy: 0.8275
Epoch 34/50
589/589 [=====] - 34s 58ms/step - loss: 0.4580 -
accuracy: 0.8588 - val_loss: 0.5748 - val_accuracy: 0.8303
Epoch 35/50
589/589 [=====] - 34s 58ms/step - loss: 0.4661 -
accuracy: 0.8566 - val_loss: 0.5551 - val_accuracy: 0.8377
Epoch 36/50
589/589 [=====] - 34s 58ms/step - loss: 0.4103 -
accuracy: 0.8739 - val_loss: 0.5674 - val_accuracy: 0.8341
Epoch 37/50
589/589 [=====] - 34s 58ms/step - loss: 0.4082 -
accuracy: 0.8740 - val_loss: 0.5512 - val_accuracy: 0.8389
Epoch 38/50
589/589 [=====] - 34s 58ms/step - loss: 0.3929 -
accuracy: 0.8781 - val_loss: 0.5714 - val_accuracy: 0.8303
Epoch 39/50
589/589 [=====] - 34s 58ms/step - loss: 0.3876 -
accuracy: 0.8800 - val_loss: 0.5027 - val_accuracy: 0.8551
Epoch 40/50
589/589 [=====] - 34s 58ms/step - loss: 0.3631 -
accuracy: 0.8885 - val_loss: 0.5335 - val_accuracy: 0.8472
Epoch 41/50
589/589 [=====] - 34s 58ms/step - loss: 0.3605 -
accuracy: 0.8873 - val_loss: 0.5165 - val_accuracy: 0.8529
Epoch 42/50
589/589 [=====] - 34s 57ms/step - loss: 0.3494 -
accuracy: 0.8918 - val_loss: 0.4885 - val_accuracy: 0.8630
Epoch 43/50
589/589 [=====] - 34s 58ms/step - loss: 0.3259 -
accuracy: 0.8982 - val_loss: 0.5002 - val_accuracy: 0.8593
Epoch 44/50
589/589 [=====] - 34s 58ms/step - loss: 0.3130 -
accuracy: 0.9017 - val_loss: 0.4681 - val_accuracy: 0.8700
Epoch 45/50
589/589 [=====] - 34s 58ms/step - loss: 0.3198 -
accuracy: 0.8998 - val_loss: 0.4936 - val_accuracy: 0.8584
Epoch 46/50
589/589 [=====] - 34s 58ms/step - loss: 0.2896 -
accuracy: 0.9092 - val_loss: 0.4782 - val_accuracy: 0.8674
Epoch 47/50
589/589 [=====] - 34s 58ms/step - loss: 0.2906 -

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accuracy: 0.9093 - val_loss: 0.4775 - val_accuracy: 0.8676
Epoch 48/50
589/589 [=====] - 34s 58ms/step - loss: 0.2765 -
accuracy: 0.9123 - val_loss: 0.4483 - val_accuracy: 0.8769
Epoch 49/50
589/589 [=====] - 34s 58ms/step - loss: 0.2747 -
accuracy: 0.9131 - val_loss: 0.4936 - val_accuracy: 0.8633
Epoch 50/50
589/589 [=====] - 34s 58ms/step - loss: 0.2687 -
accuracy: 0.9142 - val_loss: 0.4476 - val_accuracy: 0.8760

```

[4]: <tensorflow.python.keras.callbacks.History at 0x7f1af1ca2ed0>

```

[!]: !apt-get install texlive texlive-xetex texlive-latex-extra pandoc
      !pip install py pandoc
      !jupyter nbconvert --to PDF "/content/drive/MyDrive/599/lstm.ipynb"

```

```

Reading package lists... Done
Building dependency tree
Reading state information... Done
pandoc is already the newest version (1.19.2.4~dfsg-1build4).
pandoc set to manually installed.
The following package was automatically installed and is no longer required:
  libnvidia-common-460
Use 'apt autoremove' to remove it.
The following additional packages will be installed:
  fonts-droid-fallback fonts-lato fonts-lmodern fonts-noto-mono fonts-texgyre
  javascript-common libcupsfilters1 libcupsimage2 libgs9 libgs9-common
  libijs-0.35 libjbig2dec0 libjs-jquery libkpathsea6 libpotrace0 libptexenc1
  libruby2.5 libsyntaxtex1 libtexlua52 libtexluajit2 libzzip-0-13 lmodern
  poppler-data preview-latex-style rake ruby ruby-did-you-mean ruby-minitest
  ruby-net-telnet ruby-power-assert ruby-test-unit ruby2.5
  rubygems-integration tlutils tex-common tex-gyre texlive-base
  texlive-binaries texlive-fonts-recommended texlive-latex-base
  texlive-latex-recommended texlive-pictures texlive-plain-generic tipa
Suggested packages:
  fonts-noto apache2 | lighttpd | httpd poppler-utils ghostscript
  fonts-japanese-mincho | fonts-ipafont-mincho fonts-japanese-gothic
  | fonts-ipafont-gothic fonts-arphic-ukai fonts-arphic-uming fonts-nanum ri
  ruby-dev bundler debhelper gv | postscript-viewer perl-tk xpdf-reader
  | pdf-viewer texlive-fonts-recommended-doc texlive-latex-base-doc
  python-pygments icc-profiles libfile-which-perl
  libspreadsheet-parseexcel-perl texlive-latex-extra-doc
  texlive-latex-recommended-doc texlive-pstricks dot2tex prerex ruby-tcltk
  | libtcltk-ruby texlive-pictures-doc vprerex
The following NEW packages will be installed:
  fonts-droid-fallback fonts-lato fonts-lmodern fonts-noto-mono fonts-texgyre
  javascript-common libcupsfilters1 libcupsimage2 libgs9 libgs9-common

```

```

libijs-0.35 libjbig2dec0 libjs-jquery libkpathsea6 libpotrace0 libptexenc1
libruby2.5 libsynchronet1 libtexlua52 libtexluajit2 libzip-0-13 lmodern
poppler-data preview-latex-style rake ruby ruby-did-you-mean ruby-minitest
ruby-net-telnet ruby-power-assert ruby-test-unit ruby2.5
rubygems-integration tluils tex-common tex-gyre texlive texlive-base
texlive-binaries texlive-fonts-recommended texlive-latex-base
texlive-latex-extra texlive-latex-recommended texlive-pictures
texlive-plain-generic texlive-xetex tipa
0 upgraded, 47 newly installed, 0 to remove and 34 not upgraded.
Need to get 146 MB of archives.
After this operation, 460 MB of additional disk space will be used.
Get:1 http://archive.ubuntu.com/ubuntu bionic/main amd64 fonts-droid-fallback
all 1:6.0.1r16-1.1 [1,805 kB]
Get:2 http://archive.ubuntu.com/ubuntu bionic/main amd64 fonts-lato all 2.0-2
[2,698 kB]
Get:3 http://archive.ubuntu.com/ubuntu bionic/main amd64 poppler-data all
0.4.8-2 [1,479 kB]
Get:4 http://archive.ubuntu.com/ubuntu bionic/main amd64 tex-common all 6.09
[33.0 kB]
Get:5 http://archive.ubuntu.com/ubuntu bionic/main amd64 fonts-lmodern all
2.004.5-3 [4,551 kB]
Get:6 http://archive.ubuntu.com/ubuntu bionic/main amd64 fonts-noto-mono all
20171026-2 [75.5 kB]
Get:7 http://archive.ubuntu.com/ubuntu bionic/universe amd64 fonts-texgyre all
20160520-1 [8,761 kB]
Get:8 http://archive.ubuntu.com/ubuntu bionic/main amd64 javascript-common all
11 [6,066 B]
Get:9 http://archive.ubuntu.com/ubuntu bionic-updates/main amd64 libcupsfilters1
amd64 1.20.2-0ubuntu3.1 [108 kB]
Get:10 http://archive.ubuntu.com/ubuntu bionic-updates/main amd64 libcupsimage2
amd64 2.2.7-1ubuntu2.8 [18.6 kB]
Get:11 http://archive.ubuntu.com/ubuntu bionic/main amd64 libijs-0.35 amd64
0.35-13 [15.5 kB]
Get:12 http://archive.ubuntu.com/ubuntu bionic/main amd64 libjbig2dec0 amd64
0.13-6 [55.9 kB]
Get:13 http://archive.ubuntu.com/ubuntu bionic-updates/main amd64 libgs9-common
all 9.26~dfsg+0-0ubuntu0.18.04.14 [5,092 kB]
Get:14 http://archive.ubuntu.com/ubuntu bionic-updates/main amd64 libgs9 amd64
9.26~dfsg+0-0ubuntu0.18.04.14 [2,265 kB]
Get:15 http://archive.ubuntu.com/ubuntu bionic/main amd64 libjs-jquery all
3.2.1-1 [152 kB]
Get:16 http://archive.ubuntu.com/ubuntu bionic-updates/main amd64 libkpathsea6
amd64 2017.20170613.44572-8ubuntu0.1 [54.9 kB]
Get:17 http://archive.ubuntu.com/ubuntu bionic/main amd64 libpotrace0 amd64
1.14-2 [17.4 kB]
Get:18 http://archive.ubuntu.com/ubuntu bionic-updates/main amd64 libptexenc1
amd64 2017.20170613.44572-8ubuntu0.1 [34.5 kB]
Get:19 http://archive.ubuntu.com/ubuntu bionic/main amd64 rubygems-integration

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all 1.11 [4,994 B]
Get:20 <http://archive.ubuntu.com/ubuntu> bionic-updates/main amd64 ruby2.5 amd64 2.5.1-1ubuntu1.9 [48.6 kB]
Get:21 <http://archive.ubuntu.com/ubuntu> bionic/main amd64 ruby amd64 1:2.5.1 [5,712 B]
Get:22 <http://archive.ubuntu.com/ubuntu> bionic-updates/main amd64 rake all 12.3.1-1ubuntu0.1 [44.9 kB]
Get:23 <http://archive.ubuntu.com/ubuntu> bionic/main amd64 ruby-did-you-mean all 1.2.0-2 [9,700 B]
Get:24 <http://archive.ubuntu.com/ubuntu> bionic/main amd64 ruby-minitest all 5.10.3-1 [38.6 kB]
Get:25 <http://archive.ubuntu.com/ubuntu> bionic/main amd64 ruby-net-telnet all 0.1.1-2 [12.6 kB]
Get:26 <http://archive.ubuntu.com/ubuntu> bionic/main amd64 ruby-power-assert all 0.3.0-1 [7,952 B]
Get:27 <http://archive.ubuntu.com/ubuntu> bionic/main amd64 ruby-test-unit all 3.2.5-1 [61.1 kB]
Get:28 <http://archive.ubuntu.com/ubuntu> bionic-updates/main amd64 libruby2.5 amd64 2.5.1-1ubuntu1.9 [3,072 kB]
Get:29 <http://archive.ubuntu.com/ubuntu> bionic-updates/main amd64 libsyntax1 amd64 2017.20170613.44572-8ubuntu0.1 [41.4 kB]
Get:30 <http://archive.ubuntu.com/ubuntu> bionic-updates/main amd64 libtexlua52 amd64 2017.20170613.44572-8ubuntu0.1 [91.2 kB]
Get:31 <http://archive.ubuntu.com/ubuntu> bionic-updates/main amd64 libtexluajit2 amd64 2017.20170613.44572-8ubuntu0.1 [230 kB]
Get:32 <http://archive.ubuntu.com/ubuntu> bionic-updates/main amd64 libzip-0-13 amd64 0.13.62-3.1ubuntu0.18.04.1 [26.0 kB]
Get:33 <http://archive.ubuntu.com/ubuntu> bionic/main amd64 lmodern all 2.004.5-3 [9,631 kB]
Get:34 <http://archive.ubuntu.com/ubuntu> bionic/main amd64 preview-latex-style all 11.91-1ubuntu1 [185 kB]
Get:35 <http://archive.ubuntu.com/ubuntu> bionic/main amd64 t1utils amd64 1.41-2 [56.0 kB]
Get:36 <http://archive.ubuntu.com/ubuntu> bionic/universe amd64 tex-gyre all 20160520-1 [4,998 kB]
Get:37 <http://archive.ubuntu.com/ubuntu> bionic-updates/main amd64 texlive-binaries amd64 2017.20170613.44572-8ubuntu0.1 [8,179 kB]
Get:38 <http://archive.ubuntu.com/ubuntu> bionic/main amd64 texlive-base all 2017.20180305-1 [18.7 MB]
Get:39 <http://archive.ubuntu.com/ubuntu> bionic/universe amd64 texlive-fonts-recommended all 2017.20180305-1 [5,262 kB]
Get:40 <http://archive.ubuntu.com/ubuntu> bionic/main amd64 texlive-latex-base all 2017.20180305-1 [951 kB]
Get:41 <http://archive.ubuntu.com/ubuntu> bionic/main amd64 texlive-latex-recommended all 2017.20180305-1 [14.9 MB]
Get:42 <http://archive.ubuntu.com/ubuntu> bionic/universe amd64 texlive all 2017.20180305-1 [14.4 kB]
Get:43 <http://archive.ubuntu.com/ubuntu> bionic/universe amd64 texlive-pictures


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all 2017.20180305-1 [4,026 kB]
Get:44 http://archive.ubuntu.com/ubuntu bionic/universe amd64 texlive-latex-
extra all 2017.20180305-2 [10.6 MB]
Get:45 http://archive.ubuntu.com/ubuntu bionic/universe amd64 texlive-plain-
generic all 2017.20180305-2 [23.6 MB]
Get:46 http://archive.ubuntu.com/ubuntu bionic/universe amd64 tipa all 2:1.3-20
[2,978 kB]
Get:47 http://archive.ubuntu.com/ubuntu bionic/universe amd64 texlive-xetex all
2017.20180305-1 [10.7 MB]
Fetched 146 MB in 5s (31.5 MB/s)
Extracting templates from packages: 100%
Preconfiguring packages ...
Selecting previously unselected package fonts-droid-fallback.
(Reading database ... 160690 files and directories currently installed.)
Preparing to unpack .../00-fonts-droid-fallback_1%3a6.0.1r16-1.1_all.deb ...
Unpacking fonts-droid-fallback (1:6.0.1r16-1.1) ...
Selecting previously unselected package fonts-lato.
Preparing to unpack .../01-fonts-lato_2.0-2_all.deb ...
Unpacking fonts-lato (2.0-2) ...
Selecting previously unselected package poppler-data.
Preparing to unpack .../02-poppler-data_0.4.8-2_all.deb ...
Unpacking poppler-data (0.4.8-2) ...
Selecting previously unselected package tex-common.
Preparing to unpack .../03-tex-common_6.09_all.deb ...
Unpacking tex-common (6.09) ...
Selecting previously unselected package fonts-lmodern.
Preparing to unpack .../04-fonts-lmodern_2.004.5-3_all.deb ...
Unpacking fonts-lmodern (2.004.5-3) ...
Selecting previously unselected package fonts-noto-mono.
Preparing to unpack .../05-fonts-noto-mono_20171026-2_all.deb ...
Unpacking fonts-noto-mono (20171026-2) ...
Selecting previously unselected package fonts-texgyre.
Preparing to unpack .../06-fonts-texgyre_20160520-1_all.deb ...
Unpacking fonts-texgyre (20160520-1) ...
Selecting previously unselected package javascript-common.
Preparing to unpack .../07-javascript-common_11_all.deb ...
Unpacking javascript-common (11) ...
Selecting previously unselected package libcupsfilters1:amd64.
Preparing to unpack .../08-libcupsfilters1_1.20.2-0ubuntu3.1_amd64.deb ...
Unpacking libcupsfilters1:amd64 (1.20.2-0ubuntu3.1) ...
Selecting previously unselected package libcupsimage2:amd64.
Preparing to unpack .../09-libcupsimage2_2.2.7-1ubuntu2.8_amd64.deb ...
Unpacking libcupsimage2:amd64 (2.2.7-1ubuntu2.8) ...
Selecting previously unselected package libijs-0.35:amd64.
Preparing to unpack .../10-libijs-0.35_0.35-13_amd64.deb ...
Unpacking libijs-0.35:amd64 (0.35-13) ...
Selecting previously unselected package libjbig2dec0:amd64.
Preparing to unpack .../11-libjbig2dec0_0.13-6_amd64.deb ...

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Unpacking libjbig2dec0:amd64 (0.13-6) ...
Selecting previously unselected package libgs9-common.
Preparing to unpack .../12-libgs9-common_9.26~dfsg+0-0ubuntu0.18.04.14_all.deb
...
Unpacking libgs9-common (9.26~dfsg+0-0ubuntu0.18.04.14) ...
Selecting previously unselected package libgs9:amd64.
Preparing to unpack .../13-libgs9_9.26~dfsg+0-0ubuntu0.18.04.14_amd64.deb ...
Unpacking libgs9:amd64 (9.26~dfsg+0-0ubuntu0.18.04.14) ...
Selecting previously unselected package libjs-jquery.
Preparing to unpack .../14-libjs-jquery_3.2.1-1_all.deb ...
Unpacking libjs-jquery (3.2.1-1) ...
Selecting previously unselected package libkpathsea6:amd64.
Preparing to unpack .../15-libkpathsea6_2017.20170613.44572-8ubuntu0.1_amd64.deb
...
Unpacking libkpathsea6:amd64 (2017.20170613.44572-8ubuntu0.1) ...
Selecting previously unselected package libpotrace0.
Preparing to unpack .../16-libpotrace0_1.14-2_amd64.deb ...
Unpacking libpotrace0 (1.14-2) ...
Selecting previously unselected package libptexenc1:amd64.
Preparing to unpack .../17-libptexenc1_2017.20170613.44572-8ubuntu0.1_amd64.deb
...
Unpacking libptexenc1:amd64 (2017.20170613.44572-8ubuntu0.1) ...
Selecting previously unselected package rubygems-integration.
Preparing to unpack .../18-rubygems-integration_1.11_all.deb ...
Unpacking rubygems-integration (1.11) ...
Selecting previously unselected package ruby2.5.
Preparing to unpack .../19-ruby2.5_2.5.1-1ubuntu1.9_amd64.deb ...
Unpacking ruby2.5 (2.5.1-1ubuntu1.9) ...
Selecting previously unselected package ruby.
Preparing to unpack .../20-ruby_1%3a2.5.1_amd64.deb ...
Unpacking ruby (1:2.5.1) ...
Selecting previously unselected package rake.
Preparing to unpack .../21-rake_12.3.1-1ubuntu0.1_all.deb ...
Unpacking rake (12.3.1-1ubuntu0.1) ...
Selecting previously unselected package ruby-did-you-mean.
Preparing to unpack .../22-ruby-did-you-mean_1.2.0-2_all.deb ...
Unpacking ruby-did-you-mean (1.2.0-2) ...
Selecting previously unselected package ruby-minitest.
Preparing to unpack .../23-ruby-minitest_5.10.3-1_all.deb ...
Unpacking ruby-minitest (5.10.3-1) ...
Selecting previously unselected package ruby-net-telnet.
Preparing to unpack .../24-ruby-net-telnet_0.1.1-2_all.deb ...
Unpacking ruby-net-telnet (0.1.1-2) ...
Selecting previously unselected package ruby-power-assert.
Preparing to unpack .../25-ruby-power-assert_0.3.0-1_all.deb ...
Unpacking ruby-power-assert (0.3.0-1) ...
Selecting previously unselected package ruby-test-unit.
Preparing to unpack .../26-ruby-test-unit_3.2.5-1_all.deb ...

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Unpacking ruby-test-unit (3.2.5-1) ...
Selecting previously unselected package libruby2.5:amd64.
Preparing to unpack .../27-libruby2.5_2.5.1-1ubuntu1.9_amd64.deb ...
Unpacking libruby2.5:amd64 (2.5.1-1ubuntu1.9) ...
Selecting previously unselected package libsyntax1:amd64.
Preparing to unpack .../28-libsyntax1_2017.20170613.44572-8ubuntu0.1_amd64.deb
...
Unpacking libsyntax1:amd64 (2017.20170613.44572-8ubuntu0.1) ...
Selecting previously unselected package libtexlua52:amd64.
Preparing to unpack .../29-libtexlua52_2017.20170613.44572-8ubuntu0.1_amd64.deb
...
Unpacking libtexlua52:amd64 (2017.20170613.44572-8ubuntu0.1) ...
Selecting previously unselected package libtexluajit2:amd64.
Preparing to unpack
.../30-libtexluajit2_2017.20170613.44572-8ubuntu0.1_amd64.deb ...
Unpacking libtexluajit2:amd64 (2017.20170613.44572-8ubuntu0.1) ...
Selecting previously unselected package libzip-0-13:amd64.
Preparing to unpack .../31-libzip-0-13_0.13.62-3.1ubuntu0.18.04.1_amd64.deb ...
Unpacking libzip-0-13:amd64 (0.13.62-3.1ubuntu0.18.04.1) ...
Selecting previously unselected package lmodern.
Preparing to unpack .../32-lmodern_2.004.5-3_all.deb ...
Unpacking lmodern (2.004.5-3) ...
Selecting previously unselected package preview-latex-style.
Preparing to unpack .../33-preview-latex-style_11.91-1ubuntu1_all.deb ...
Unpacking preview-latex-style (11.91-1ubuntu1) ...
Selecting previously unselected package t1utils.
Preparing to unpack .../34-t1utils_1.41-2_amd64.deb ...
Unpacking t1utils (1.41-2) ...
Selecting previously unselected package tex-gyre.
Preparing to unpack .../35-tex-gyre_20160520-1_all.deb ...
Unpacking tex-gyre (20160520-1) ...
Selecting previously unselected package texlive-binaries.
Preparing to unpack .../36-texlive-
binaries_2017.20170613.44572-8ubuntu0.1_amd64.deb ...
Unpacking texlive-binaries (2017.20170613.44572-8ubuntu0.1) ...
Selecting previously unselected package texlive-base.
Preparing to unpack .../37-texlive-base_2017.20180305-1_all.deb ...
Unpacking texlive-base (2017.20180305-1) ...
Selecting previously unselected package texlive-fonts-recommended.
Preparing to unpack .../38-texlive-fonts-recommended_2017.20180305-1_all.deb ...
Unpacking texlive-fonts-recommended (2017.20180305-1) ...
Selecting previously unselected package texlive-latex-base.
Preparing to unpack .../39-texlive-latex-base_2017.20180305-1_all.deb ...
Unpacking texlive-latex-base (2017.20180305-1) ...
Selecting previously unselected package texlive-latex-recommended.
Preparing to unpack .../40-texlive-latex-recommended_2017.20180305-1_all.deb ...
Unpacking texlive-latex-recommended (2017.20180305-1) ...
Selecting previously unselected package texlive.

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Preparing to unpack .../41-texlive_2017.20180305-1_all.deb ...
Unpacking texlive (2017.20180305-1) ...
Selecting previously unselected package texlive-pictures.
Preparing to unpack .../42-texlive-pictures_2017.20180305-1_all.deb ...
Unpacking texlive-pictures (2017.20180305-1) ...
Selecting previously unselected package texlive-latex-extra.
Preparing to unpack .../43-texlive-latex-extra_2017.20180305-2_all.deb ...
Unpacking texlive-latex-extra (2017.20180305-2) ...
Selecting previously unselected package texlive-plain-generic.
Preparing to unpack .../44-texlive-plain-generic_2017.20180305-2_all.deb ...
Unpacking texlive-plain-generic (2017.20180305-2) ...
Selecting previously unselected package tipa.
Preparing to unpack .../45-tipa_2%3a1.3-20_all.deb ...
Unpacking tipa (2:1.3-20) ...
Selecting previously unselected package texlive-xetex.
Preparing to unpack .../46-texlive-xetex_2017.20180305-1_all.deb ...
Unpacking texlive-xetex (2017.20180305-1) ...
Setting up libgs9-common (9.26~dfsg+0-0ubuntu0.18.04.14) ...
Setting up libkpathsea6:amd64 (2017.20170613.44572-8ubuntu0.1) ...
Setting up libjs-jquery (3.2.1-1) ...
Setting up libtexlua52:amd64 (2017.20170613.44572-8ubuntu0.1) ...
Setting up fonts-droid-fallback (1:6.0.1r16-1.1) ...
Setting up libsynchronet1:amd64 (2017.20170613.44572-8ubuntu0.1) ...
Setting up libptexenc1:amd64 (2017.20170613.44572-8ubuntu0.1) ...
Setting up tex-common (6.09) ...
update-language: texlive-base not installed and configured, doing nothing!
Setting up poppler-data (0.4.8-2) ...
Setting up tex-gyre (20160520-1) ...
Setting up preview-latex-style (11.91-1ubuntu1) ...
Setting up fonts-texgyre (20160520-1) ...
Setting up fonts-noto-mono (20171026-2) ...
Setting up fonts-lato (2.0-2) ...
Setting up libcupsfilters1:amd64 (1.20.2-0ubuntu3.1) ...
Setting up libcupsimage2:amd64 (2.2.7-1ubuntu2.8) ...
Setting up libjbig2dec0:amd64 (0.13-6) ...
Setting up ruby-did-you-mean (1.2.0-2) ...
Setting up t1utils (1.41-2) ...
Setting up ruby-net-telnet (0.1.1-2) ...
Setting up libijs-0.35:amd64 (0.35-13) ...
Setting up rubygems-integration (1.11) ...
Setting up libpotrace0 (1.14-2) ...
Setting up javascript-common (11) ...
Setting up ruby-minitest (5.10.3-1) ...
Setting up libzzip-0-13:amd64 (0.13.62-3.1ubuntu0.18.04.1) ...
Setting up libgs9:amd64 (9.26~dfsg+0-0ubuntu0.18.04.14) ...
Setting up libtexluajit2:amd64 (2017.20170613.44572-8ubuntu0.1) ...
Setting up fonts-lmodern (2.004.5-3) ...
Setting up ruby-power-assert (0.3.0-1) ...

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Setting up texlive-binaries (2017.20170613.44572-8ubuntu0.1) ...
update-alternatives: using /usr/bin/xdvi-xaw to provide /usr/bin/xdvi.bin
(xdvi.bin) in auto mode
update-alternatives: using /usr/bin/bibtex.original to provide /usr/bin/bibtex
(bibtex) in auto mode
Setting up texlive-base (2017.20180305-1) ...
mktexlsr: Updating /var/lib/texmf/ls-R-TEXLIVEDIST...
mktexlsr: Updating /var/lib/texmf/ls-R-TEXMFMAIN...
mktexlsr: Updating /var/lib/texmf/ls-R...
mktexlsr: Done.
tl-paper: setting paper size for dvips to a4: /var/lib/texmf/dvips/config
/config-paper.ps
tl-paper: setting paper size for dvipdfmx to a4: /var/lib/texmf/dvipdfmx
/dvipdfmx-paper.cfg
tl-paper: setting paper size for xdvi to a4: /var/lib/texmf/xdvi/XDvi-paper
tl-paper: setting paper size for pdftex to a4:
/var/lib/texmf/tex/generic/config/pdftexconfig.tex
Setting up texlive-fonts-recommended (2017.20180305-1) ...
Setting up texlive-plain-generic (2017.20180305-2) ...
Setting up texlive-latex-base (2017.20180305-1) ...
Setting up lmodern (2.004.5-3) ...
Setting up texlive-latex-recommended (2017.20180305-1) ...
Setting up texlive-pictures (2017.20180305-1) ...
Setting up tipa (2:1.3-20) ...
Regenerating '/var/lib/texmf/fmtutil.cnf-DEBIAN'... done.
Regenerating '/var/lib/texmf/fmtutil.cnf-TEXLIVEDIST'... done.
update-fmtutil has updated the following file(s):
    /var/lib/texmf/fmtutil.cnf-DEBIAN
    /var/lib/texmf/fmtutil.cnf-TEXLIVEDIST
If you want to activate the changes in the above file(s),
you should run fmtutil-sys or fmtutil.
Setting up texlive (2017.20180305-1) ...
Setting up texlive-latex-extra (2017.20180305-2) ...
Setting up texlive-xetex (2017.20180305-1) ...
Setting up ruby2.5 (2.5.1-1ubuntu1.9) ...
Setting up ruby (1:2.5.1) ...
Setting up ruby-test-unit (3.2.5-1) ...
Setting up rake (12.3.1-1ubuntu0.1) ...
Setting up libruby2.5:amd64 (2.5.1-1ubuntu1.9) ...
Processing triggers for mime-support (3.60ubuntu1) ...
Processing triggers for libc-bin (2.27-3ubuntu1.2) ...
/sbin/ldconfig.real: /usr/local/lib/python3.7/dist-
packages/ideep4py/lib/libmkldnn.so.0 is not a symbolic link

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