2019-10-25
Lab meeting 2

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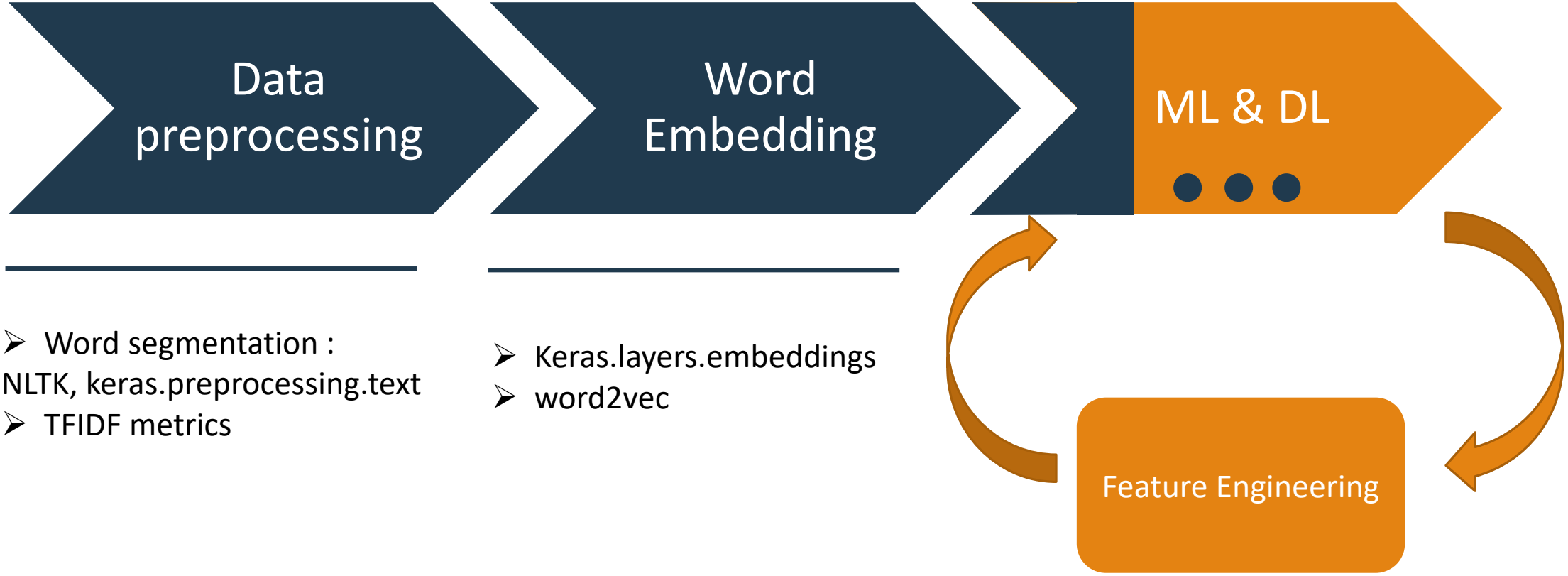
Outline

1. AI cup
2. Data release survey : Harvard Data Verse

2019 AI cup

AI cup progress (1/2)



- Word segmentation : NLTK, keras.preprocessing.text
- TFIDF metrics

- Keras.layers.embeddings
- word2vec

AI cup progress (2/2)

- ML model works
- Classification Method :
  - SVM
  - Naïve Bayes
  - Decision Tree
  - Logistic Regression
  - Random Forest
  - XG Boost
- Deep Neuron Network :
  - MLP
  - RNN
  - CNN
  - CRNN

AI cup Model : MLP example (1/4)

```
from sklearn.model_selection import train_test_split

X_train,X_test,y_train,y_test = train_test_split(k_x_train,K_y_train,test_size=0.4, random_state=
0)
```

```
# Try about keras preprocessing
from keras.preprocessing import sequence
from keras.preprocessing.text import Tokenizer

token = Tokenizer(num_words=500)
token.fit_on_texts(X_train)
print(token.document_count)
```

```
4200
```

```
x_train_seq = token.texts_to_sequences(X_train)
x_test_seq = token.texts_to_sequences(X_test)

xtrain = sequence.pad_sequences(x_train_seq,maxlen=100)
xtest = sequence.pad_sequences(x_test_seq,maxlen=100)

print('Before pad_sequences length=', len(x_train_seq[0]))
print(x_train_seq[0])
print('After pad_sequences length=', len(xtrain[0]))
print(xtrain[0])
```

AI cup Model : MLP example (2/4)

```
# labels' one_hot() encoding
from keras.utils import np_utils
y_train_OneHot = np_utils.to_categorical(y_train)
y_test_OneHot = np_utils.to_categorical(y_test)
```

```
from keras.models import Sequential
from keras.layers.core import Dense, Dropout, Activation, Flatten
from keras.layers.embeddings import Embedding

model = Sequential()
model.add(Embedding(output_dim=32,input_dim=500,input_length=100))
model.add(Dropout(0.15))
model.add(Flatten())
model.add(Dense(units=256,activation='relu'))
model.add(Dropout(0.1))
model.add(Dense(units=128))
model.add(Dense(units=8,activation='sigmoid'))
model.compile(optimizer='adam', loss='binary_crossentropy', metrics=['accuracy'])
train_history = model.fit(xtrain, y_train_OneHot, nb_epoch=100, batch_size=100,
                          verbose=2, validation_split=0.2)
```

AI cup Model : MLP example (3/4)

```
# prediction
prediction = model.predict_classes(xtest)
scores = model.evaluate(xtest,y_test_OneHot,verbose=0)

from sklearn import metrics
from sklearn.metrics import accuracy_score

print("Classification report for classifier:\n%s"% ( metrics.classification_report(y_test, predict
ion.tolist())))
accuracy = accuracy_score(y_test, prediction.tolist())
print("Accuracy: %.2f%%" % (accuracy * 100.0))
print("================================\n")
# output confusion_matrix
import pandas_ml
from pandas_ml import ConfusionMatrix
confusion_matrix = ConfusionMatrix(y_test, prediction.tolist())
print("Confusion matrix:\n%s" % confusion_matrix)
```

AI cup Model : MLP example (4/4)

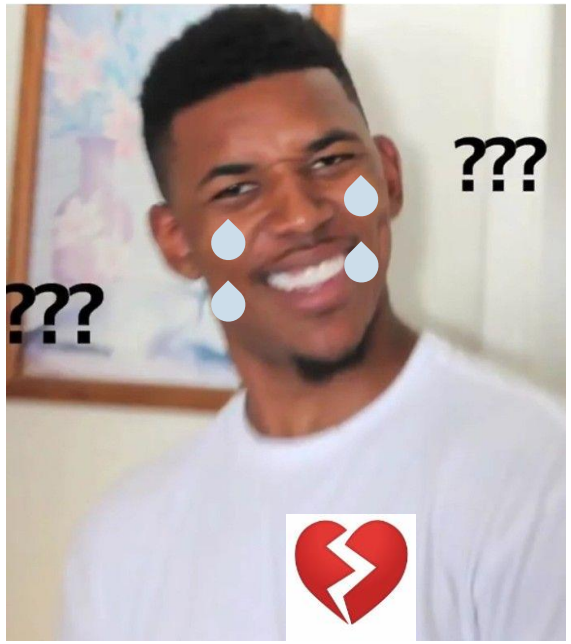
```
Classification report for classifier:
              precision    recall  f1-score   support

           0       0.45      0.48      0.47       796
           1       0.38      0.40      0.39       783
           2       0.22      0.21      0.22       387
           3       0.13      0.09      0.10       148
           4       0.15      0.15      0.15       243
           5       0.12      0.13      0.12       293
           6       0.08      0.07      0.08        97
           7       0.00      0.00      0.00        53

    accuracy                           0.31      2800
   macro avg       0.19      0.19      0.19      2800
weighted avg       0.30      0.31      0.31      2800

Accuracy: 31.18%
==============================

Confusion matrix:
Predicted    0    1    2    3    4    5    6   7  __all__
Actual
0          386  152   71   29   34  104   17   3      796
1          157  311   97   20   79   85   28   6      783
2           65  121   82   18   50   32   14   5      387
3           49   30   22   13   12   15    7   0      148
4           39   80   53    9   37   16    8   1      243
5          101   89   25    8   22   37    6   5      293
6           32   20   18    3    8    9    7   0       97
7           23   15    3    3    5    3    1   0       53
__all__    852  818  371  103  247  301   88  20     2800
```



- Adjust the parameter
- Try out another DNN model

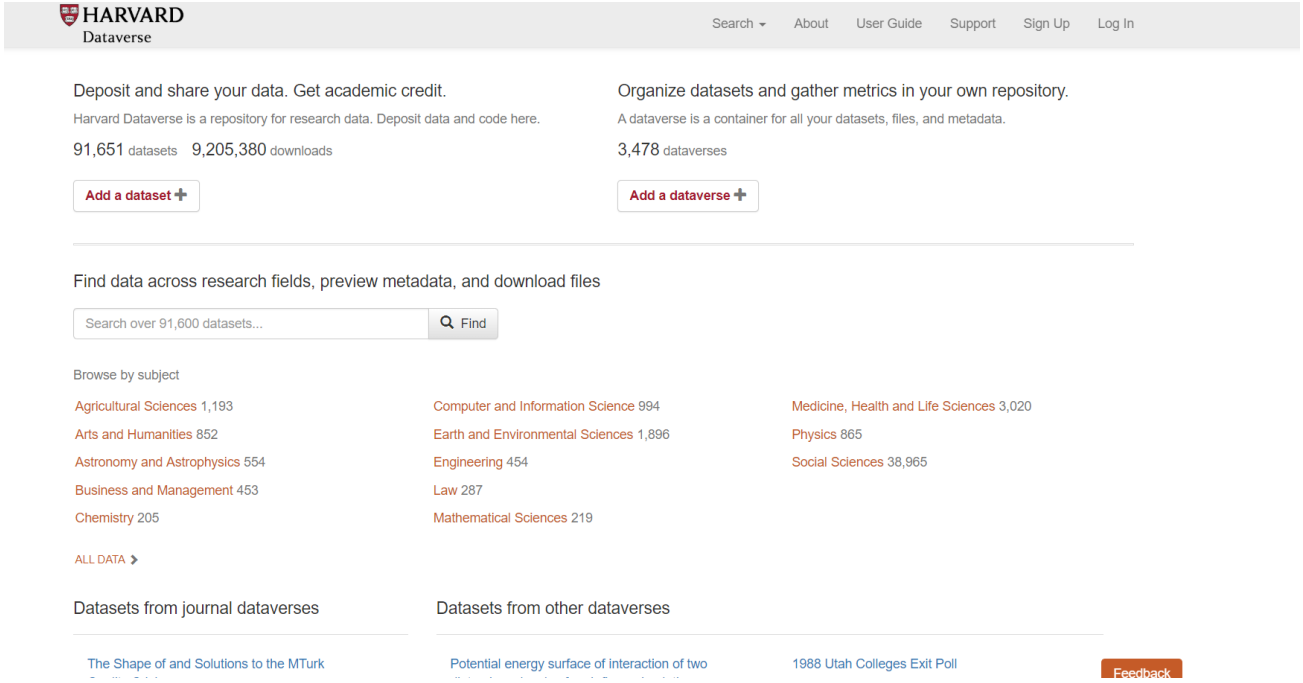
Next week's goals

- Upload submission to leaderboard
- Finish trying every model
- Additional, Go on to feature engineering

Data release survey

Harvard Dataverse

Harvard Dataverse



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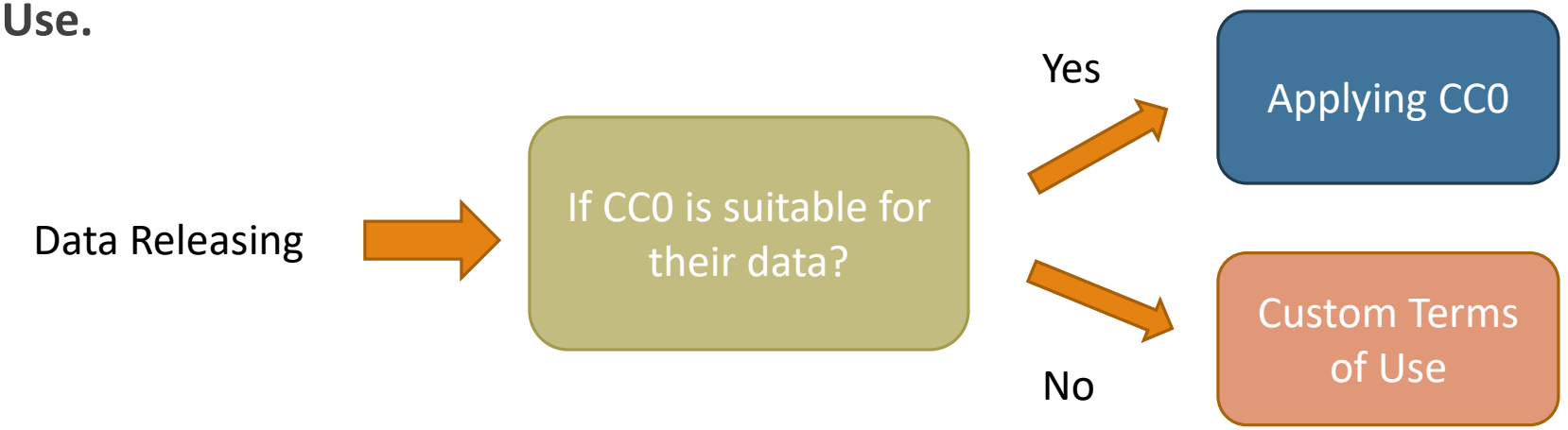

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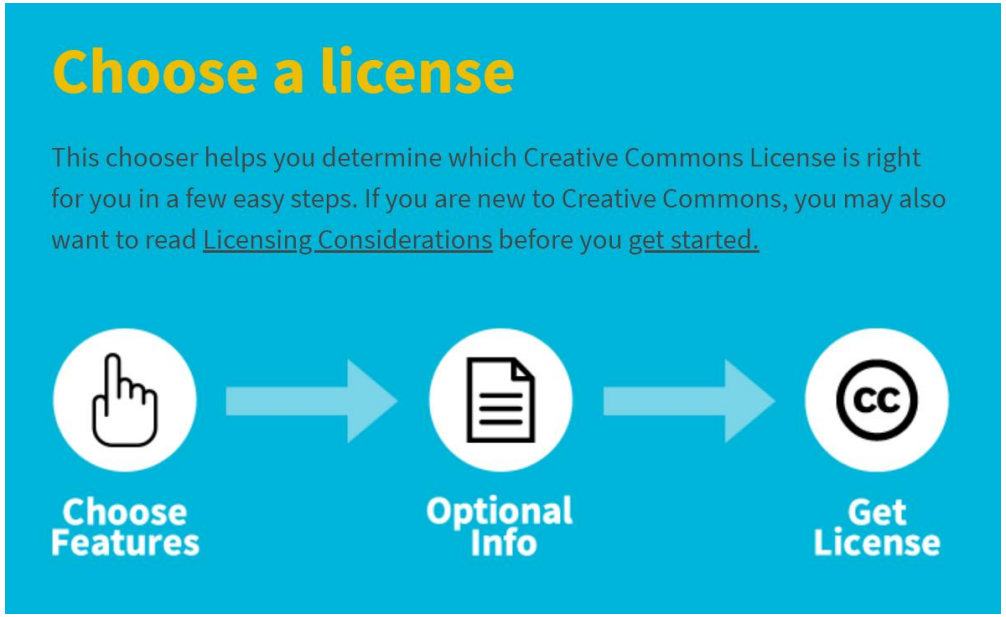

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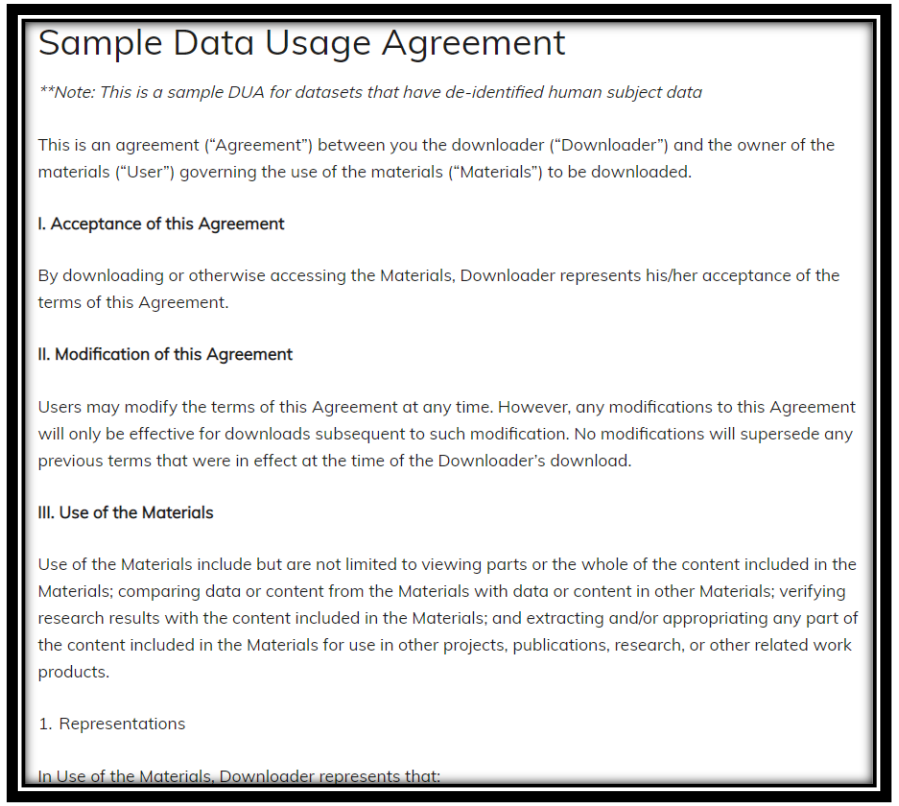
- Example of data usage agreement
- Restrict files in dataset



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