Projet 6 : Classifier automatiquement des biens de consommation

Mentor : Amine HADJ-YOUCEF

Etudiant : Marin DUCHEMIN

OPENCLASSROOMS

Plan de la Présentation

I ~ Rappel de la Problématique et Apperçu du Jeu de Données

II ~ Données Texte

III ~ Données Images

Conclusions et Perspectives

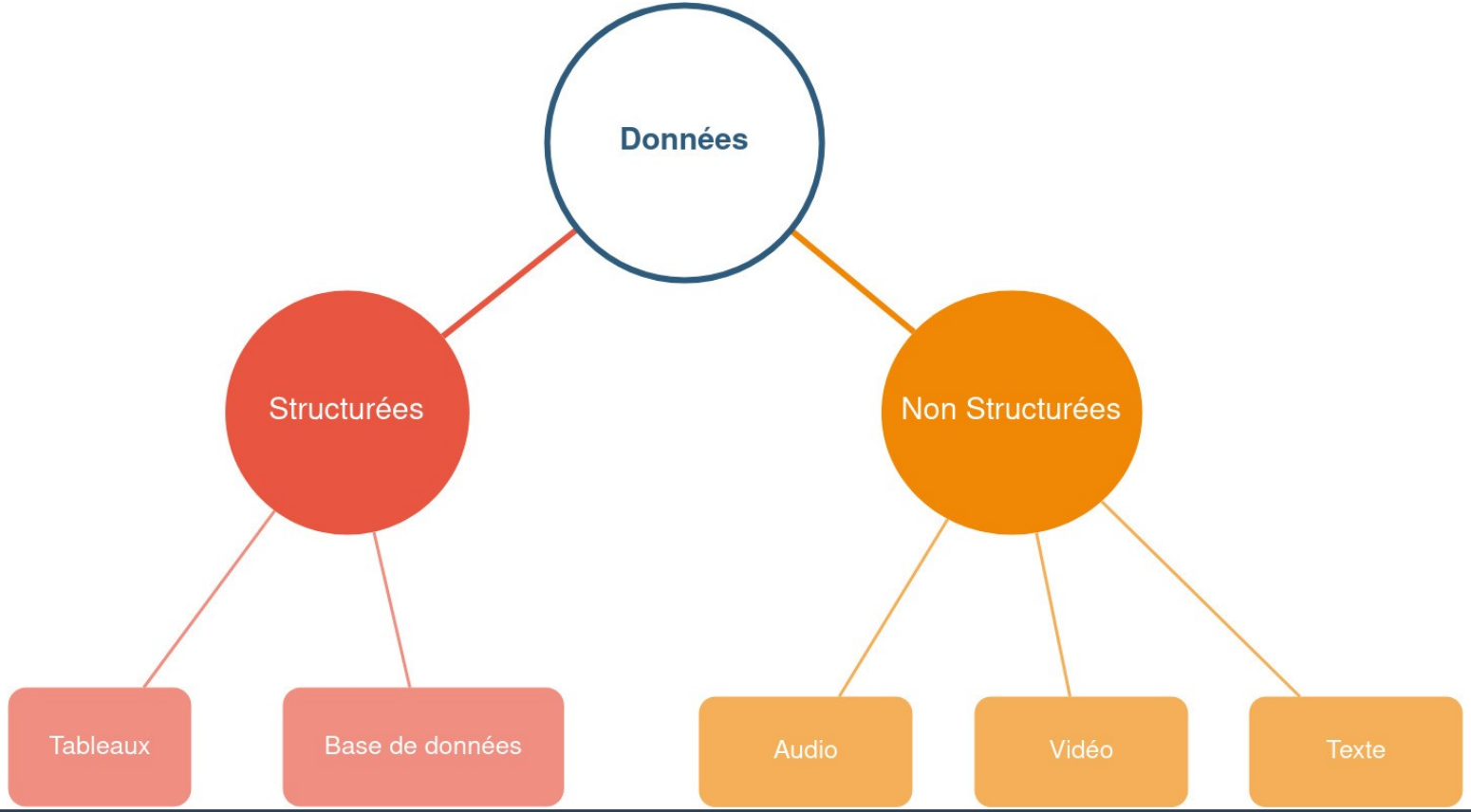
I ~ Rappel de la Problématique

Place de Marché : marketplace e-commerce

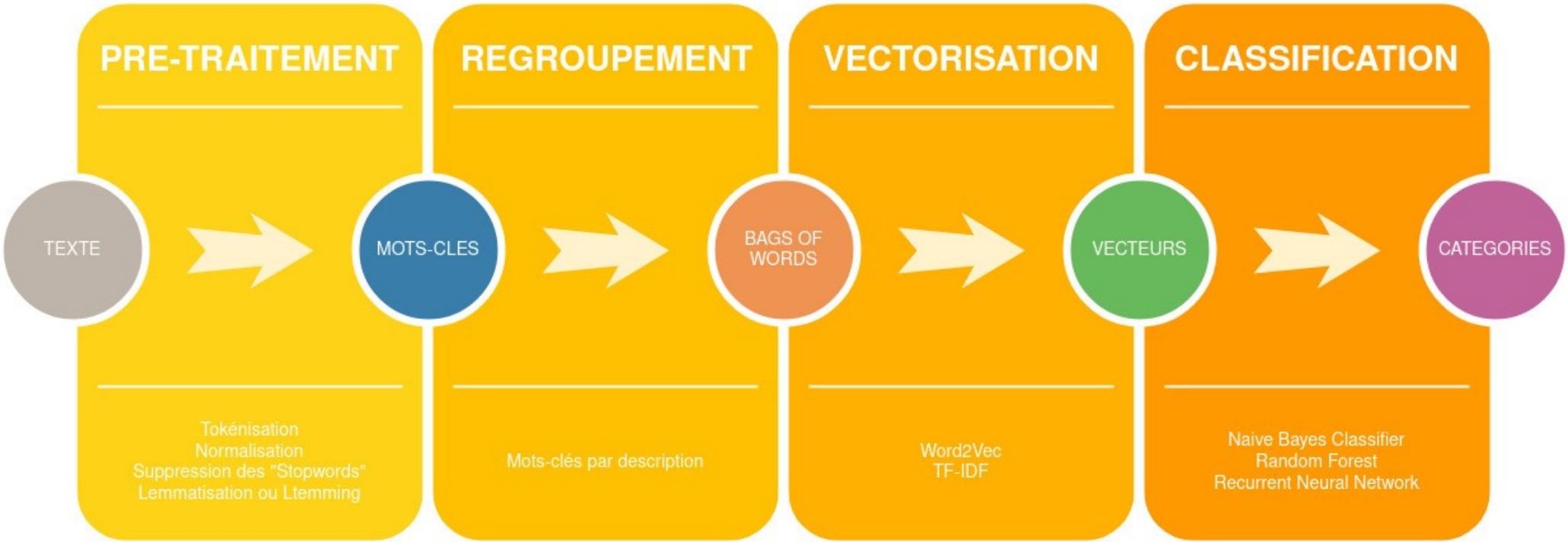
Objectifs :

- Etude de faisabilité d’un moteur de classification des biens
- Classification basée sur une description et une image

I ~ Rappel de la Problématique



I ~ Rappel de la Problématique



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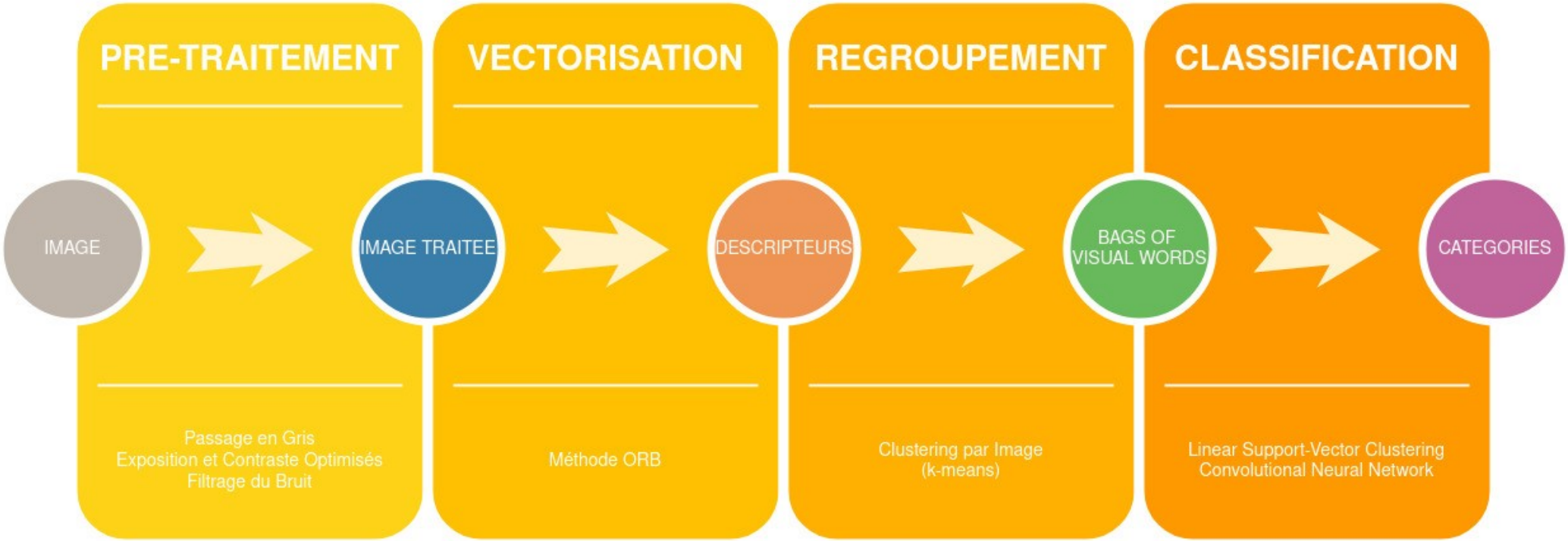
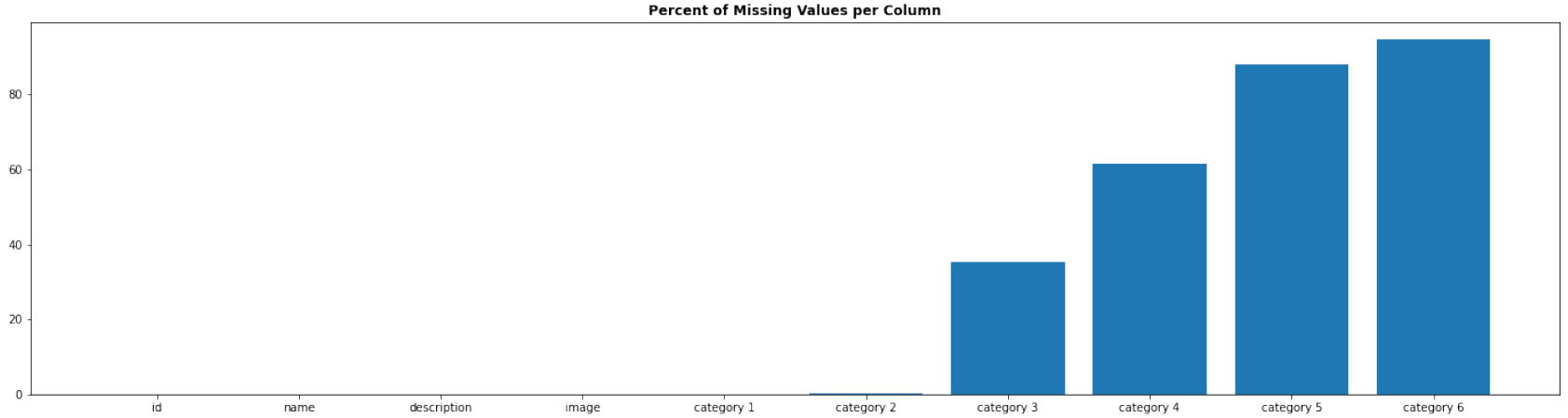


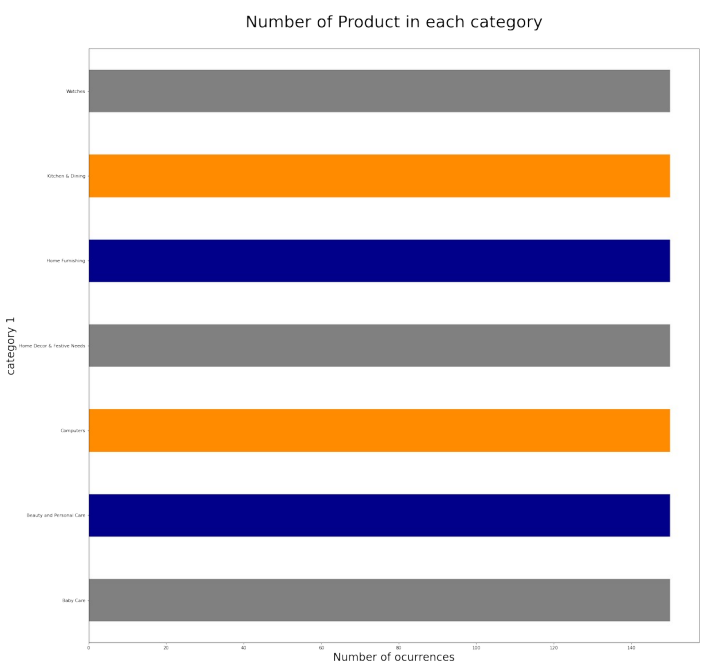
I ~ Rappel de la Problématique

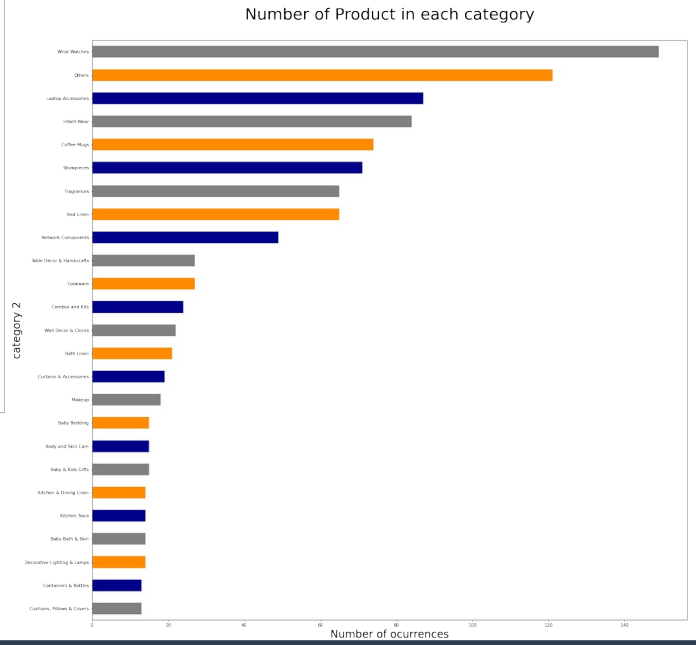


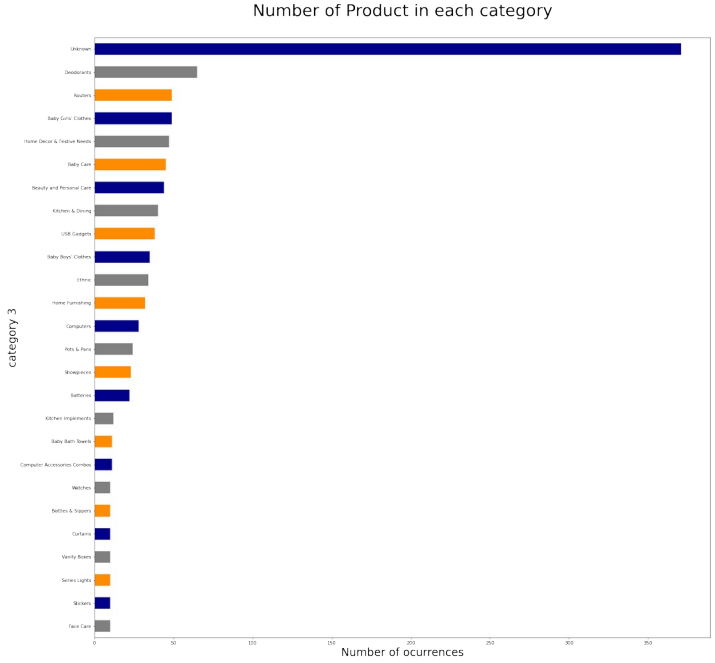
- Aucune description ou image manquante.

- Peu d’informations sur les trois dernières catégories.

I ~ Rappel de la Problématique



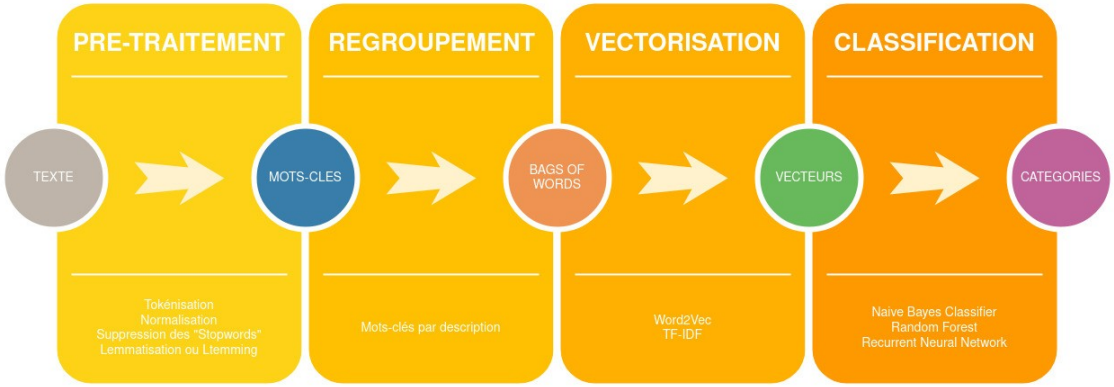




II ~ Pré-traitement du Texte

Pré-traitements (nltk, gensim, wordcloud):

- Tokenisation
- Passage en minuscule
- Suppression des ‘stopwords’
- Lemmatisation




```
We went from this :
 This is a text, made to illustrate the text's transformations processes that will and have occured.
 to this :
['text', 'make', 'illustrate', 'text', 'transformation', 'process', 'occur']
```

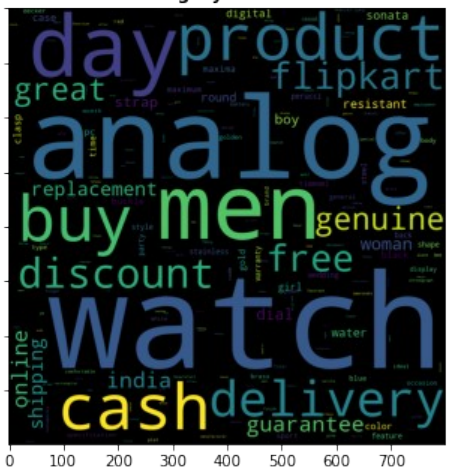
II ~ Pré-traitement du Texte

Regroupement:

Utilisation des Bag of Words

Category Home Furnishing:

Category Watches:



Category Kitchen & Dining:

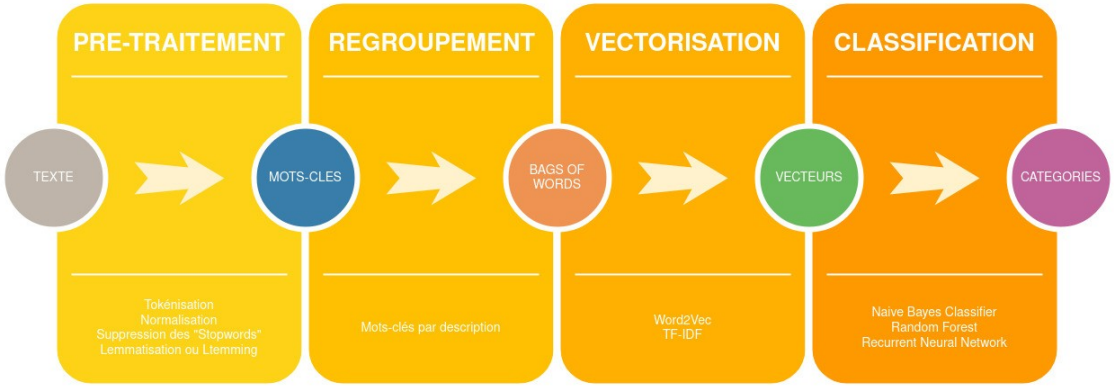
Category Computers:

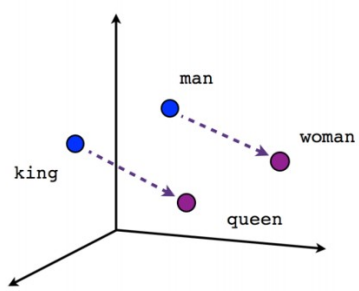
II ~ Pré-traitement du Texte

Vectorisation :

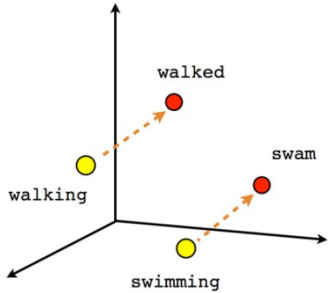
- Term Frequency - Inverse Document Frequency (tf-idf)

- Word2Vec (Continuous Bags of Words, Skip Gram)

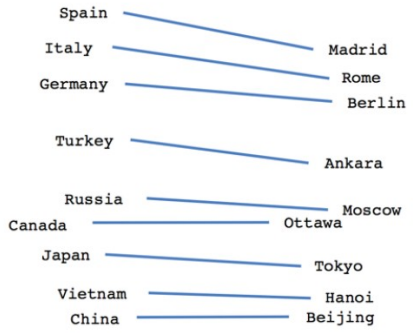




Male-Female



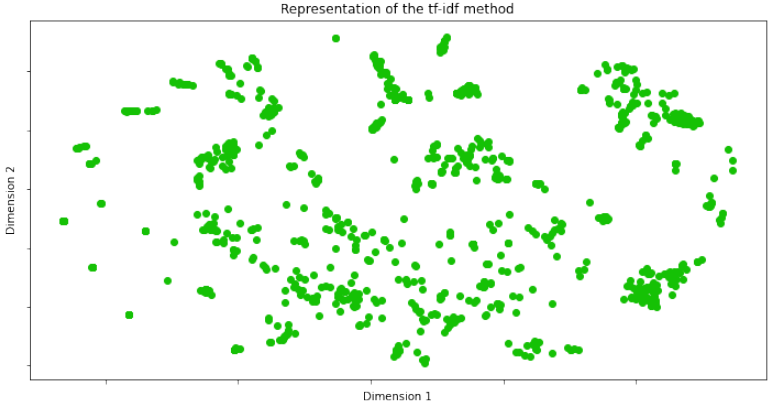
Verb tense

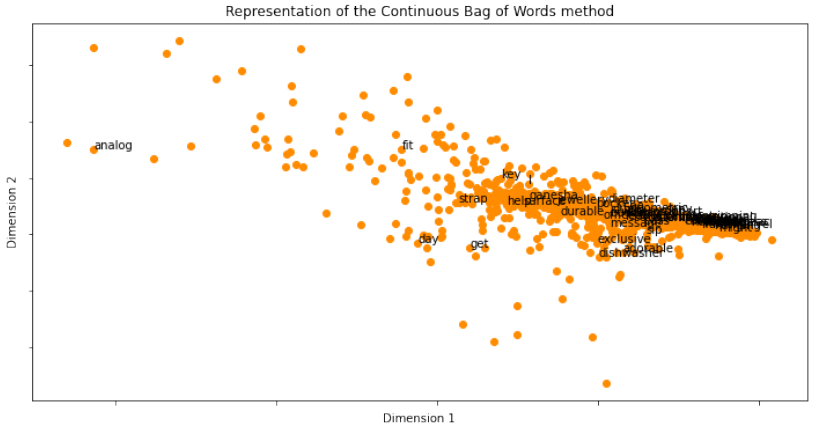


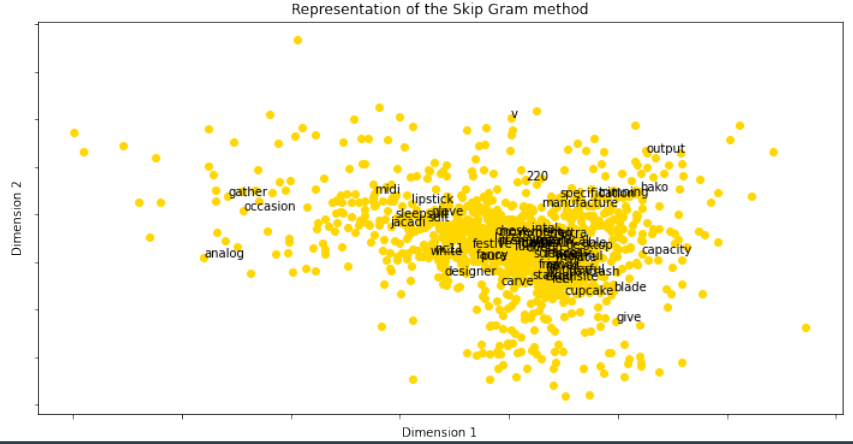
Country-Capital

II ~ Pré-traitement du Texte

Vectorisation :







II ~ Classification du Texte

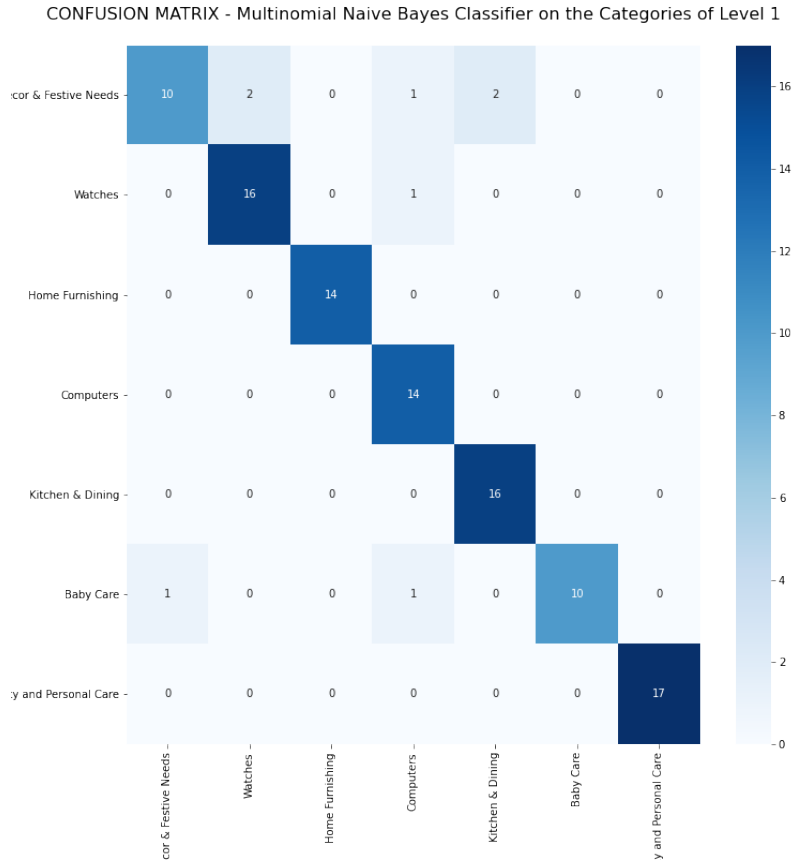
Aller plus loin, la classification :

- En entrée : vecteurs
- En sortie : niveaux de catégories
- Séparation en jeux d’entrainement et de test

II ~ Classification du Texte

Classification :

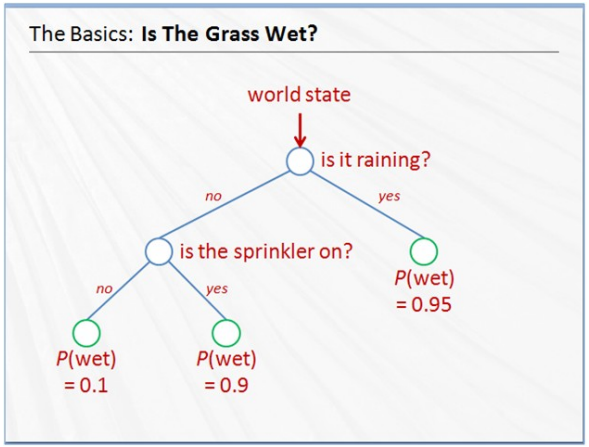
- Naive Bayes Classifier
  - Niveau 1 : 92%
  - Niveau 2 : 74%
  - Niveau 3 : 67%

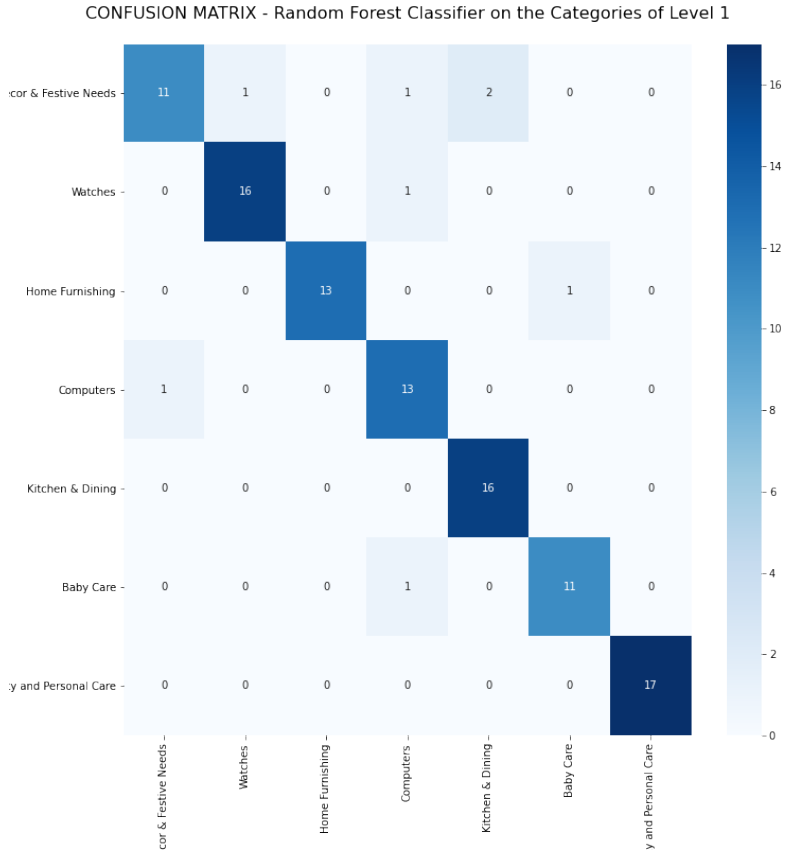


II ~ Classification du Texte

Classification :

- Random Forests
  - Niveau 1 : 92%
  - Niveau 2 : 87%
  - Niveau 3 : 83%



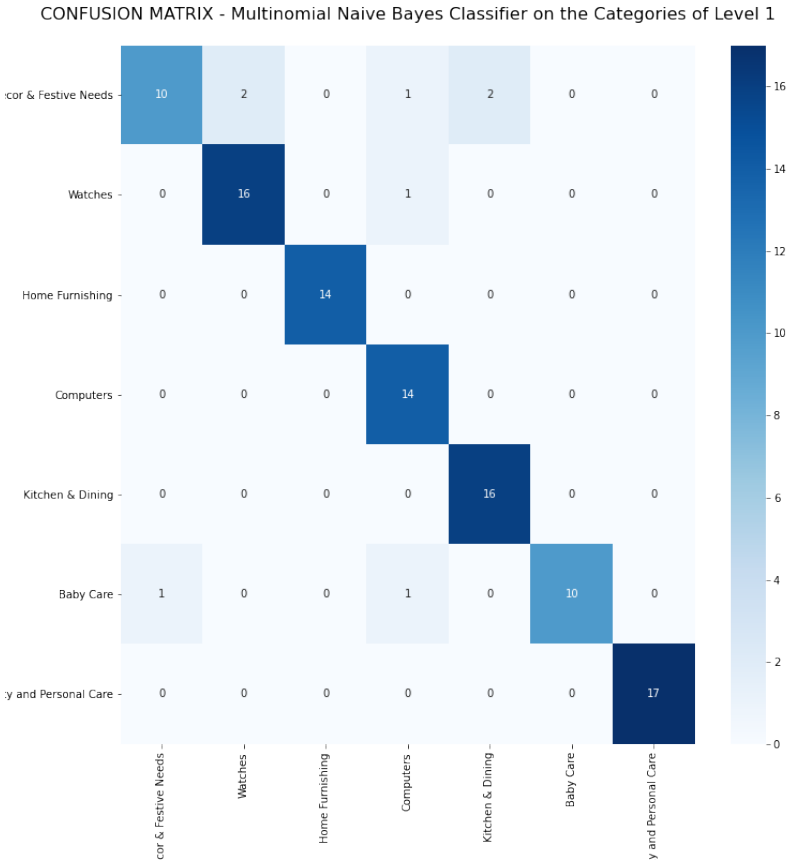


II ~ Classification du Texte

Classification :

- Recurrent Neural Network
  - Niveau 1 : 93%
  - Niveau 2 : 84%
  - Niveau 3 : 80%

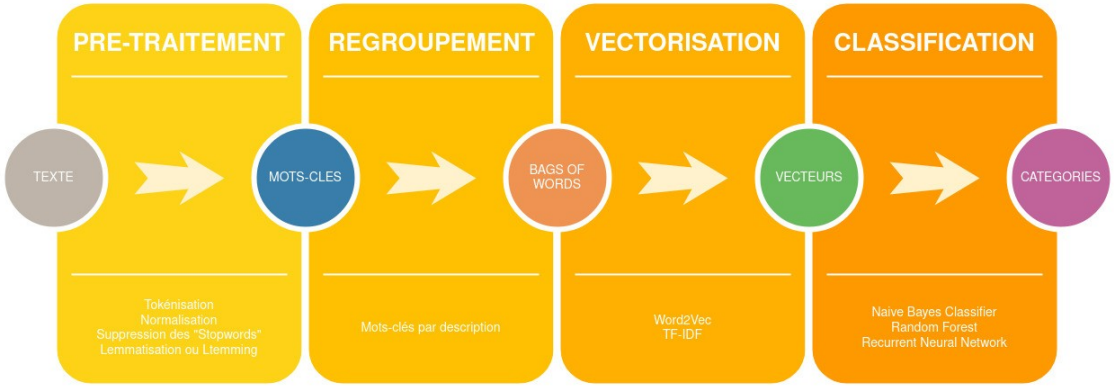
- Déployé par moi même
  - Modèle simple, 3 couches
  - Testé sur CBOW et Skip Gram



II ~ Classification du Texte

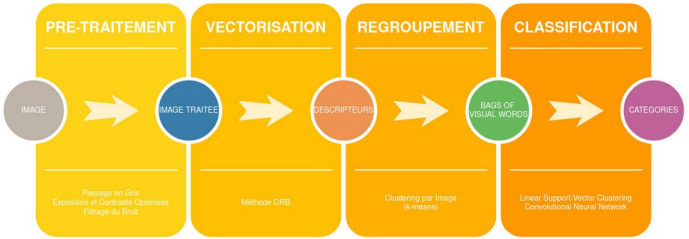
Classification :

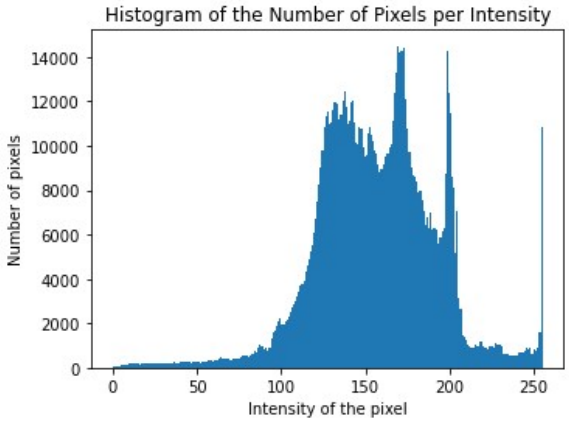
Level of Category	Model	Accuracy	Time
Level 1	Multinomial Naive Bayes	92.380952	0.023243
	Random Forest	92.380952	0.520511
	RNN on Continuous Bag of Word	80.000001	13.767050
	RNN on Skip Gram	92.631578	17.020003
Level 2	Multinomial Naive Bayes	74.285714	0.011050
	Random Forest	86.666667	0.568172
	RNN on Continuous Bag of Word	70.526314	29.507907
	RNN on Skip Gram	84.210527	28.094129
Level 3	Multinomial Naive Bayes	66.666667	0.022552
	Random Forest	82.857143	0.608572
	RNN on Continuous Bag of Word	66.315788	41.373782
	RNN on Skip Gram	80.000001	29.876024



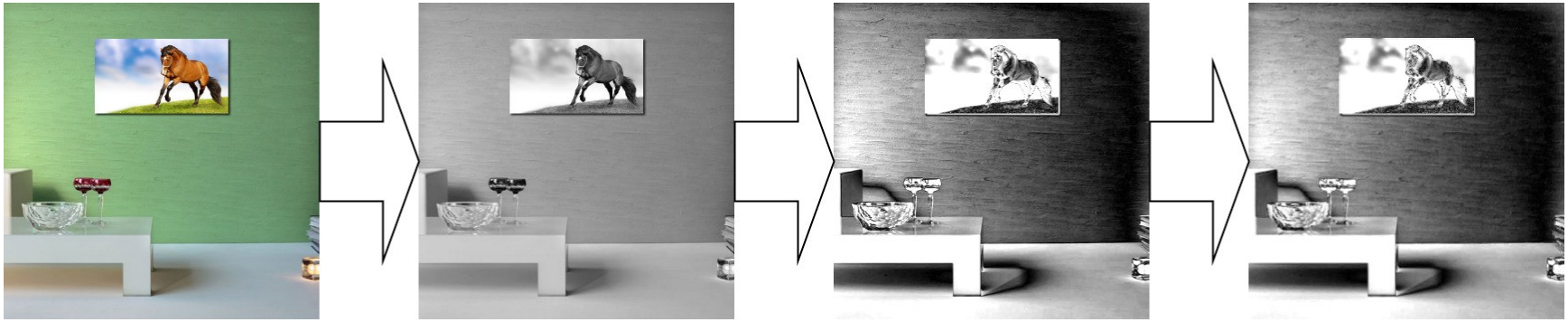
III ~ Pré-traitement des Images

Pré-traitement (OpenCV) :





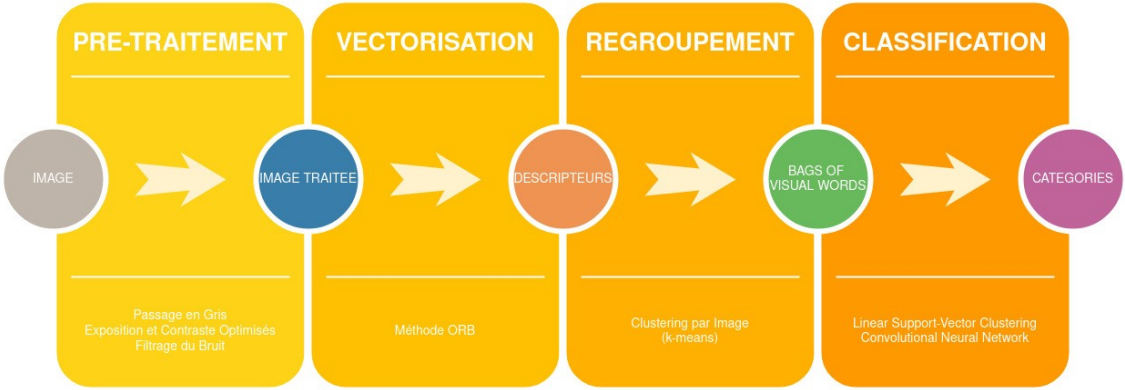
- Passage en Gris
- Exposition et Contraste Optimisés
- Filtrage du Bruit

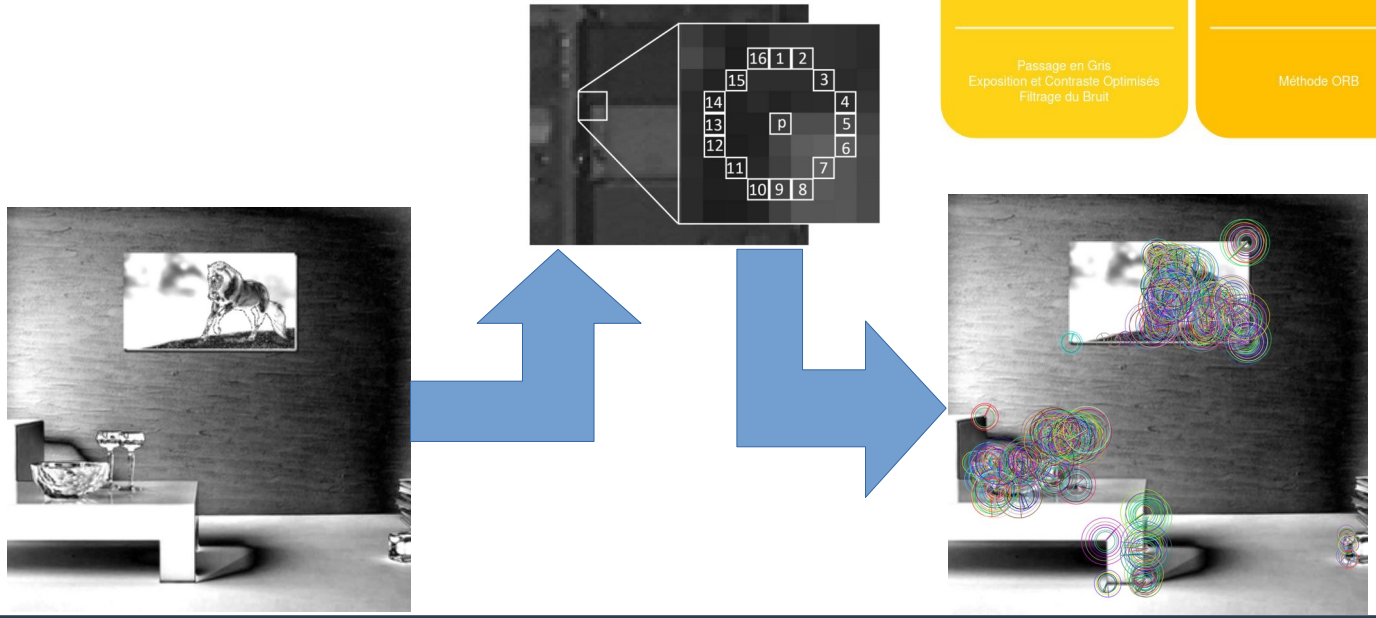


III ~ Pré-traitement des Images

Vectorisation :

Méthode ORB : Oriented FAST and rotated BRIEF

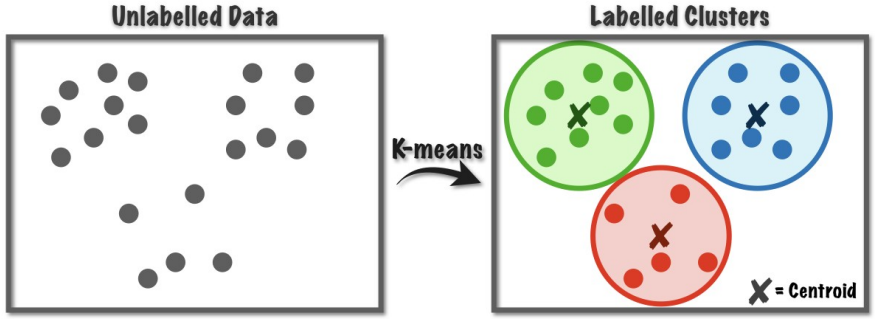


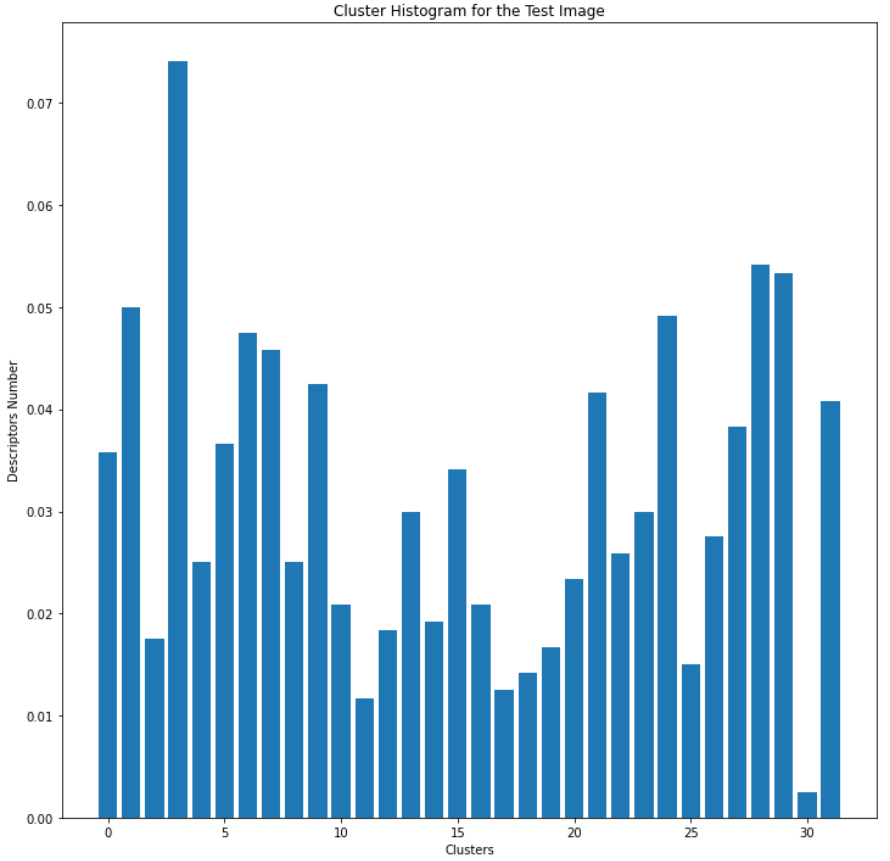


III ~ Pré-traitement des Images

Regroupement :

K-means Clustering

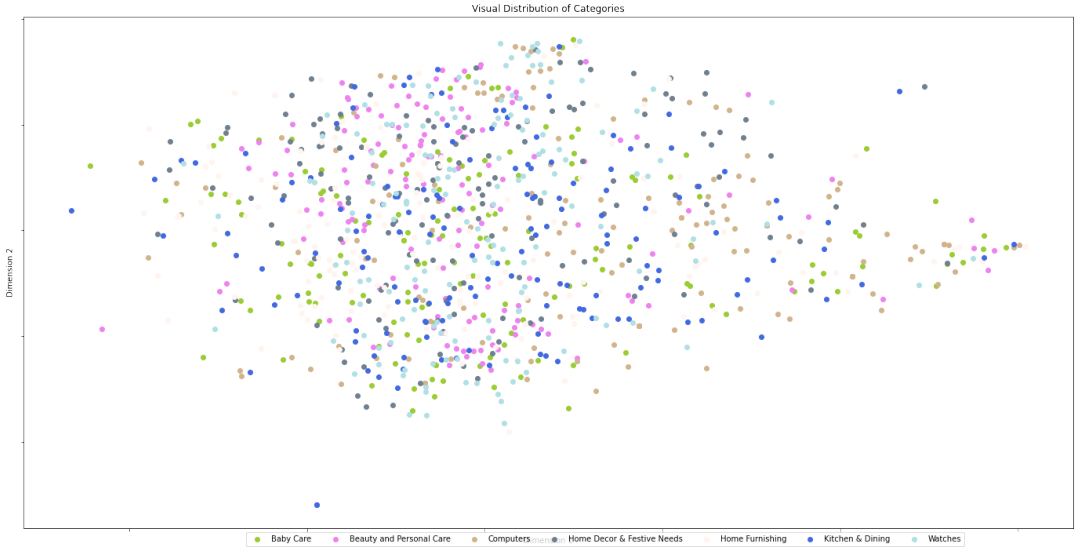




III ~ Pré-traitement des Images

Réduction Dimensionnelle :

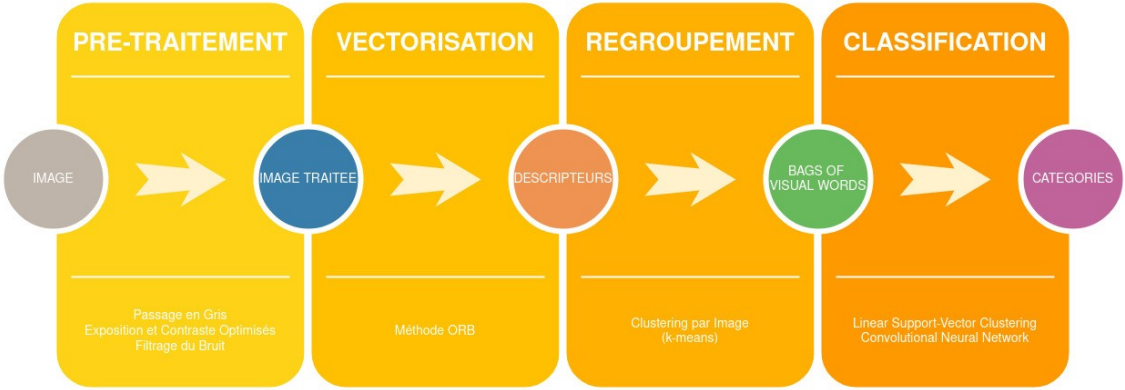
- Décorrélation :
  - Meilleure séparation
  - Réduction du temps de traitement
- PCA :
  - 99% variance expliquée
  - 32 à 28 composantes
- T-SNE :
  - Visualisation

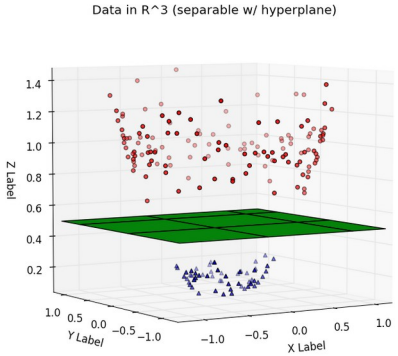


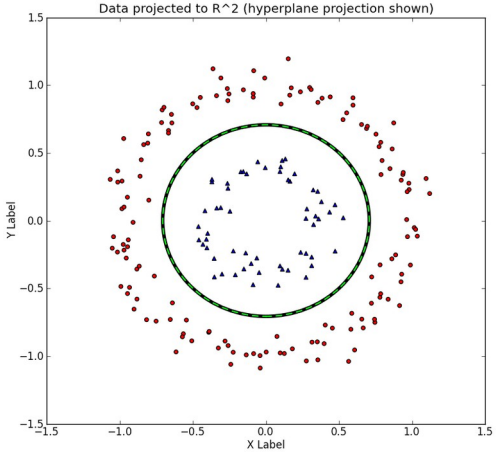
III ~ Classification des Images

Classification:

- Linear Suppport-Vector Clustering (SVC)





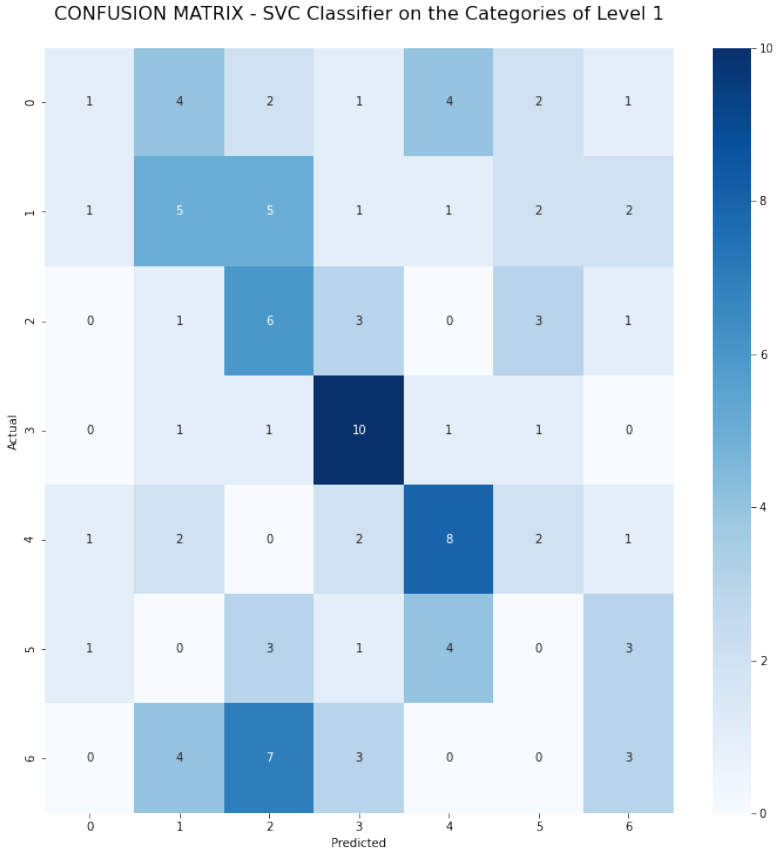


III ~ Classification des Images

Classification:

Linear SVC

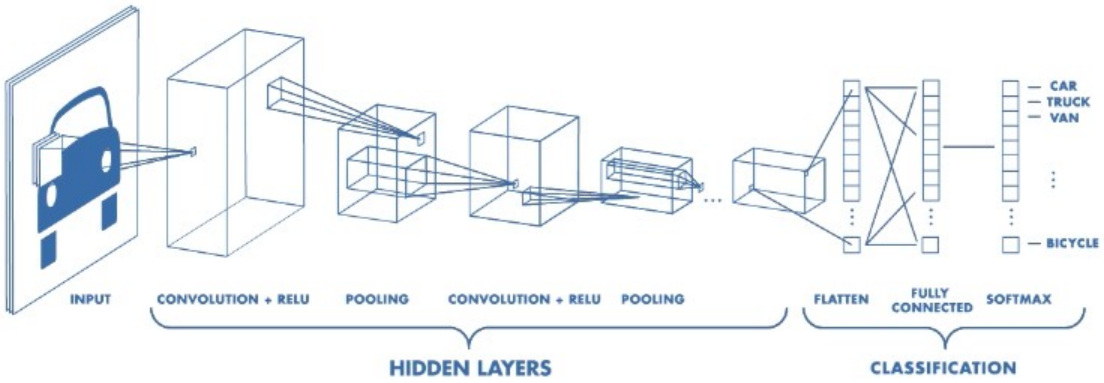
- Niveau 1 : 31%
- Niveau 2 : 2%
- Niveau 3 : 5%

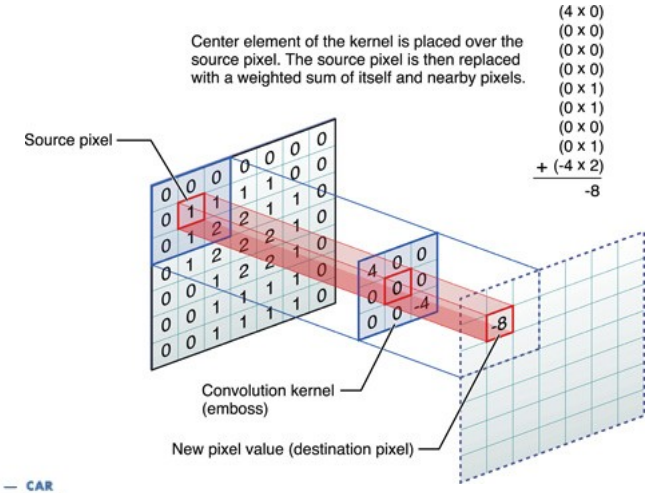


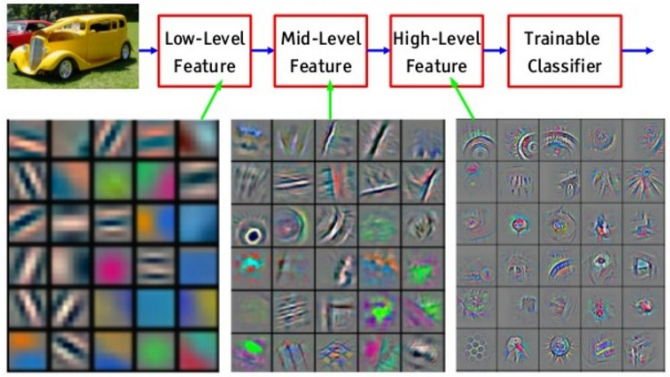
III ~ Classification des Images

Classification:

- Convolutional Neural Network (CNN)



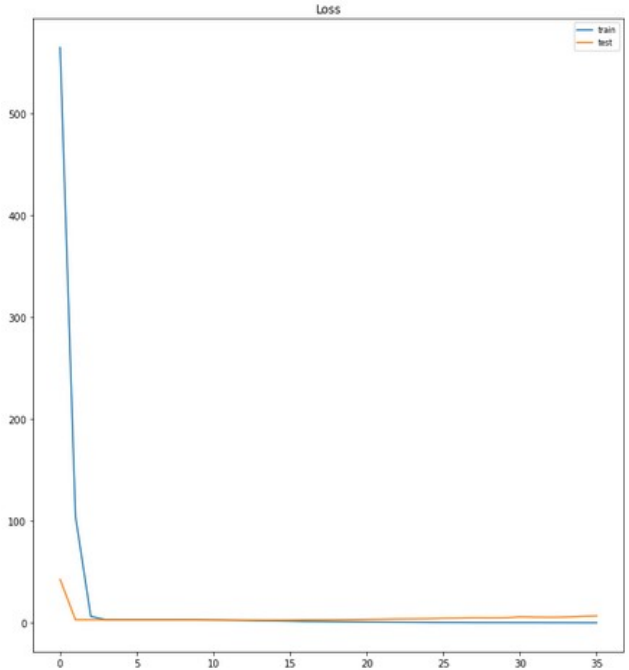


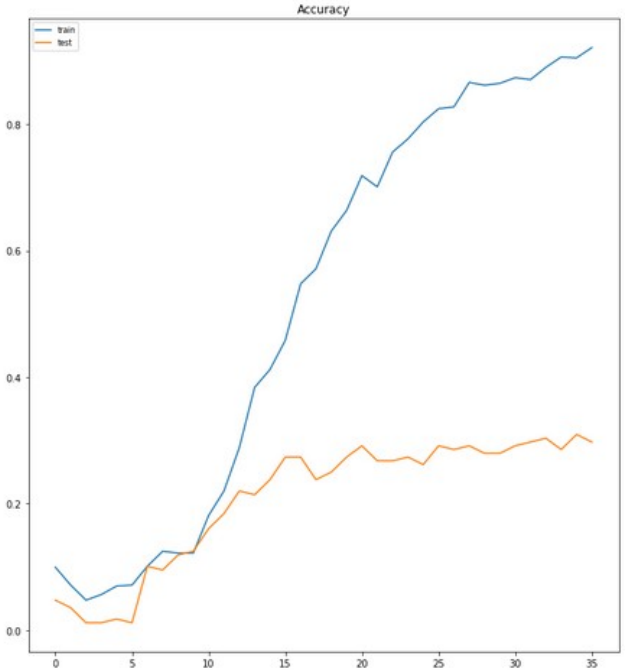


III ~ Classification des Images

Classification:

- CNN
  - Niveau 1 : 35%
  - Niveau 2 : 30%
  - Niveau 3 : 5%

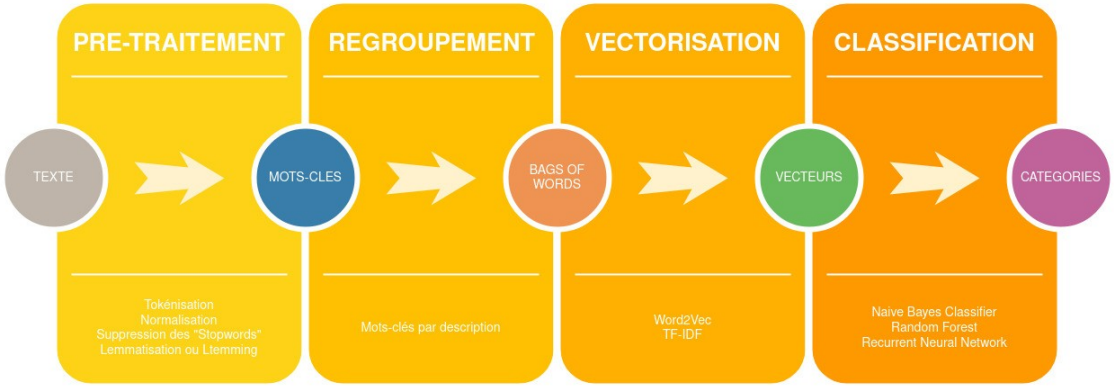




III ~ Classification des Images

Classification :

Level of Category	Model	Accuracy	Time
Level 1	Linear SVC	31.428571	2.942513
	CNN	34.523809	190.002122
Level 2	Linear SVC	1.904762	4.112777
	CNN	29.761904	207.038256
Level 3	Linear SVC	4.761905	3.729364
	CNN	39.285713	197.103601



Conclusion et Perspectives

Conclusion :

- Traitement de textes
- Traitement d’images
- Classifieur :
  - Texte → possible en l’état
  - Image → non possible en l’état

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Conclusion et Perspectives

Axes de poursuite

- Autres classifieurs
- Optimisation (hyperparamètres, “Transfert Learning”, etc)
- GPU plutôt que CPU
- Plus de données ou “data augmentation”
- Mélange de classifieurs.

Merci de votre attention

Réserve

Recurrent Neural Network