TFG informe inicial

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Contents

1 Data

1.1 Initial Data

- Embedding matrix of size $(50000, 12416)$, con 62080000 features.
- **labels** Labels vector of size $50k$ which every label is in numeric format $(0, 999)$
- **synsets = synset0 synset1 synset2 ...** The set of synsets that we will analyze:

  $synsets = [living\_things, mammal, dog, hunting\_dogs]$
- **categories = {-1 0 1 }** The possible values of the features.

1.2 Generated Data

- **synset_index_hyponim.txt** A list with all the hyponims of every synset.
- **synset_index.txt**For each synset a list with the index of the elements of the hyponim list in the embedding.
- Un diccionario con la cantidad de imágenes que tiene cada feature para cada category.
- **features_per_image[synsets].pkl** dfd
- **features_per_layer[synsets].pkl**dsf
- **images_per_feature_per_synset[synsets].pkl**fsdfs
- **intra_synset[synsets].pkl**fdsfs

2 Objetivos

- Estadísticas del dataset por imagen del conjunto de synsets **(hecho)**
- Estadísticas internas para cada synset(que synsets son subconjunto de cual y en que proporción)**(hecho)**
- Estadísticas totales de la distribución de las features respecto a toda la matriz de imágenes. **(solo faltan grafiquillas)**
- Estadísticas totales de la distribución de las features respecto a toda la matriz de imágenes por layer.**(falta escribir + grafiquillas)**
- Estadísticas de las features respecto el subconjunto de imágenes de cada synset. **(faltan grafiquillas)**
- Estadísticas de las features respecto el subconjunto de imágenes de cada synset por layer.**(falta todo)**
- Distribución de imágenes por feature (para 1, -1, 0):
  - respecto a todas las imágenes
  - respecto a cada uno de los subconjuntos de imágenes de cada synset

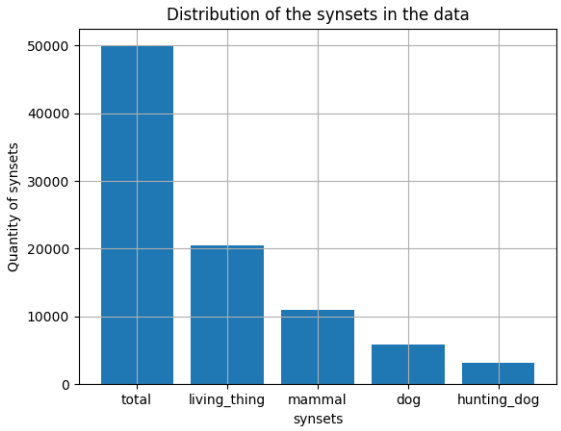
  está calculado, falta escribir
- Repetir para el resto de embeddings
- Montarlo para que me genere todo automático para cada conjunto de synsets.
- Hacer que guarde todo en maps

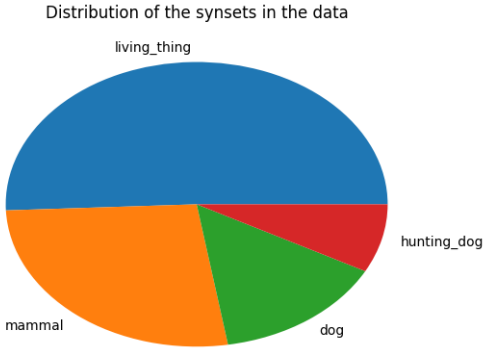
- Features por imagen: Para cada imagen cuantas features (de cada category) se activan. Usando todos los valores obtenidos dibujo un histograma para cada category de feature. Con el eje de las x siendo la frecuencia y el de las y la cantidad de imágenes que cumplen eso.
- Imágenes por feature: Para cada features (de cada category), cuantas imágenes toman este valor. Usando todos los valores obtenidos dibujo un histograma para cada category de feature. Con el eje de las x siendo la frecuencia y el de las y la cantidad de imágenes que cumplen eso.
- Comprobar si dentro de un mismo synset hay features que se den con 1 y -1.
- Hacer las distribuciones de la suma.
- Ordenar del código y generar una documentación y tests.

3 Análisis

Tenemos 50000 imagenes, de las cuales:

- el 41.0% son living_thing.
- el 21.8% son mammal.
- el 11.799999999999999% son dog.
- el 6.3% son hunting_dog.





3.1 Intra sinset

Dentro de living_things las imágenes se distribuyen como:

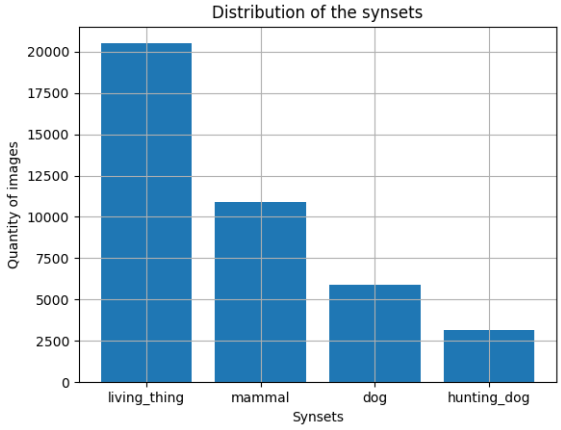
- el 53.1707317073% son mammal.
- el 28.7804878049% son dog.
- el 15.3658536585% son hunting_dog.

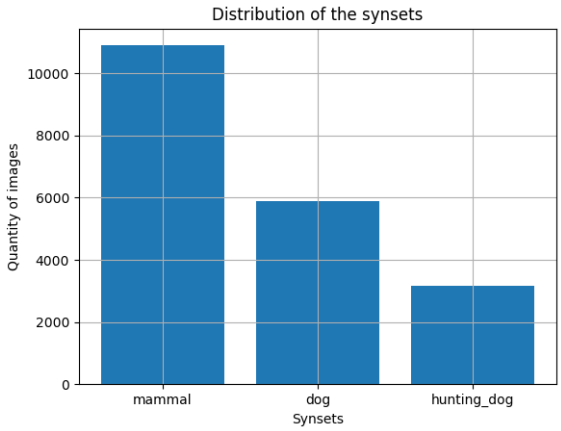
Dentro de mammal las imágenes se distribuyen como:

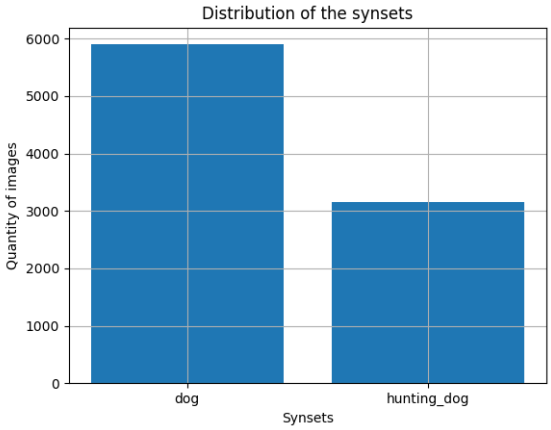
- el 54.128440367% son dog.
- el 28.8990825688% son hunting_dog.

Dentro de dog las imágenes se distribuyen como:

- el 53.3898305085% son hunting_dog.



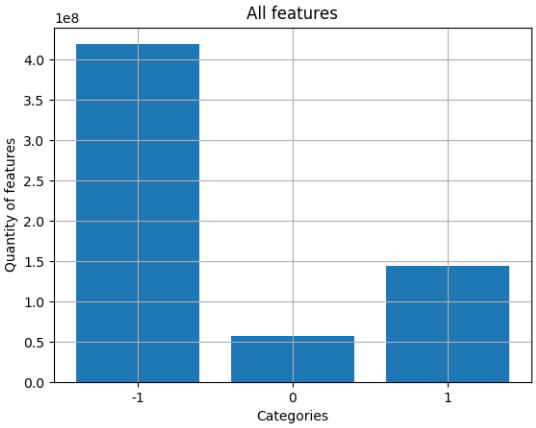

Distribution of the synsets
Quantity of images
0
2000
4000
6000
8000
10000
mammal
dog
hunting_dog
Synsets


Distribution of the synsets
Quantity of images
0
1000
2000
3000
4000
5000
6000
dog
hunting_dog
Synsets

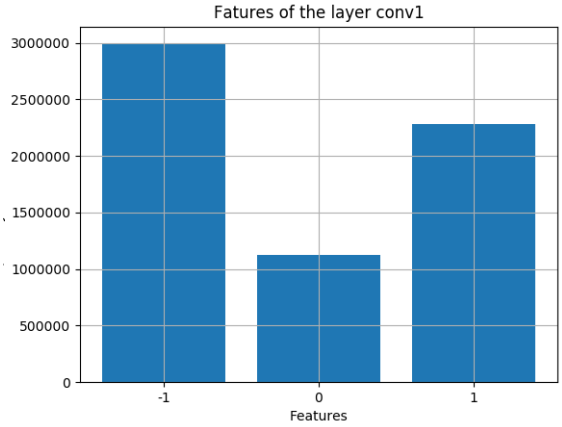
3.2 Distribución total de las features

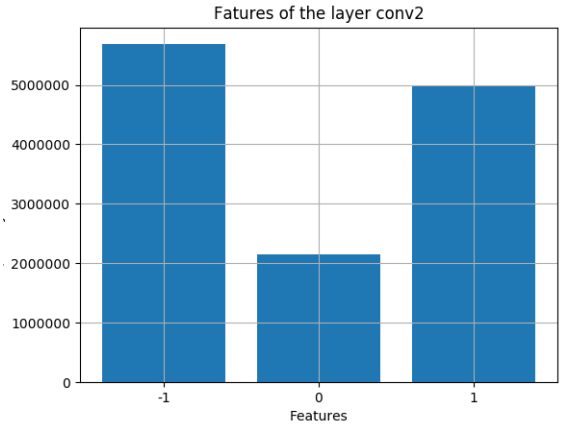
Del total de 620800000 features:

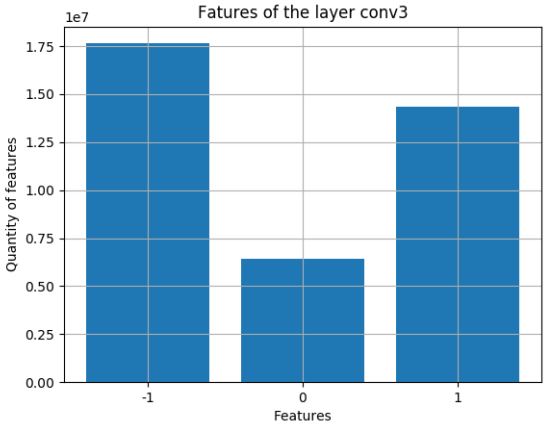
- Features de category -1: 419255437 el 67.534703125 %
- Features de category 0: 56916672 el 9.16827835052 %
- Features de category 1: 144627891 el 23.2970185245 %

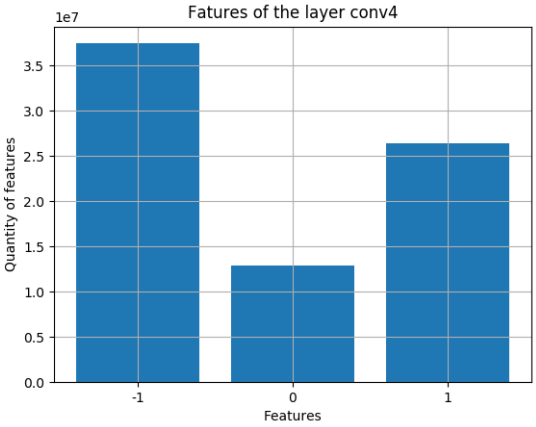


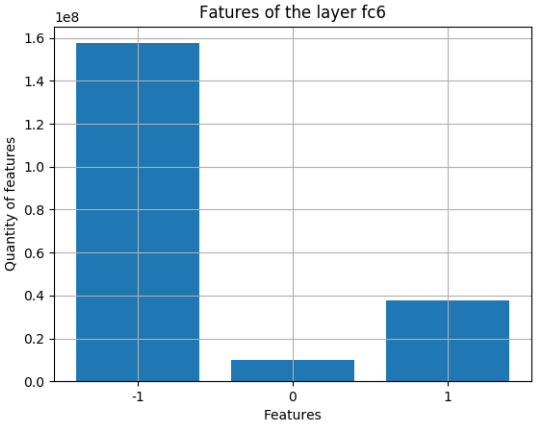
3.3 Distribución de las features por layer

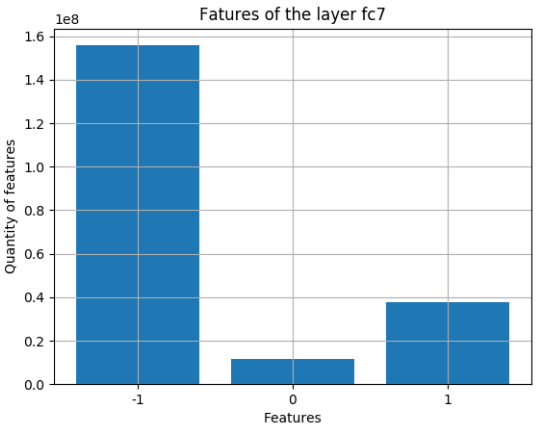




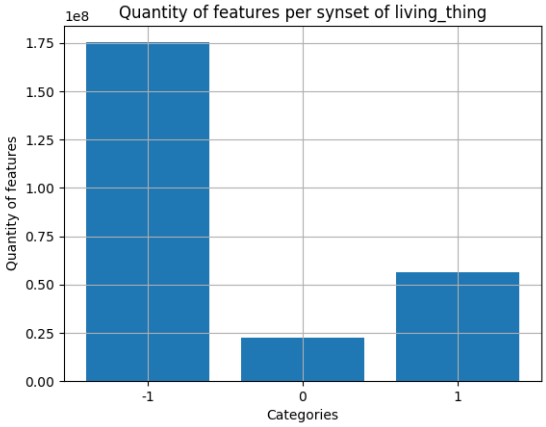

Fatures of the layer conv3
1e7
1.75
1.50
1.25
1.00
0.75
0.50
0.25
0.00
Quantity of features
-1
0
1
Features

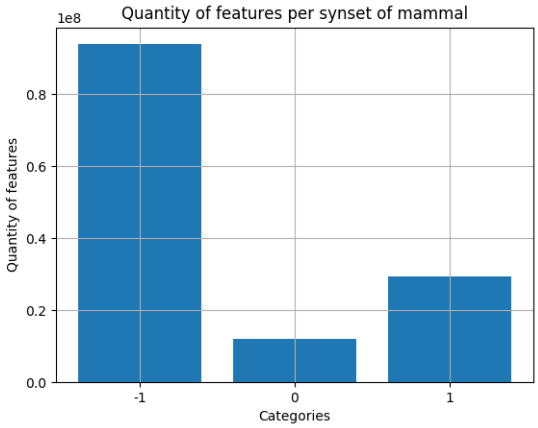

Fatures of the layer conv4
1e7
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
Quantity of features
-1
0
1
Features

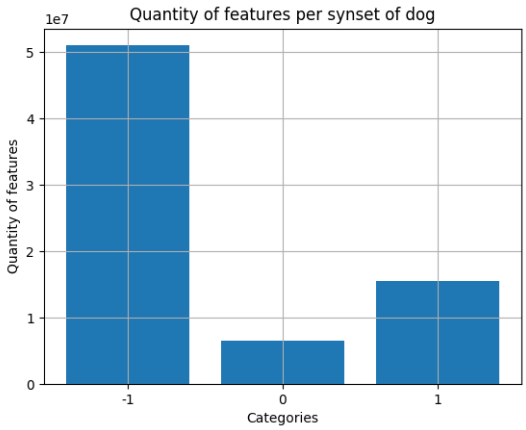

Fatures of the layer fc6
1e8
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
Quantity of features
-1
0
1
Features

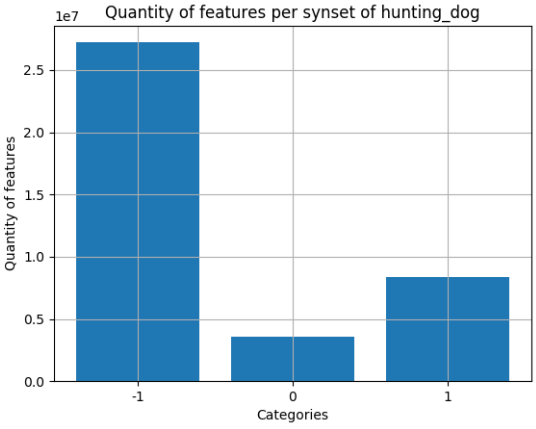

Fatures of the layer fc7
1e8
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
Quantity of features
-1
0
1
Features

3.4 Distribución de las features por synset



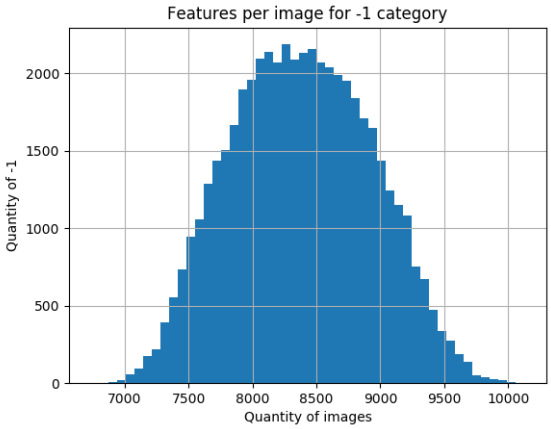


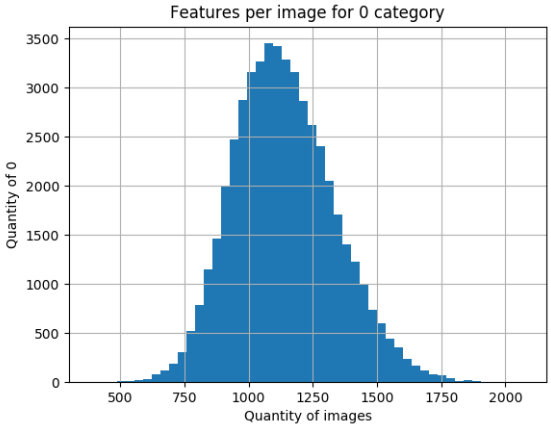

Quantity of features per synset of dog
1e7
5
4
3
2
1
0
Quantity of features
-1
0
1
Categories

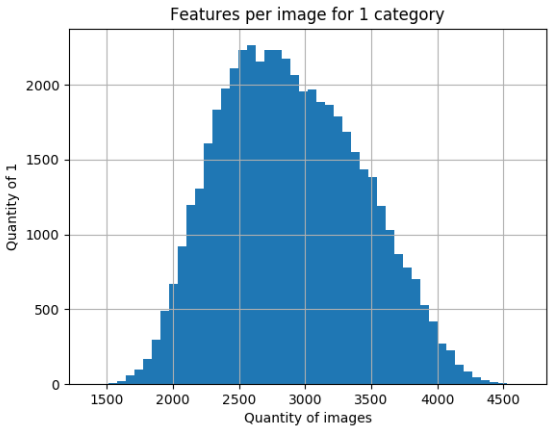

Quantity of features per synset of hunting_dog
1e7
2.5
2.0
1.5
1.0
0.5
0.0
Quantity of features
-1
0
1
Categories

3.5 Features per image

There are for each image the total counting of features active, for the different possible categories $(-1, 0, 1)$:

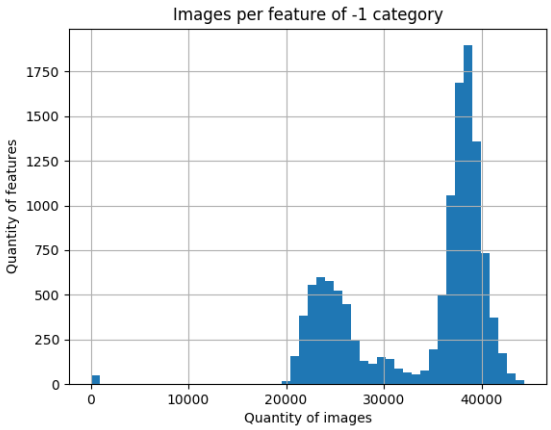


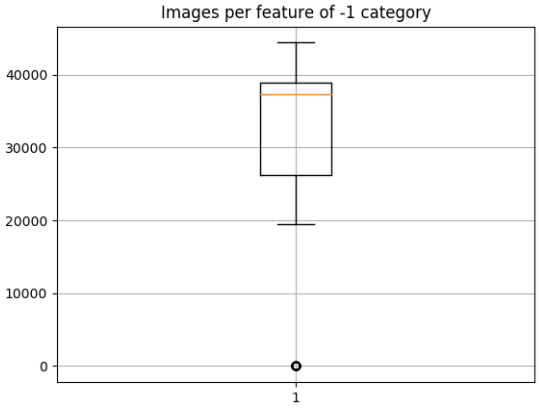


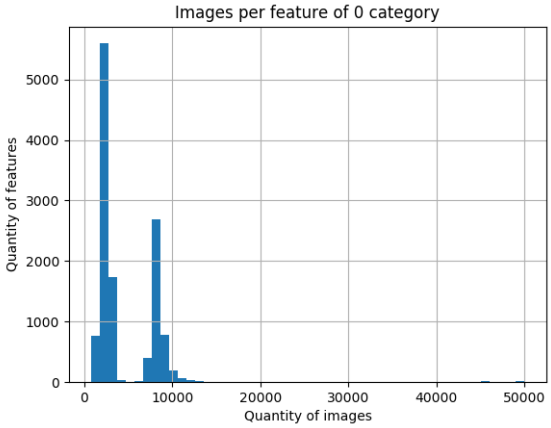

Features per image for 1 category
Quantity of 1
0
500
1000
1500
2000
1500
2000
2500
3000
3500
4000
4500
Quantity of images

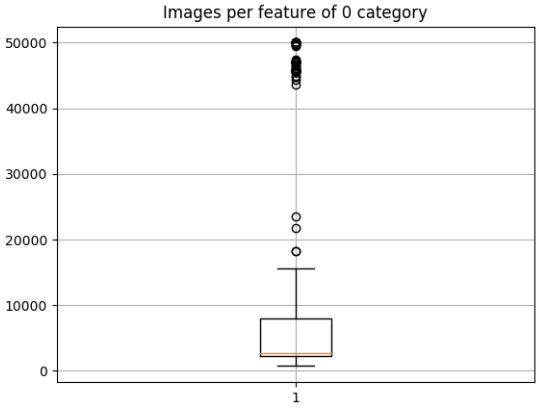
3.6 Images per feature

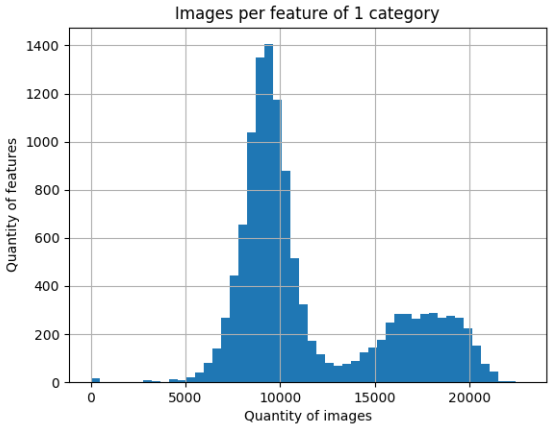
Now I calculate for each feature how many images activate in each specific category:

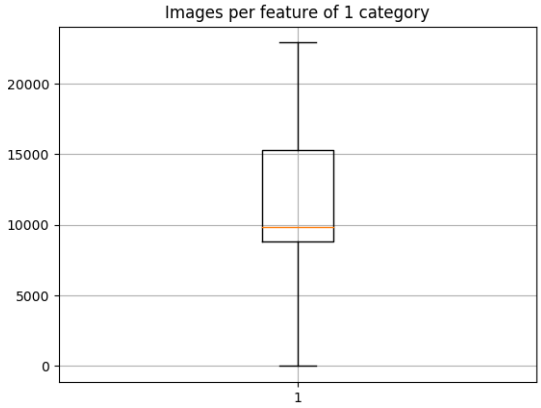




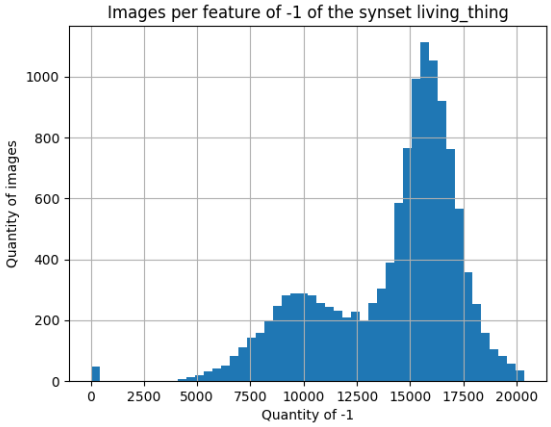

Images per feature of 0 category
Quantity of features
Quantity of images
0
1000
2000
3000
4000
5000
0
10000
20000
30000
40000
50000

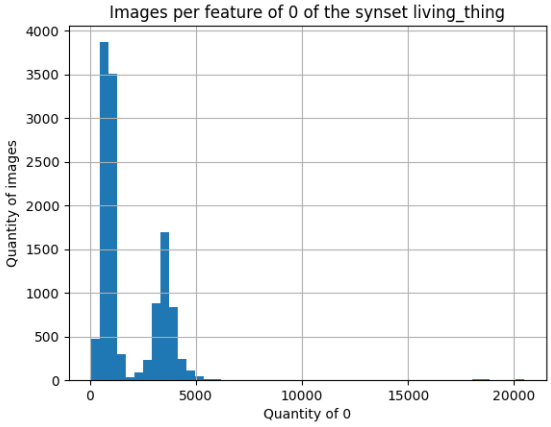

Images per feature of 0 category
0
10000
20000
30000
40000
50000
1

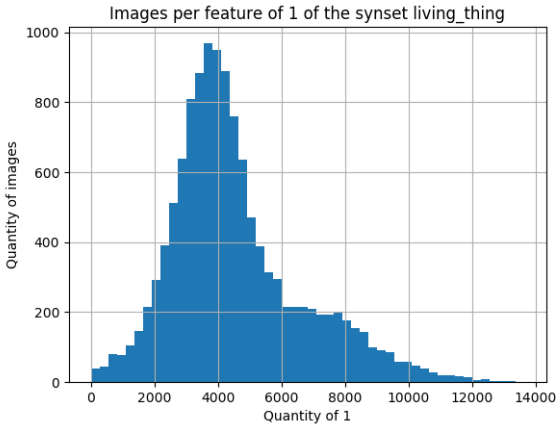

Images per feature of 1 category
Quantity of features
Quantity of images
0
200
400
600
800
1000
1200
1400
0
5000
10000
15000
20000

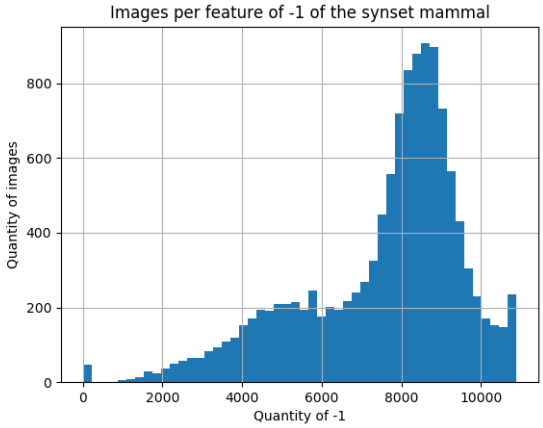

Images per feature of 1 category
20000
15000
10000
5000
0
1

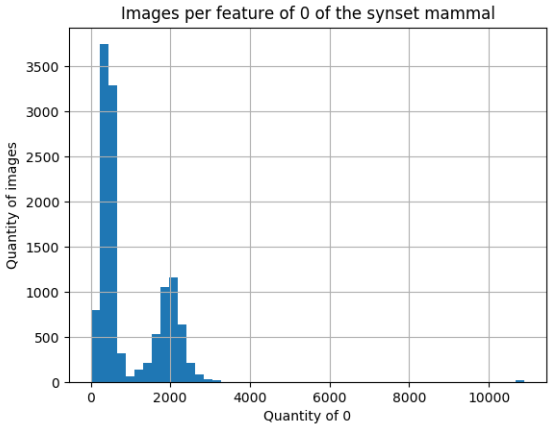
3.7 Images per feature per synset

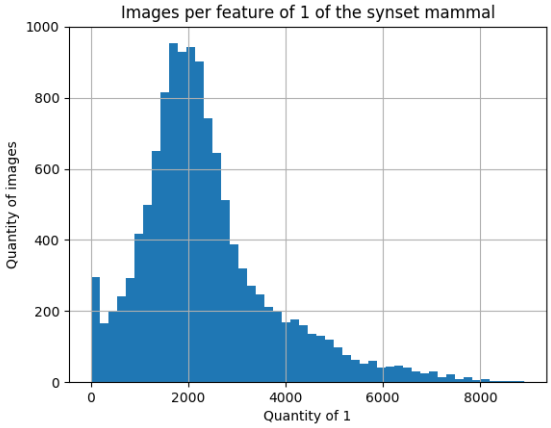


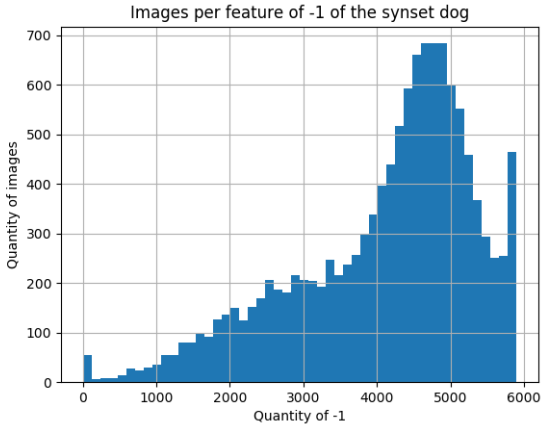


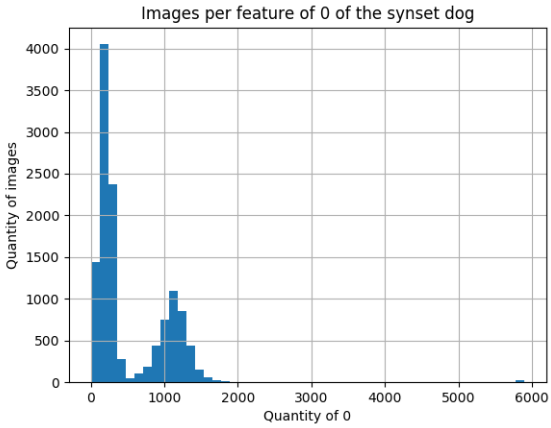

Images per feature of 1 of the synset living_thing
Quantity of images
Quantity of 1
0
200
400
600
800
1000
0
2000
4000
6000
8000
10000
12000
14000

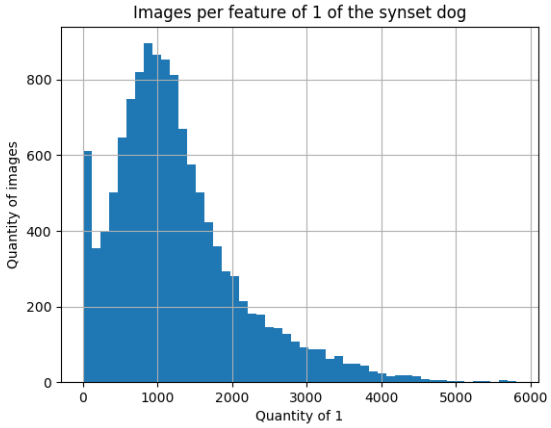

Images per feature of -1 of the synset mammal
Quantity of images
Quantity of -1
0
200
400
600
800
0
2000
4000
6000
8000
10000

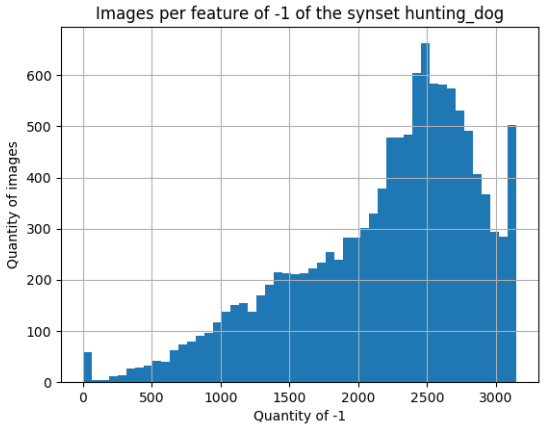

Images per feature of 0 of the synset mammal
Quantity of images
Quantity of 0
0
500
1000
1500
2000
2500
3000
3500
0
2000
4000
6000
8000
10000

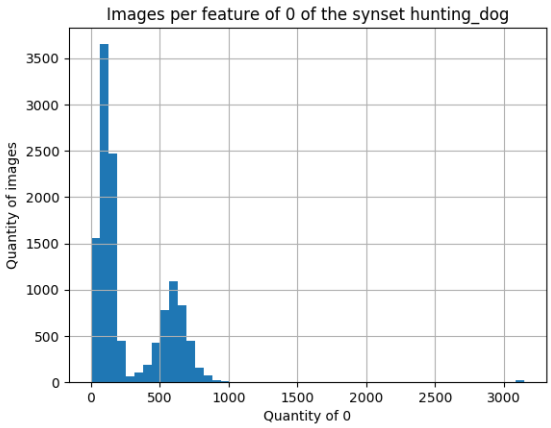

Images per feature of 1 of the synset mammal
Quantity of images
Quantity of 1
0
200
400
600
800
1000
0
2000
4000
6000
8000

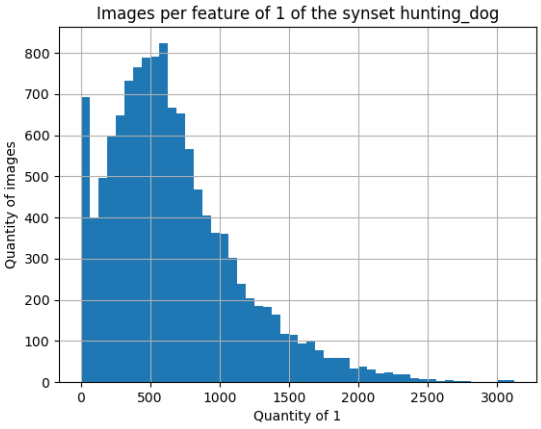

Images per feature of -1 of the synset dog
Quantity of images
Quantity of -1
0
100
200
300
400
500
600
700
0
1000
2000
3000
4000
5000
6000


Images per feature of 0 of the synset dog
Quantity of images
Quantity of 0
0
500
1000
1500
2000
2500
3000
3500
4000
0
1000
2000
3000
4000
5000
6000


Images per feature of 1 of the synset dog
Quantity of images
Quantity of 1
0
200
400
600
800
0
1000
2000
3000
4000
5000
6000


Images per feature of -1 of the synset hunting_dog
Quantity of images
Quantity of -1
0
100
200
300
400
500
600
0
500
1000
1500
2000
2500
3000


Images per feature of 0 of the synset hunting_dog
Quantity of images
Quantity of 0
0
500
1000
1500
2000
2500
3000
3500
0
500
1000
1500
2000
2500
3000


Images per feature of 1 of the synset hunting_dog
Quantity of images
Quantity of 1
0
100
200
300
400
500
600
700
800
0
500
1000
1500
2000
2500
3000

3.8 Comprobación de que las cosas tinen sentido

- **Hay alguna imagen que no tenga ninguna feature con valor cero?**
  No, ninguna
- **Hay algun synset que tenga valor 1 y -1 para la misma feature?**

3.9 Estudio de los outliers de imagenes per feature

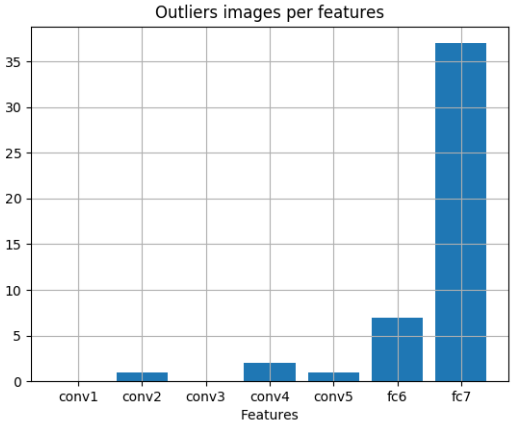


Figure 1: Category: -1

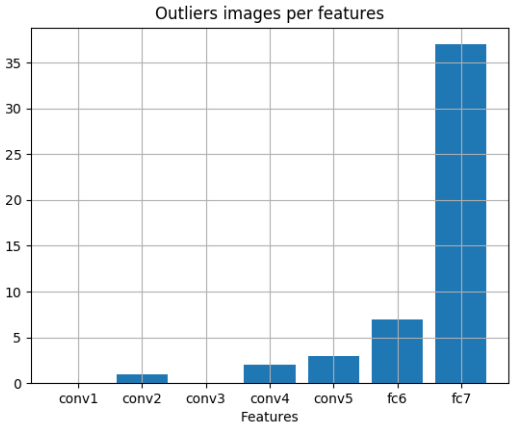


Figure 2: Category: 0

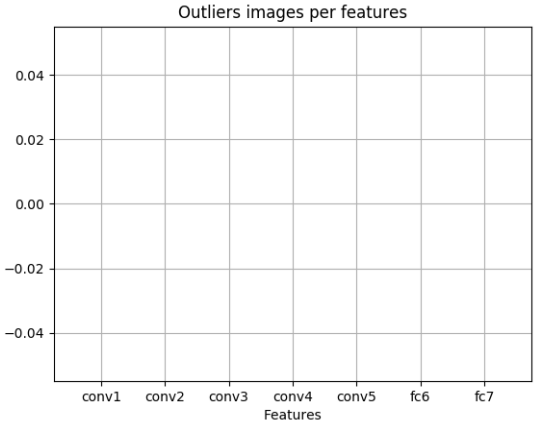


Figure 3: Category: 1