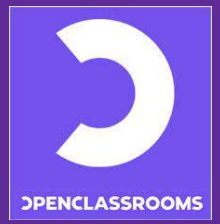
Projet 5 : Parcours Machine Learning
Catégorisez automatiquement des questions



Juillet 2023
Clara Yaïche
Étudiante en alternance NXP - OpenClassrooms
Parcours Machine Learning

La problématique

Natural language processing (NLP)

Topic modelling

How to make good reproducible pandas examples

Asked 9 years, 7 months ago Modified 5 months ago Viewed 50k times

220

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`python` `pandas`

Sommaire

I. Les données, leur traitement et leur représentation
   1. Traitements des posts
   2. Approche du type “bag-of-word”
   3. Représentation en grande dimension : id2word, TF-IDF, sparse matrix, LSA

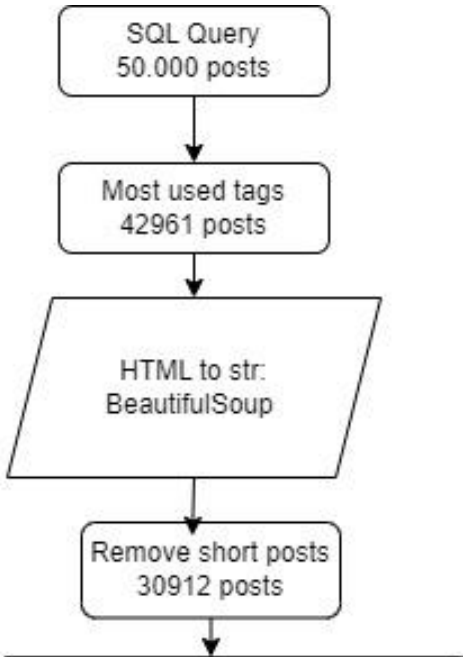
II. Le choix du modèle
   1. Approche non supervisé : LSA, LDA, K-means evaluation
   2. Approche supervisée : Régression logistique, SVM, arbres aléatoires
   3. Réseau de neurones avec embeddings : Word2Vec, USE and BERT

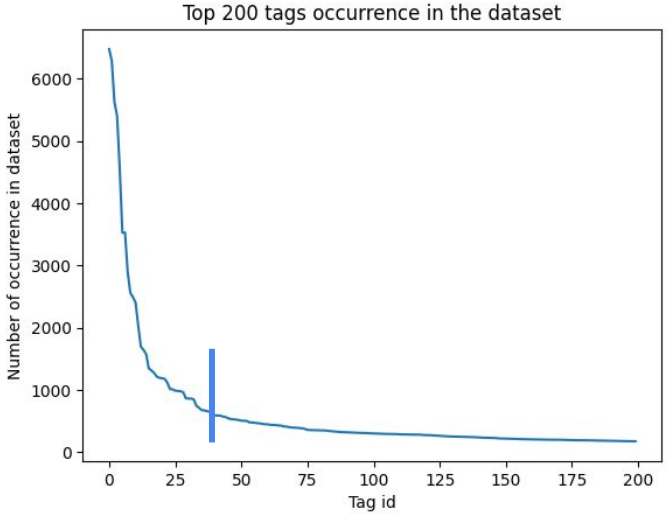
III. La Mise en production :

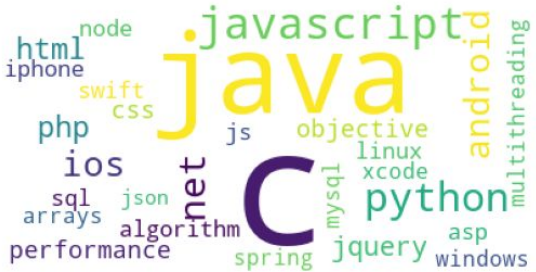
   1. Gestion de version : Git
   2. Streamlit et MLFlow

Les données, leur traitement et leur représentation

Traitements des posts

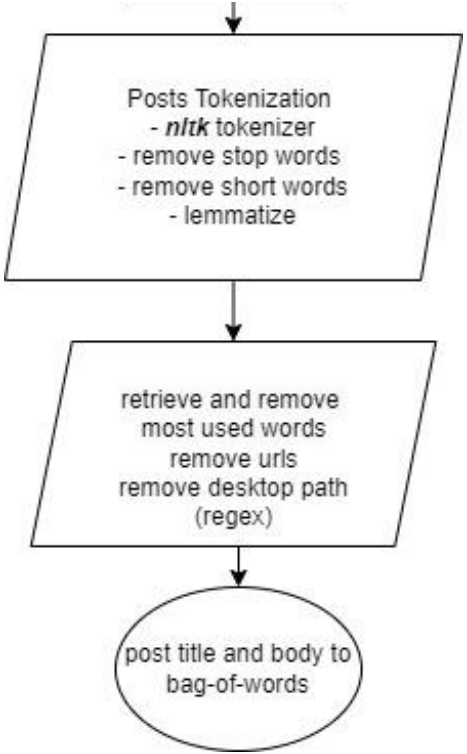






Les données, leur traitement et leur représentation

Approche du type “bag-of-word”



Let's tokenize this sentence !! This will make a great example

['tokenize', 'sentence', 'This', 'make', 'great', 'example']

['tokenize', 'sentence', 'great']

Nombre de tokens par post :

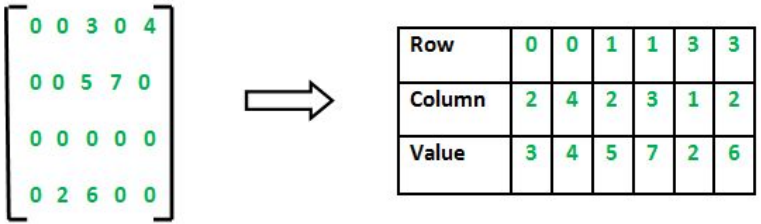
count	30912
mean	122
50%	87
min	15
max	2368

Choix particulier au projet : garder les majuscules et les minuscules, lemmatisation plutôt que stémmatisaton

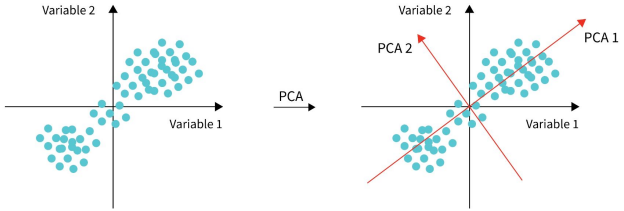
Les données, leur traitement et leur représentation

Représentation en grande dimension : id2word, TF-IDF, matrice creuse, LSA

	about	bird	heard	is	the	word	you
About the bird, the bird, bird bird bird	1	5	0	0	2	0	0
You heard about the bird	1	1	1	0	1	0	1
The bird is the word	0	1	0	1	2	1	0



Représentation mémoire des matrices creuses



Réduction de dimension

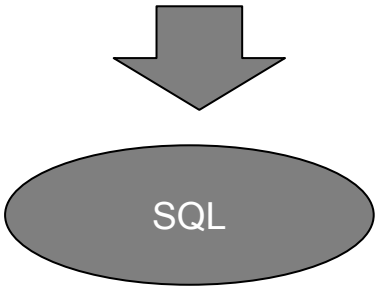
Le choix du modèle

Le choix du modèle

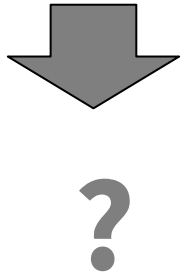
Approche non supervisé : LSA, LDA, K-means

LSA :

```
Component 4 ['query', 'database',
'date', 'connection', 'record',
'MySQL', 'column', 'SELECT',
'WHERE', 'FROM', 'table', 'row',
'month', 'Date', 'day', 'Server',
'session', 'product',
'transaction', 'timestamp']
```



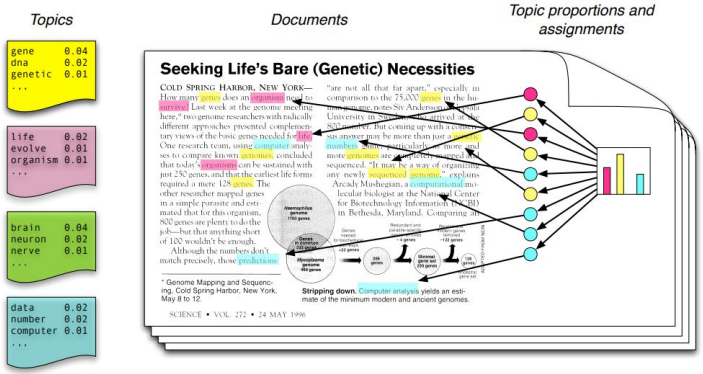

```
Component 3 ['dependency',
'Studio', 'compile', 'build',
'Visual', 'assembly', 'module',
'artifactId', 'groupId', 'package',
'Android', 'directory', 'file',
'install', 'service', 'folder',
'Windows', 'INFO', 'project',
'machine']
```



Le choix du modèle

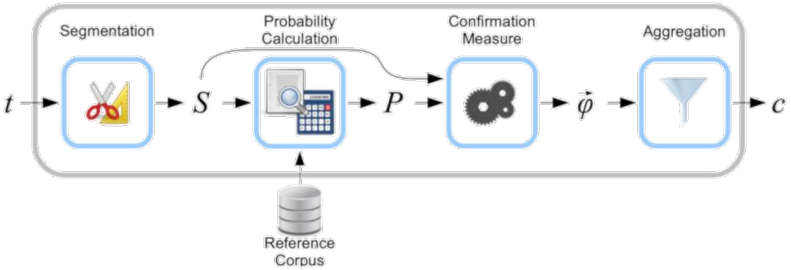
Approche non supervisé : LSA, LDA, K-means

LDA : Latent Ditrichlet Allocation



- Each **topic** is a distribution over words
- Each **document** is a mixture of corpus-wide topics
- Each **word** is drawn from one of those topics

Mesure l'interprétabilité :



Choix des mesures de cohérence : c_v et u_mass

Le choix du modèle

Approche supervisée : Régression logistique, SVM, arbres aléatoires

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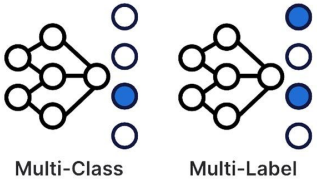
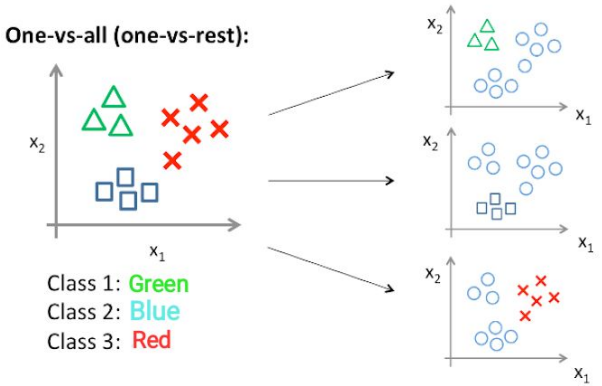
python pandas



MultiLabelBinarizer()

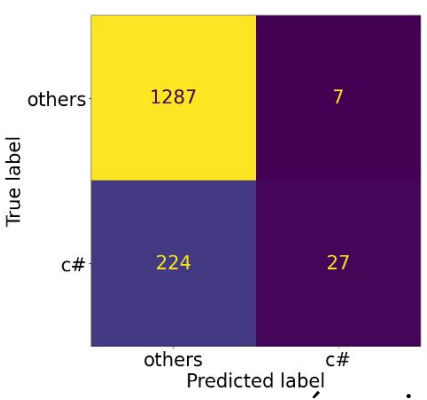


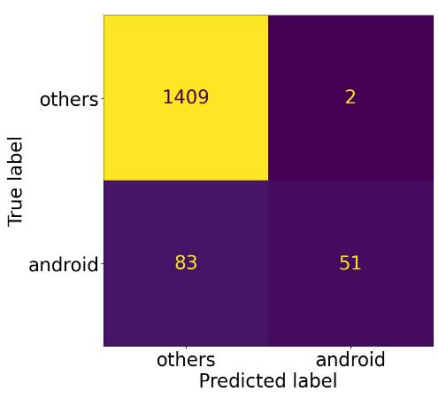
Regression logistique : One Vs Rest

SVM : SVC, One Vs One

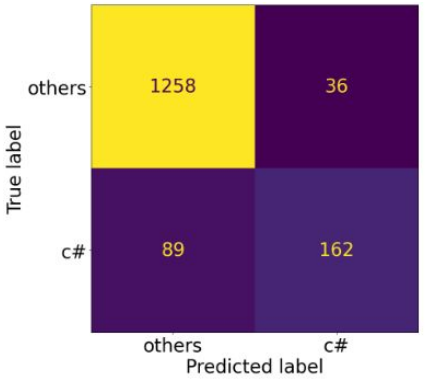
Le choix du modèle

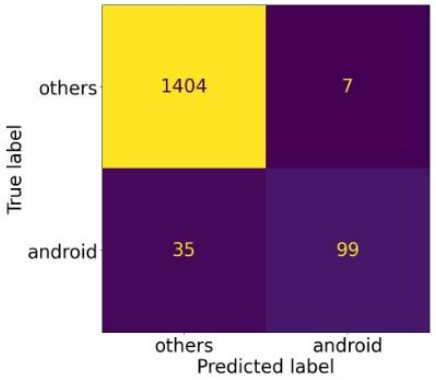
Approche supervisée : Régression logistique, SVM, arbres aléatoires



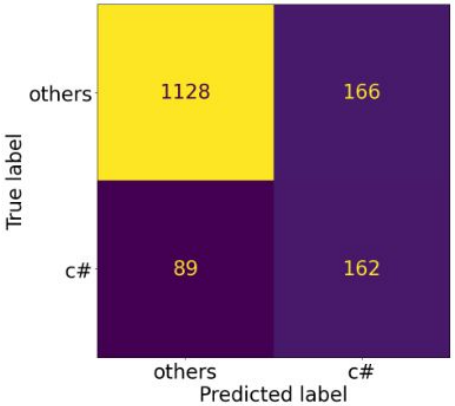


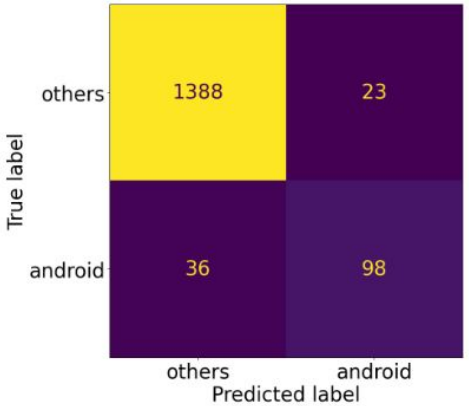
régression logistique





SVC

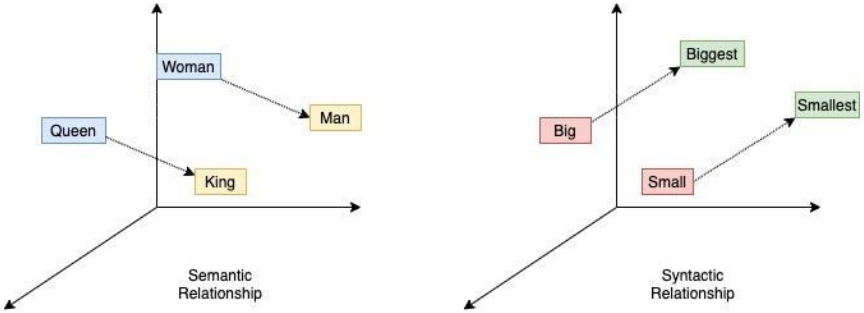




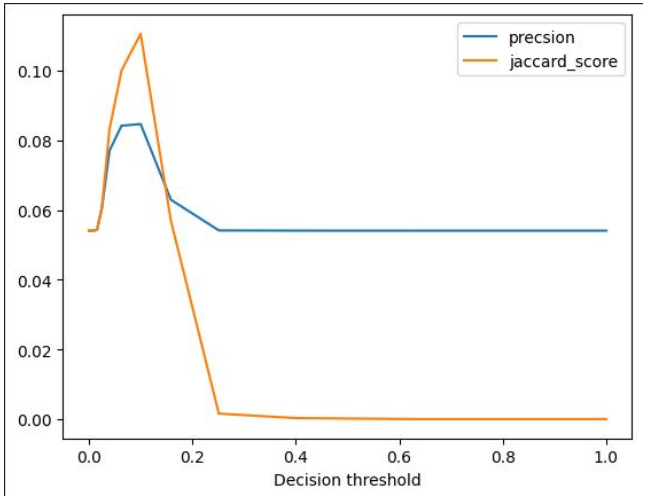
arbres aléatoires

Le choix du modèle

Approche supervisée : Neural Networks with embeddings : Word2Vec, USE and BERT



De la probabilité d'appartenance à l'appartenance à la classe : le choix du seuil



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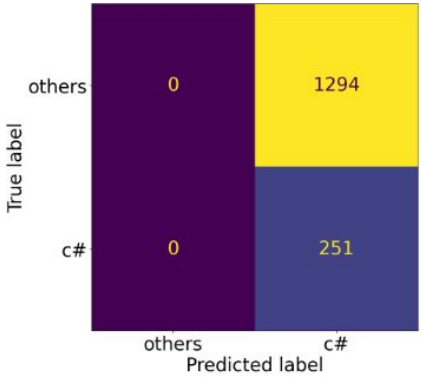
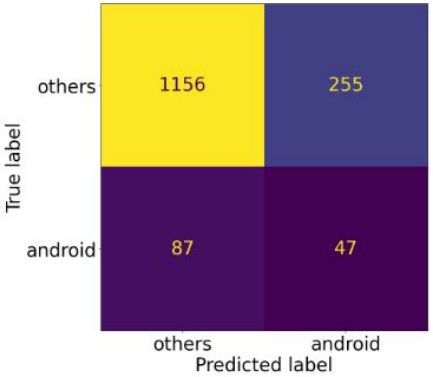
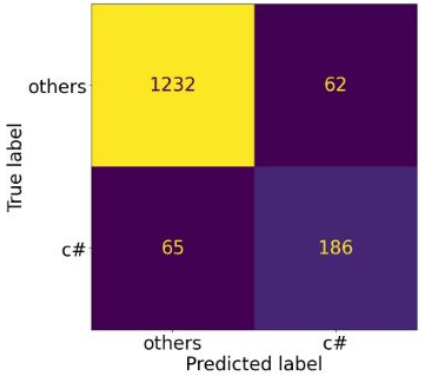
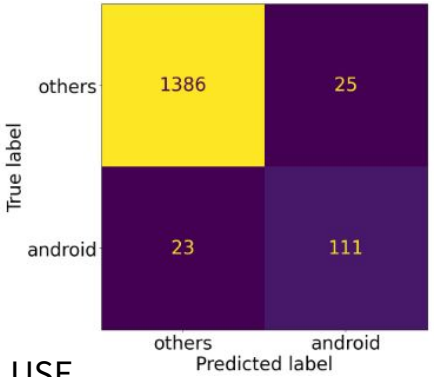


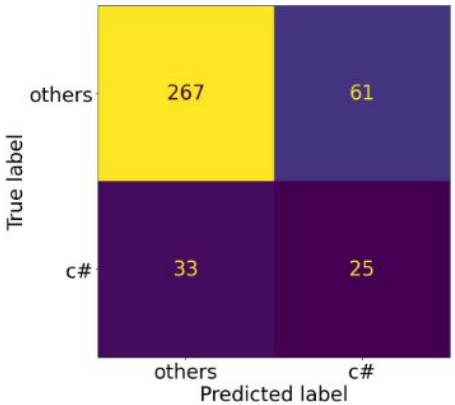


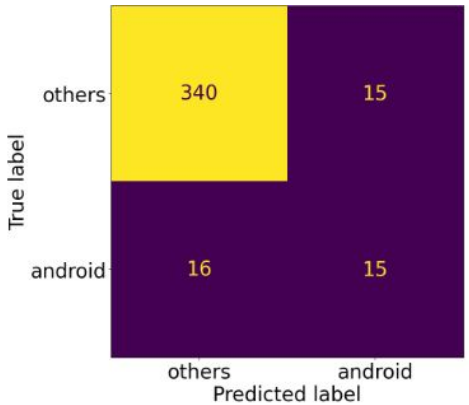
Word2Vec





USE





BERT

Le choix du modèle

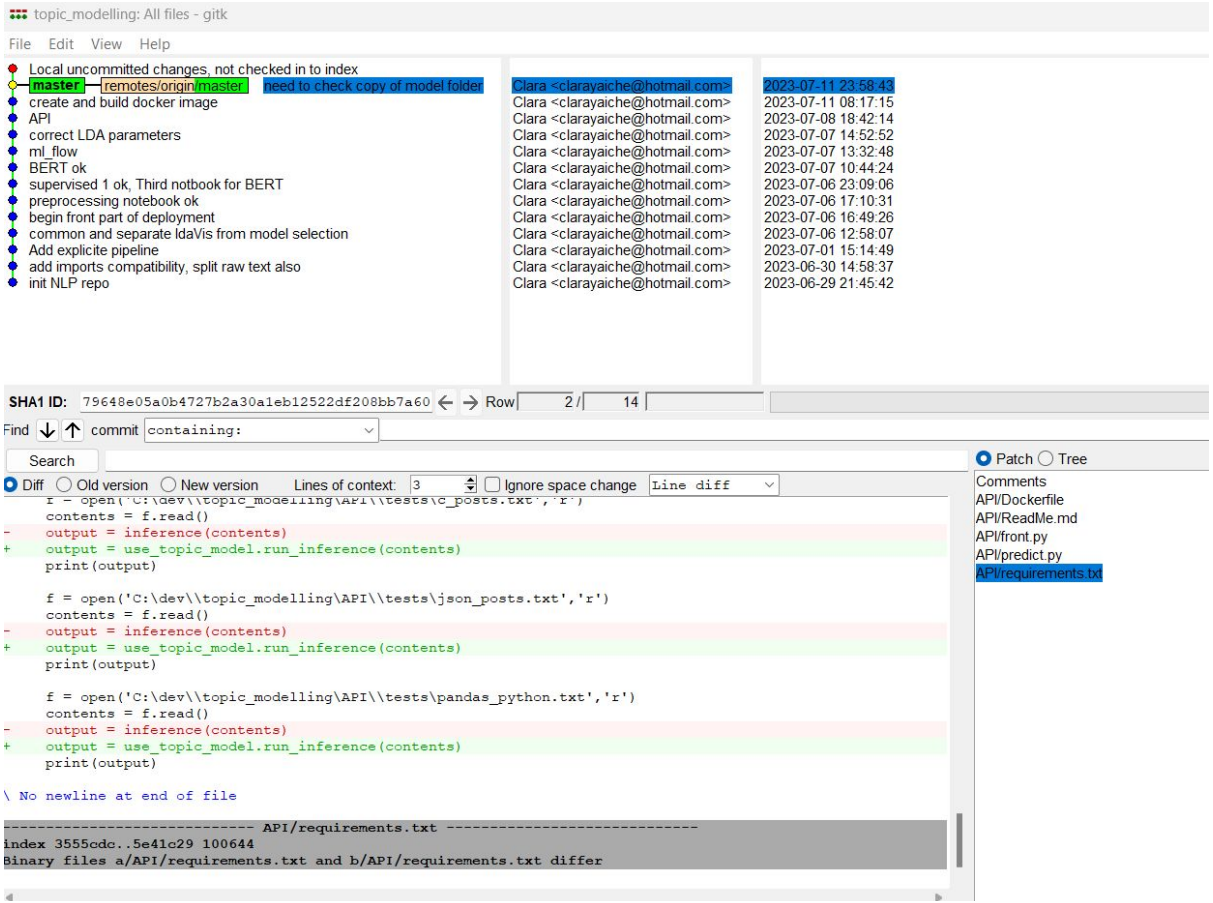
	u_mass_scores	c_v_scores
lsa	-7.234623	0.349950
lda	-7.871950	0.475715
kmeans	-12.306075	0.485754

	model	average_precision_scores	jaccard_scores
0	Dummy classifier	0.055033	0.000000
1	logistic : concatenation	0.139004	0.097722
2	SVM : concatenation	0.373852	0.382614
3	RandomForest	0.296040	0.345479
0	Word2Vec	0.084533	0.111220
1	USE	0.471676	0.508555
0	BERT	0.140975	0.188865

Déploiement

Mise en production : gestion de version

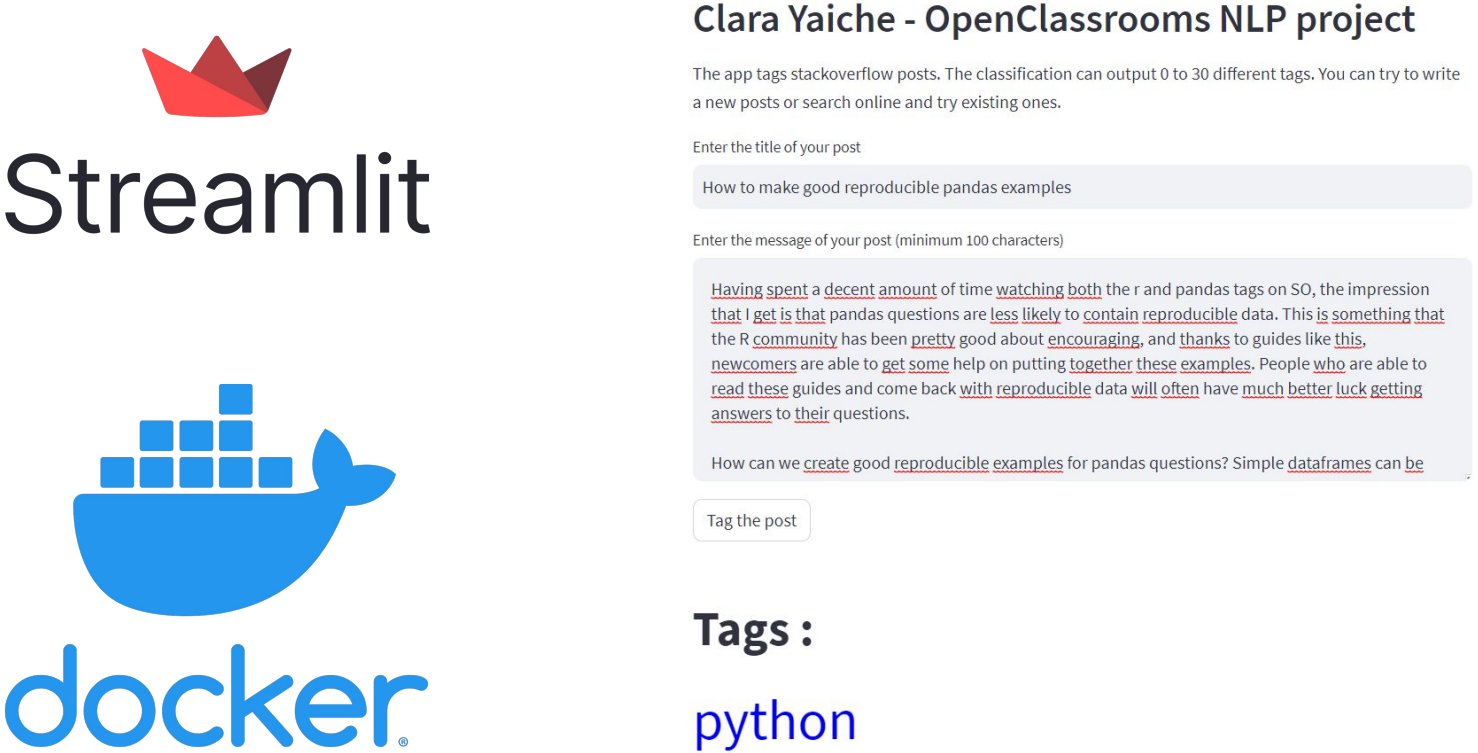
https://github.com/CYaiche/nlp_topic_modelling



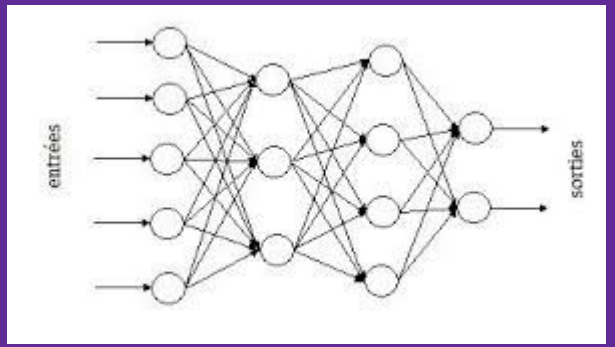
Mise en production : streamlit, Docker, Azur

Streamlit

docker



Perspectives



Annexes

Sources utiles : [Understanding Topic Coherence Measures]

$$(10.1)\quad Accuracy = \frac{T_p + T_n}{T_p + T_n + F_p + F_n}$$

$$(10.2)\quad Precision = \frac{T_p}{T_p + F_p}$$

$$(10.3)\quad Recall = \frac{T_p}{T_p + T_n}$$

$$(10.4)\quad F_1 = 2 \cdot \frac{precision \cdot recall}{precision + recall}$$