

TFG informe inicial

Raquel

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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 = [living_things, mammal, dog, hunting_dogs]

synsets.non_living_things = [artifact, instrumentality, conveyance, wheeled_vehicle]

- **categories = {-1 0 1 }** The possible values of the features.

- **The layers:**

```
self.layers = {
    'conv1_1': [0, 64],  # 1
    'conv1_2': [64, 128], # 2
    'conv2_1': [128, 256], # 3
    'conv2_2': [256, 384], # 4
    'conv3_1': [384, 640], # 5
    'conv3_2': [640, 896], # 6
    'conv3_3': [896, 1152], # 7
    'conv4_1': [1152, 1664], # 8
    'conv4_2': [1664, 2176], # 9
    'conv4_3': [2176, 2688], # 10
    'conv5_1': [2688, 3200], # 11
```

```

        'conv5_2': [3200, 3712], # 12
        'conv5_3': [3712, 4224], # 13
        'fc6': [4224, 8320], # 14
        'fc7': [8320, 12416], # 15
        'conv1': [0, 128], # 16
        'conv2': [128, 384], # 17
        'conv3': [384, 1152], # 18
        'conv4': [1152, 2688], # 19
        'conv5': [2688, 4224], # 20
        'conv': [0, 4224], # 21
        '2_5conv': [128, 4224], # 22
        'fc6tofc7': [4224, 12416], # 23
        '# all': [0, 12416] # 24
    }
    self.reduced_layers = {
        'conv1': [0, 128],
        'conv2': [128, 384],
        'conv3': [384, 1152],
        'conv4': [1152, 2688],
        'conv5': [2688, 4224],
        'fc6': [4224, 8320],
        'fc7': [8320, 12416]
    }
}

```

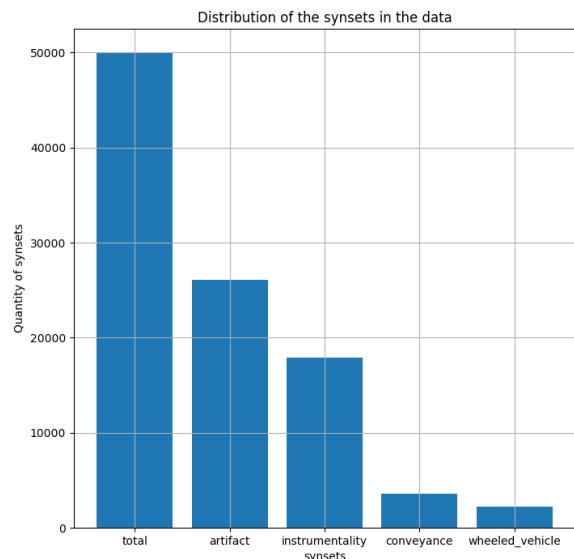
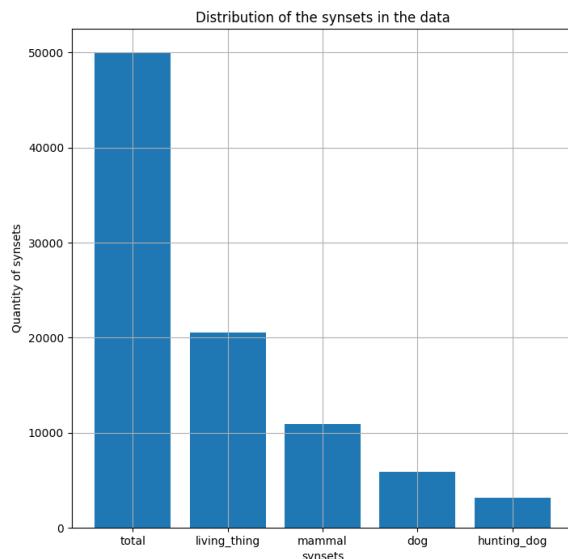
1.2 Generated Data

- **synset_index_hyponim.txt** A list with all the hyponyms of every synset.
- **synset_index.txt** For each synset a list with the index of the elements of the hyponym list in the embedding.
- Un diccionario con la cantidad de imágenes que tiene cada feature para cada category.
- **features_per_image[synsets].pkl** Es un diccionario que contiene :
feature_per_image[image][category] = cantidad e imagenes de esta categoría
- **features_per_layer[synsets].pkl** features_per_layer[layer][category] = cantidad de features de la category tal en el layer
- **Images/_per_feature_per_synset[synsets].pkl** Genera un diccionario tal que:
dict[features][category][synset] = cantidad e imagenes del synset que tienen esta categoria en cuestión.
- **intra_synset[synsets].pkl** dict[synset][synsethijo] = cantidad de synset hijo en synset

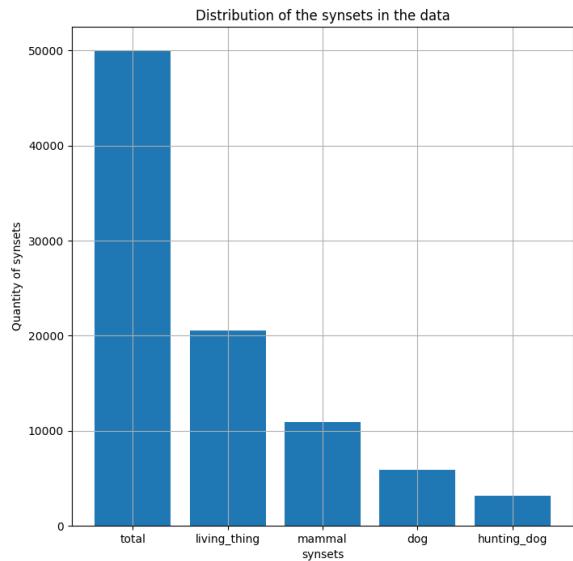
2 TODOS

- Matrices mezclando living y nonliving (en proceso)
- Buscar una representación mejor para las matrices de cambios (y hacerlo por layer) (en proceso)
- Redactar análisis hasta las matrices.
- Obtener el resto de los embeddings que me ha generado Armand.
- Generar labels para cada synset con valor 1 si el elemento pertenece al synset y 0 else.
- Sacar conclusiones respecto a la profundidad de la capa, la "profundidad" del synset y los cambios de -1 a 1. Cuanto más específico es el synset y más profunda es la capa deberían cambiar de -1 a 1 más elementos.

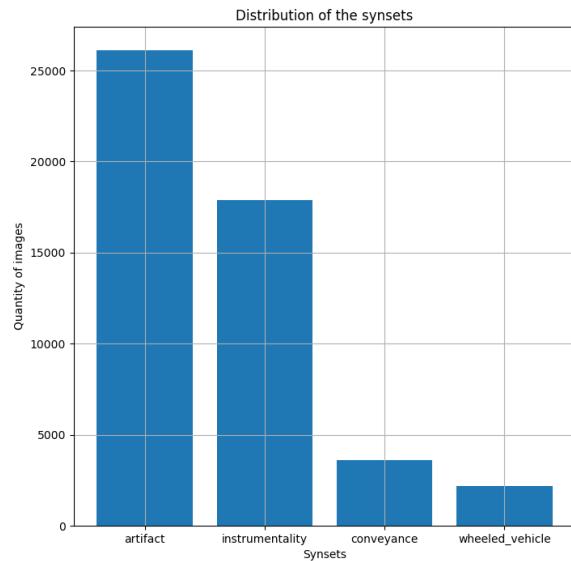
3 Análisis Base



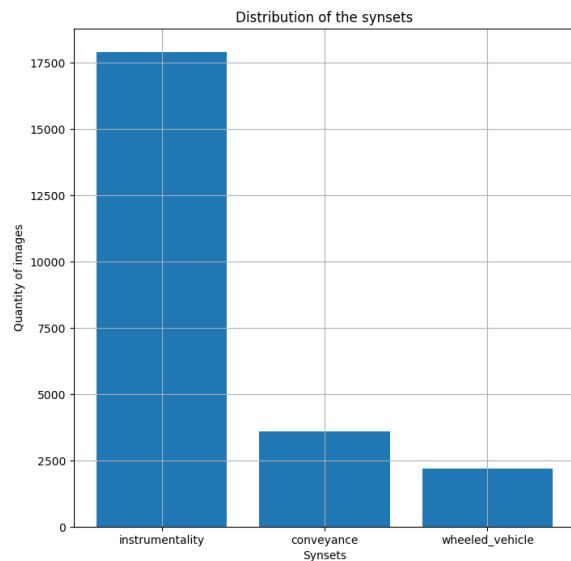
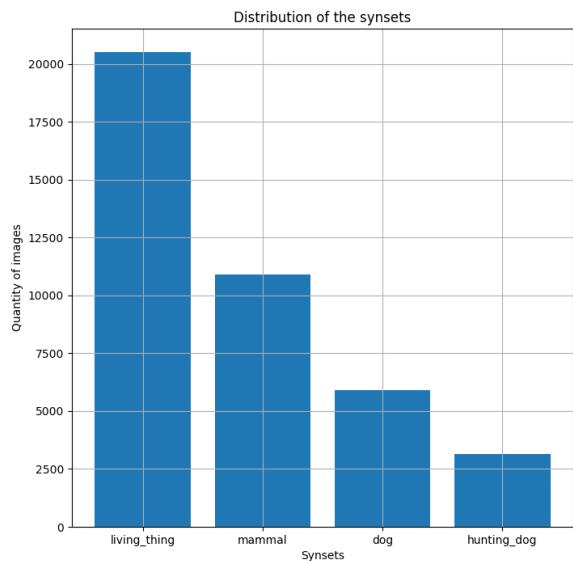
3.1 Intra sinset

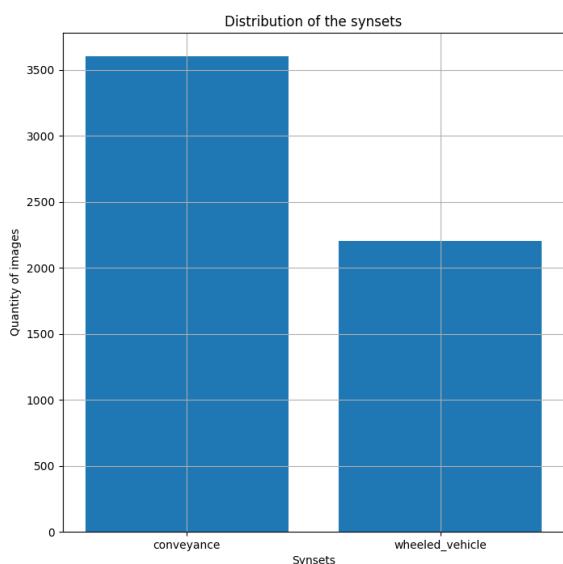
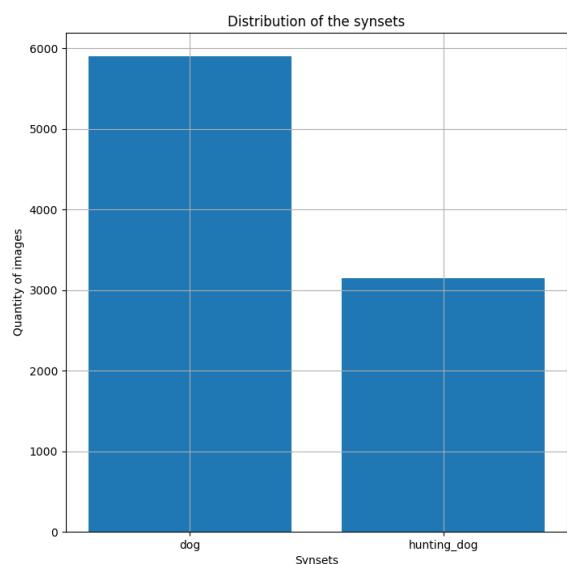
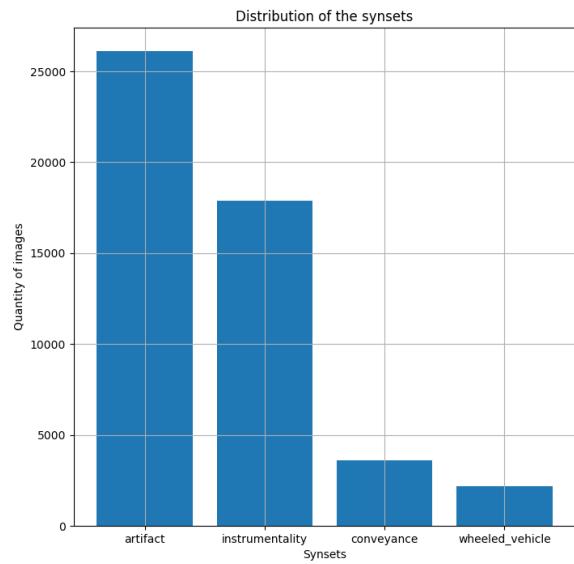
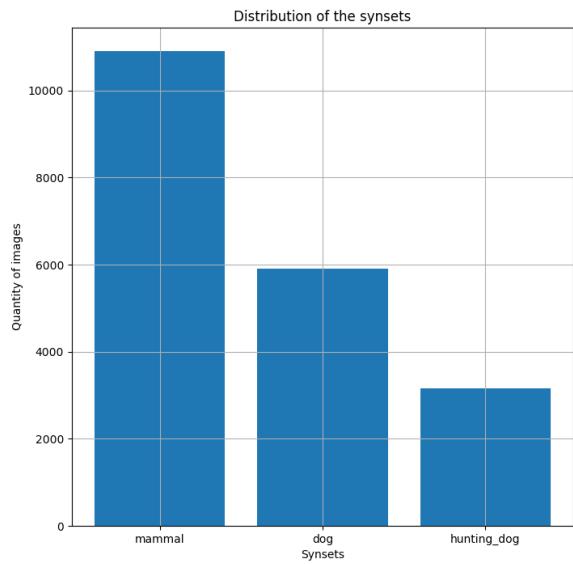


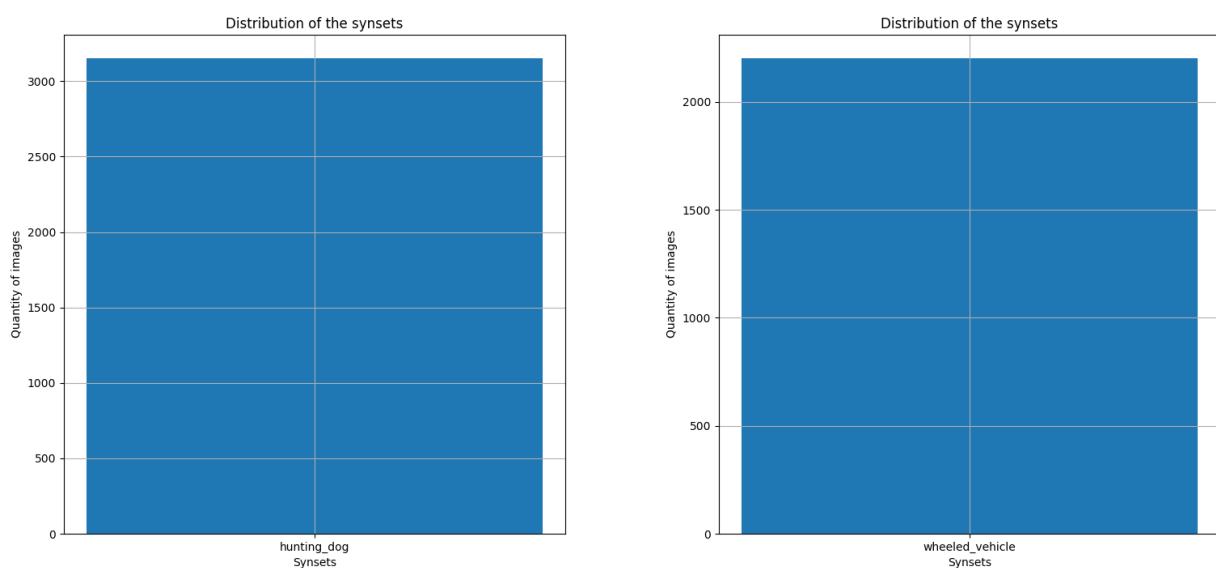
Living Things



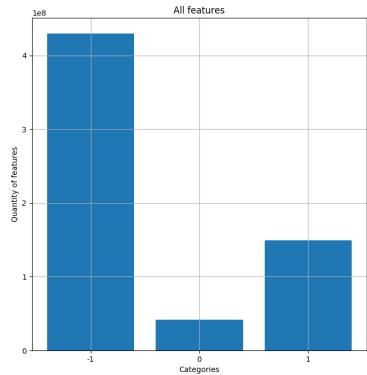
Non Living Things



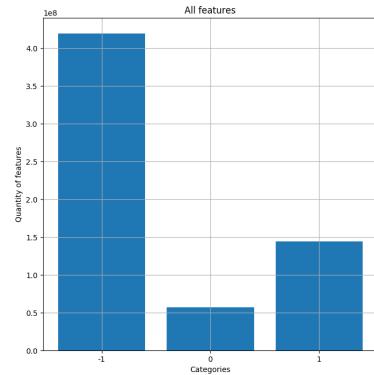




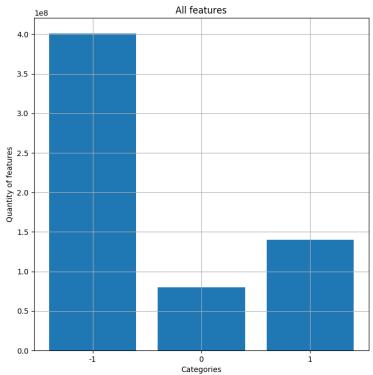
3.2 Distribución total de las features



Embedding 19

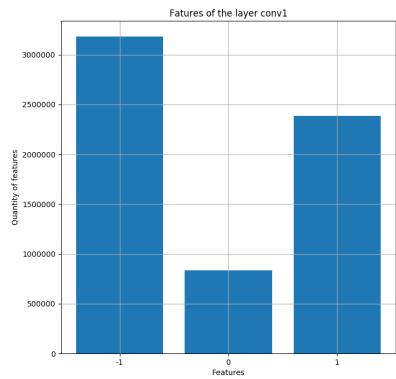


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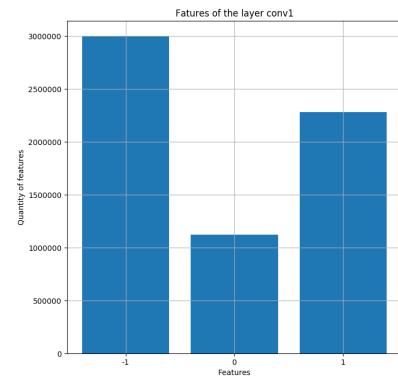


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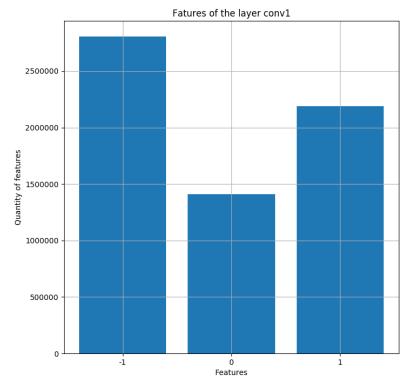
3.3 Distribución de las features por layer



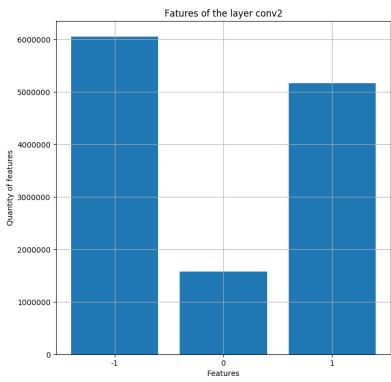
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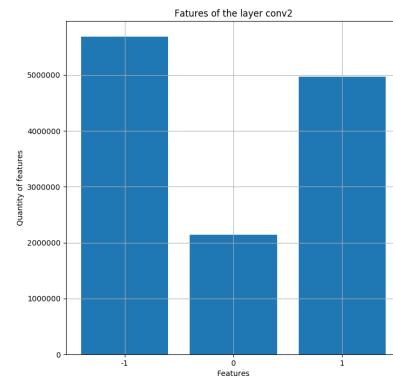
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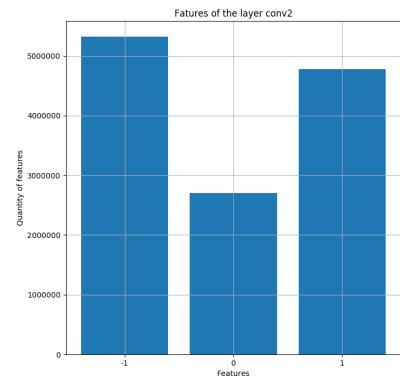
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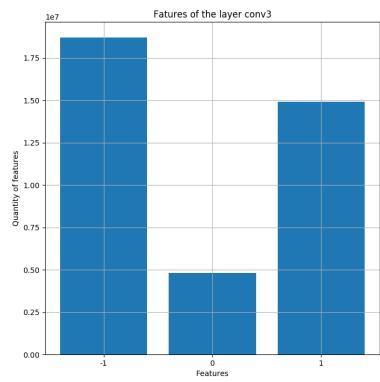
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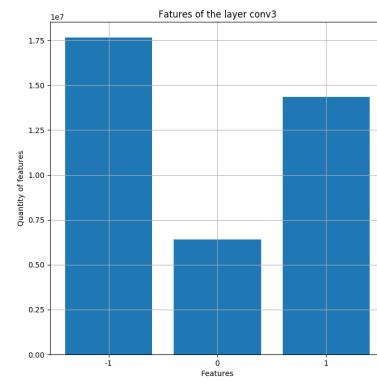
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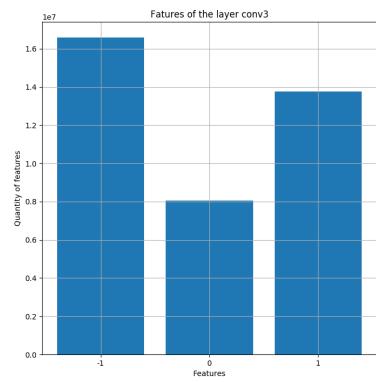
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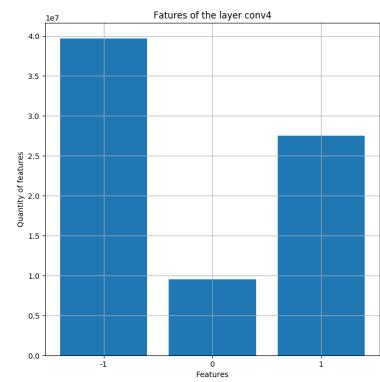
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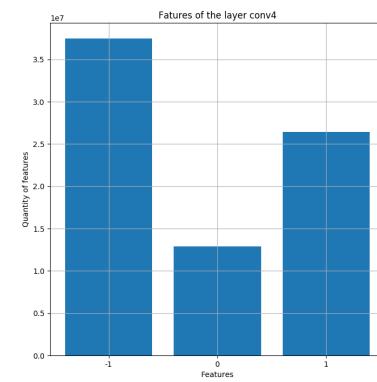
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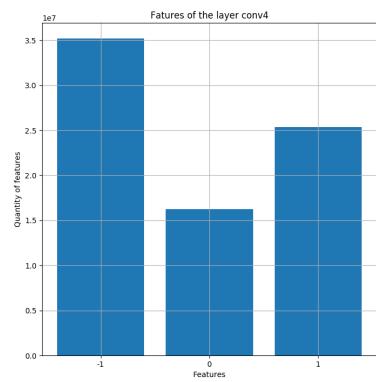
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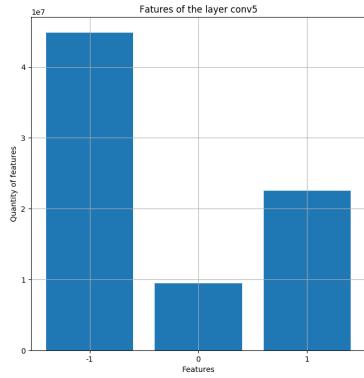
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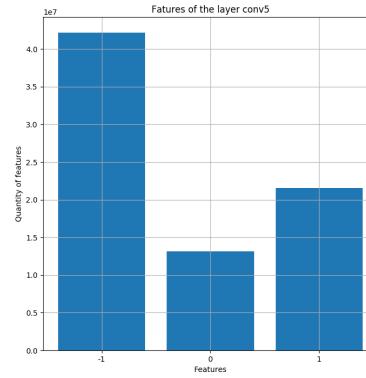
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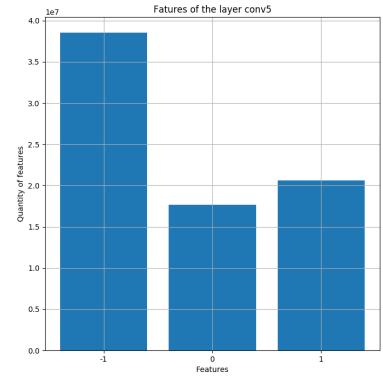
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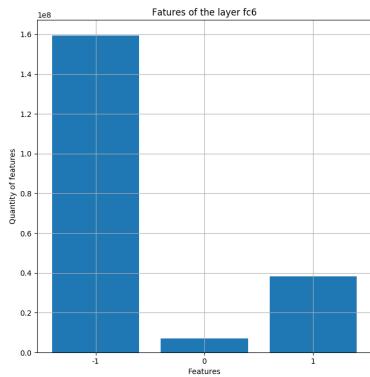
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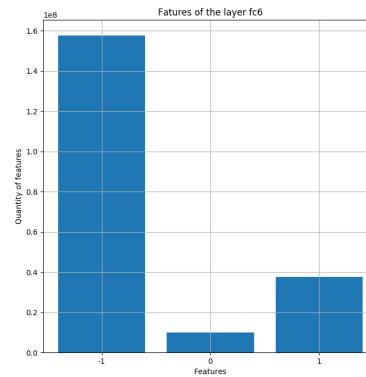
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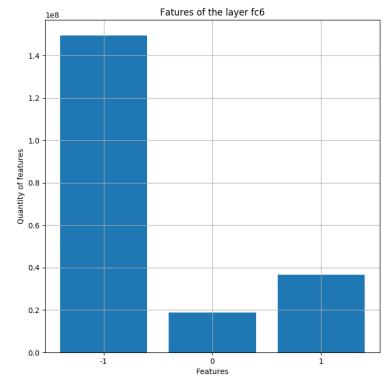
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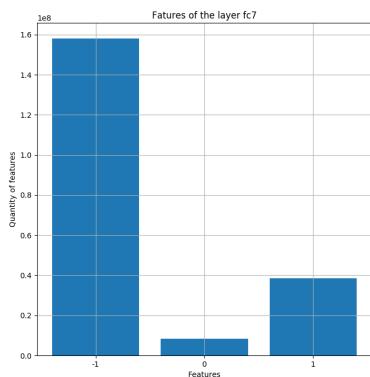
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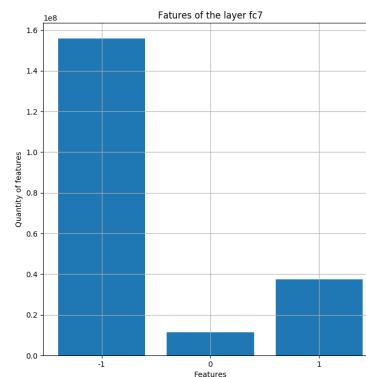
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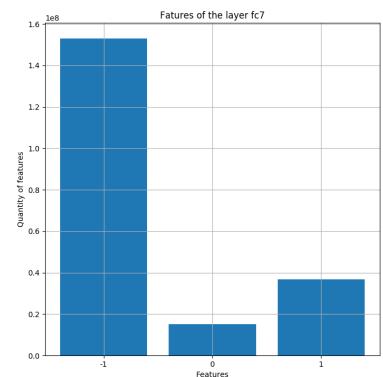
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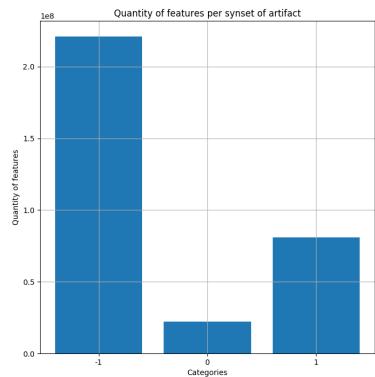


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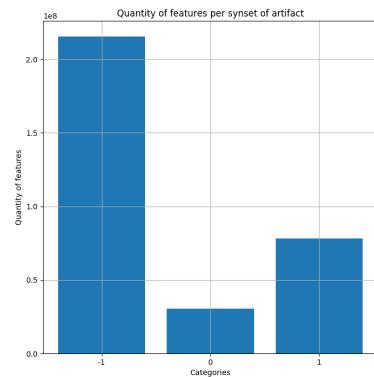


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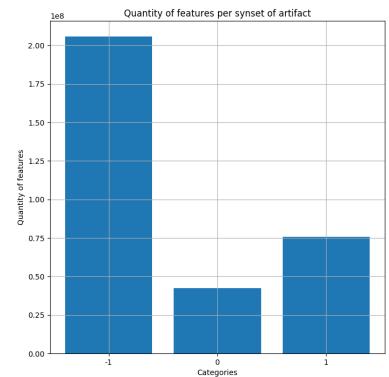
3.4 Distribución de las features por synset



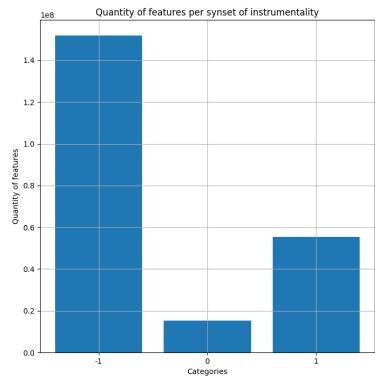
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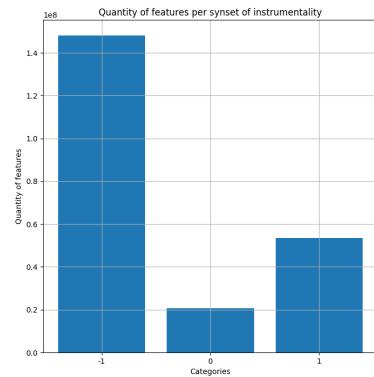
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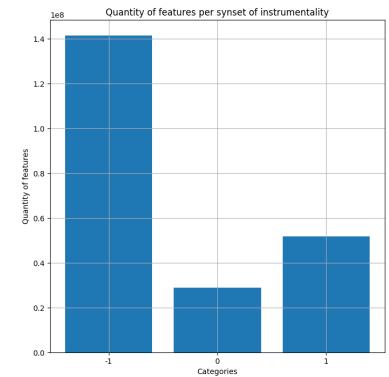
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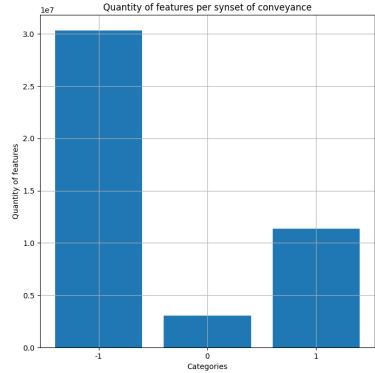
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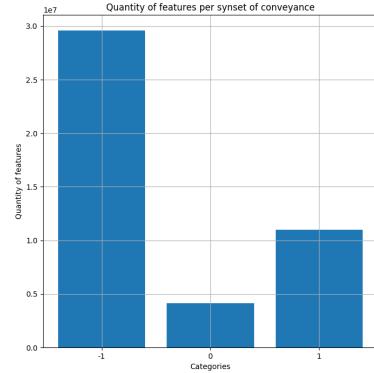
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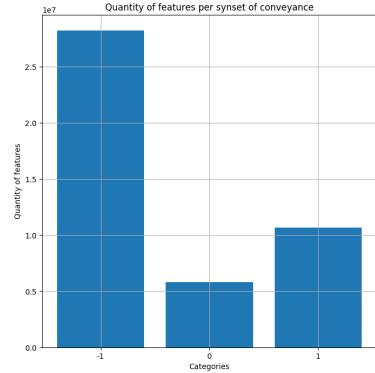
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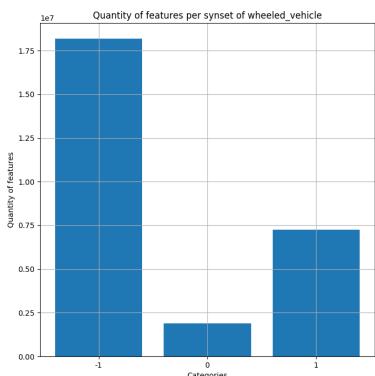
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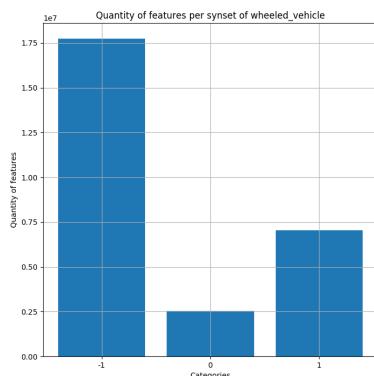
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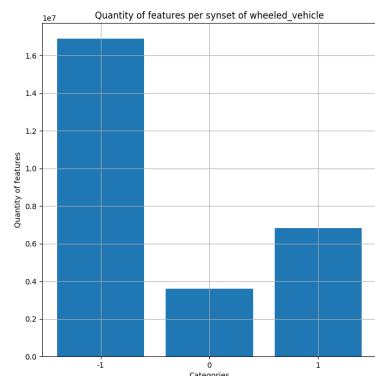
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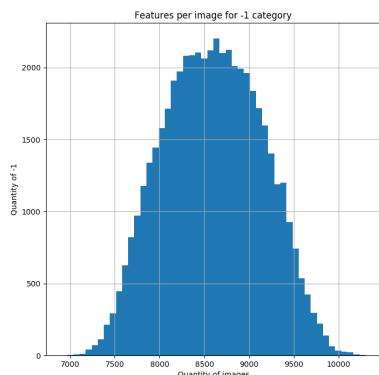
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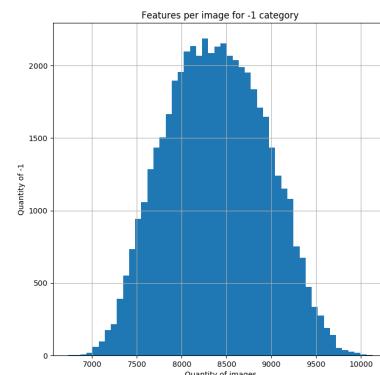
Embedding 31

3.5 Features per image

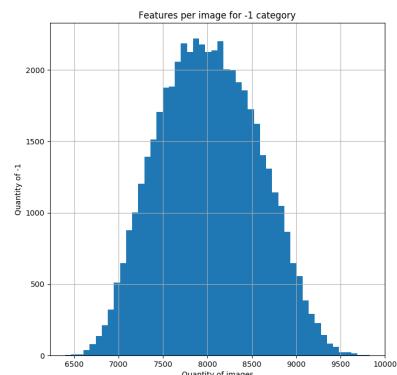
There are for each image the total counting of features active, for the different possible categories ($-1, 0, 1$):



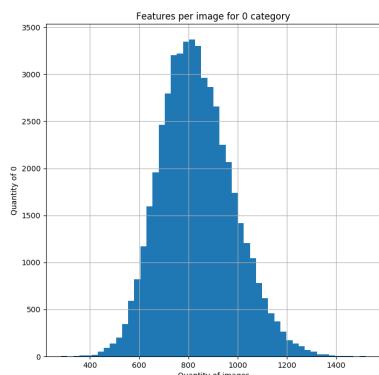
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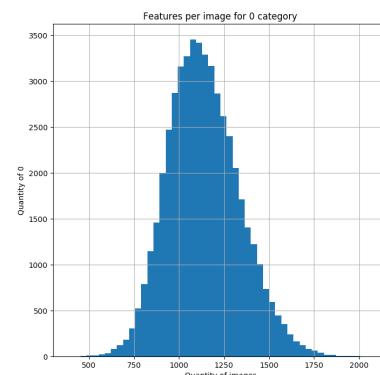
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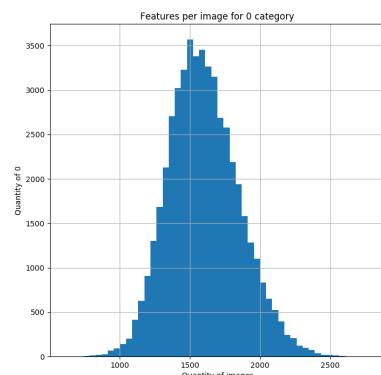
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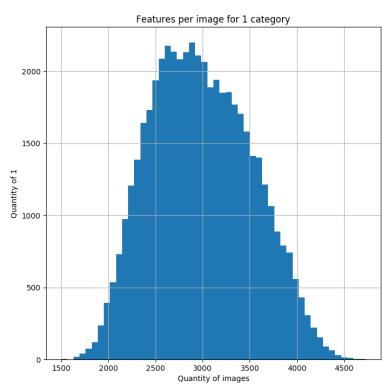
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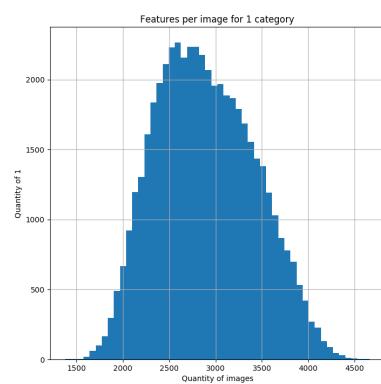
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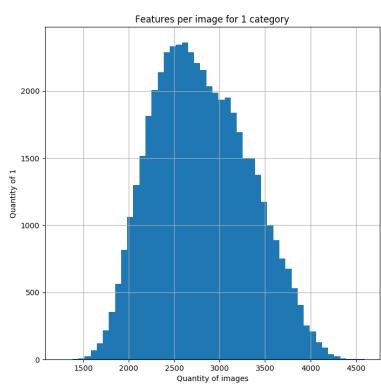
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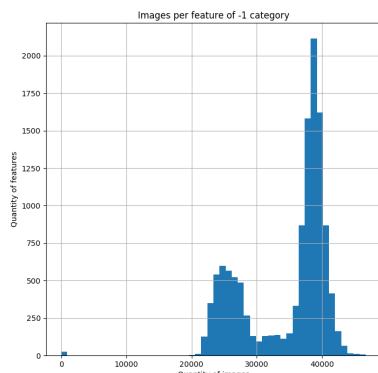
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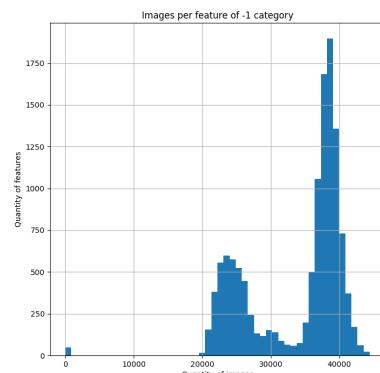
Embedding 31

3.6 Images per feature

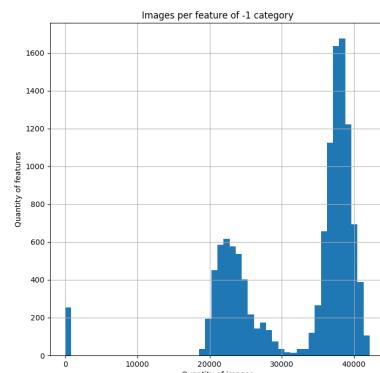
Now I calculate for each feature how many images activate in each specific category:



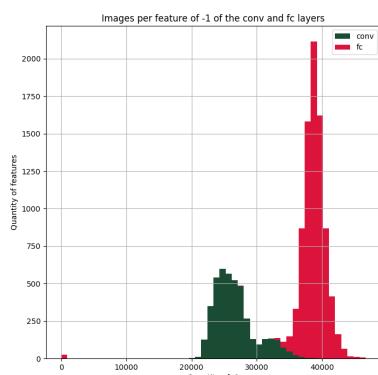
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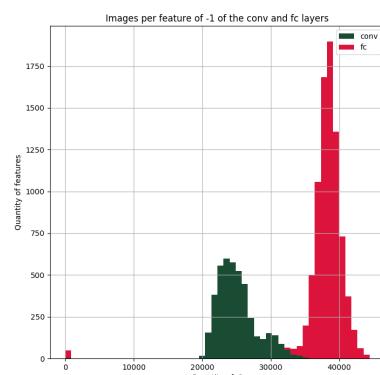
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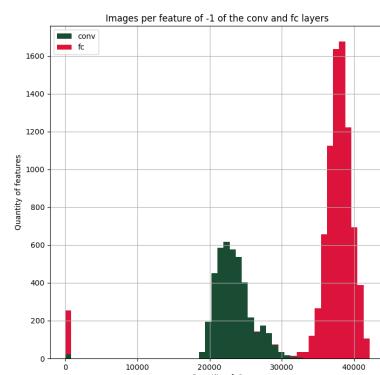
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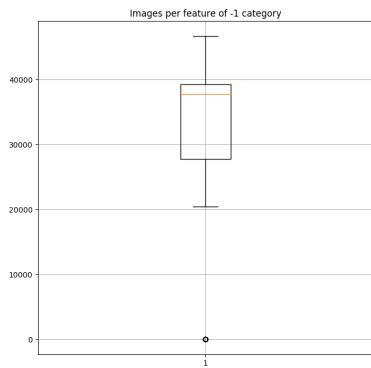
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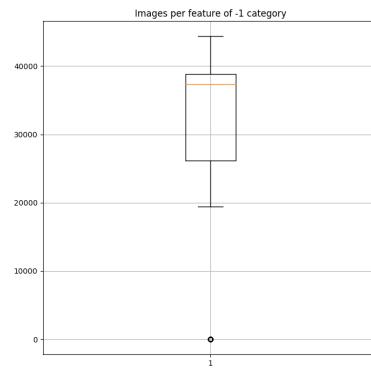
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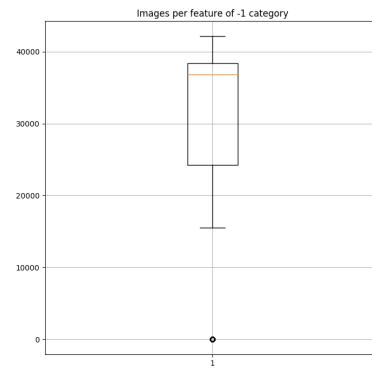
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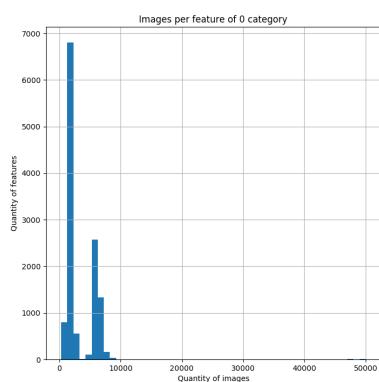
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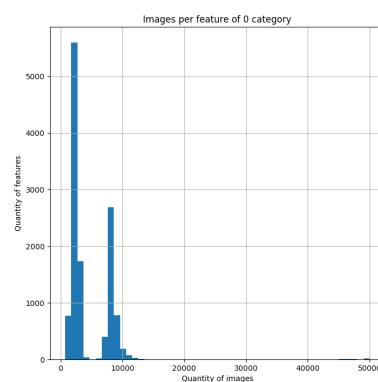
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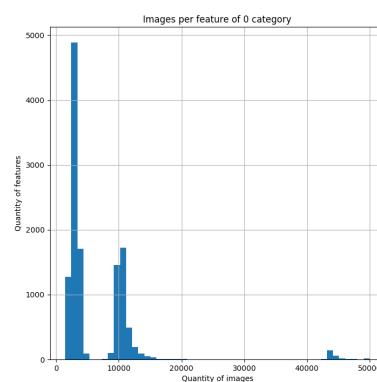
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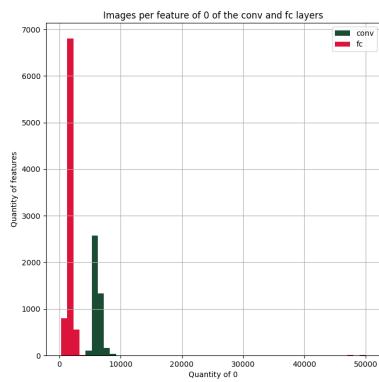
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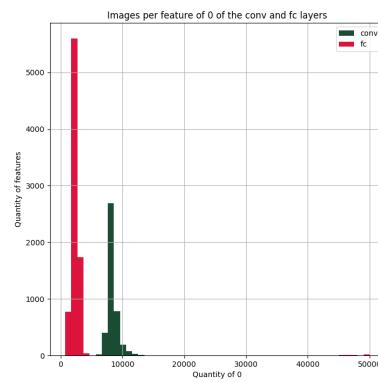
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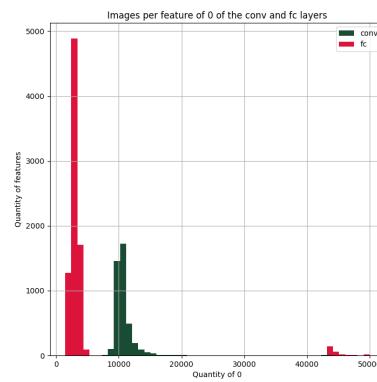
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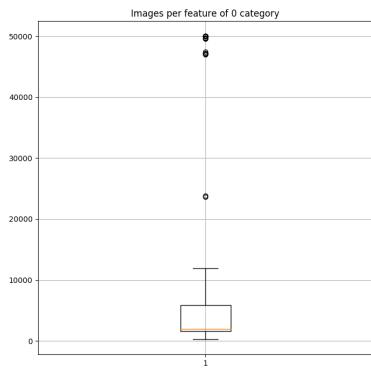
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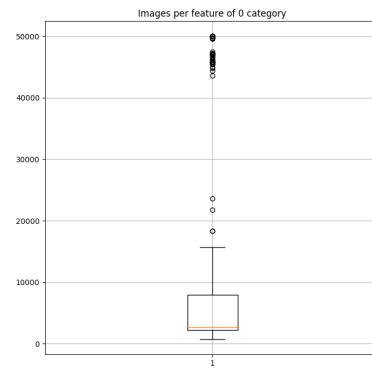
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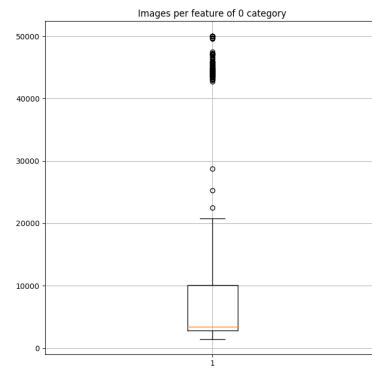
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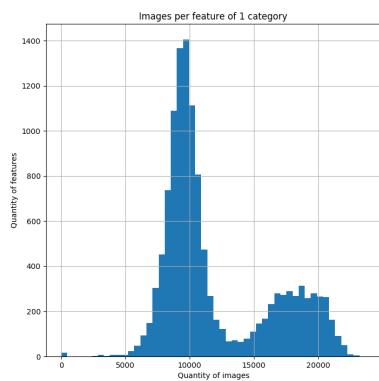
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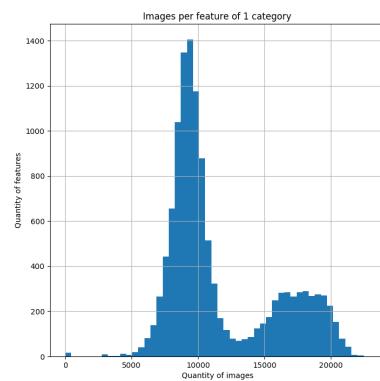
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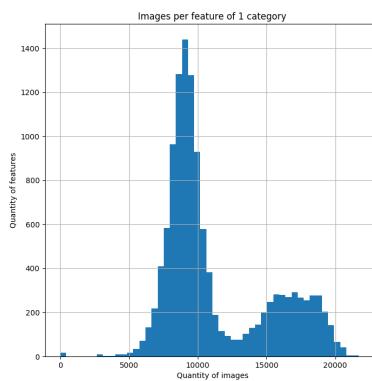
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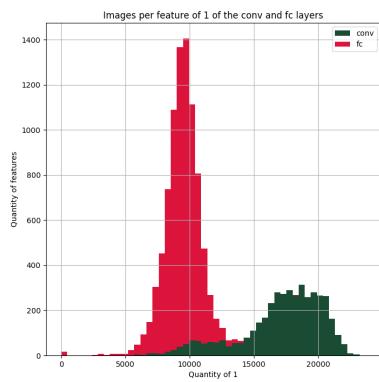
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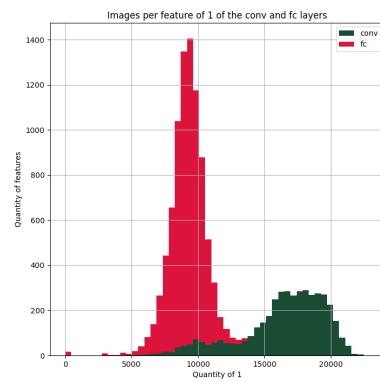
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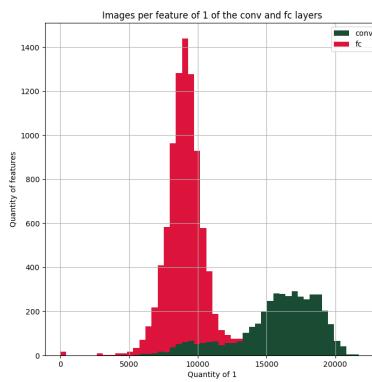
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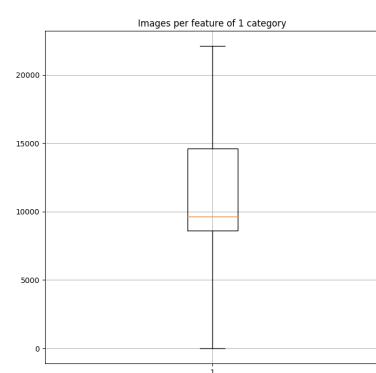
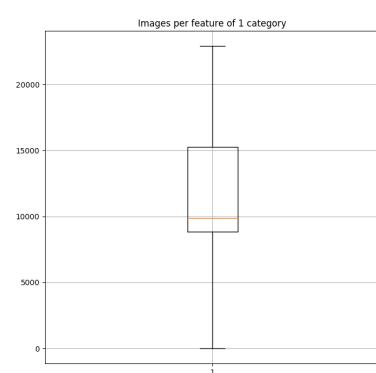
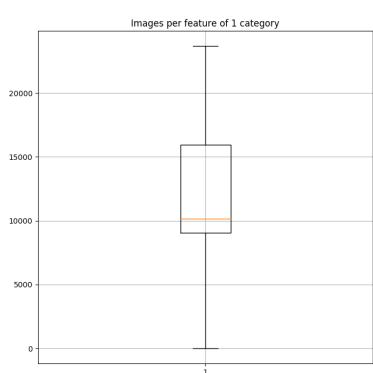
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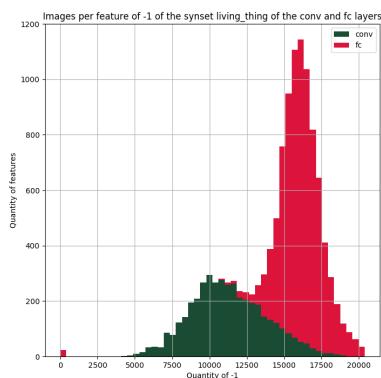
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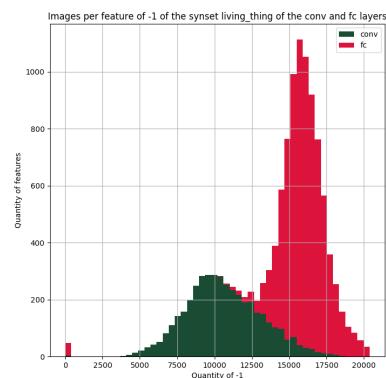
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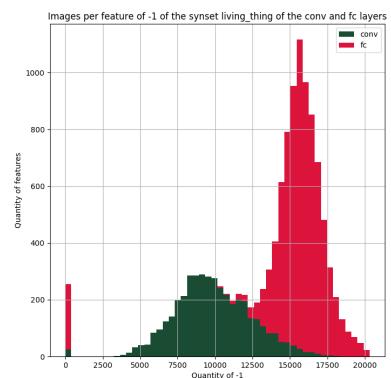
3.7 Images per feature per synset



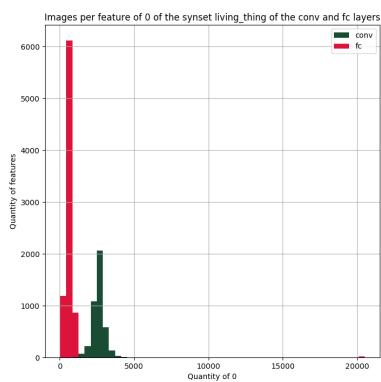
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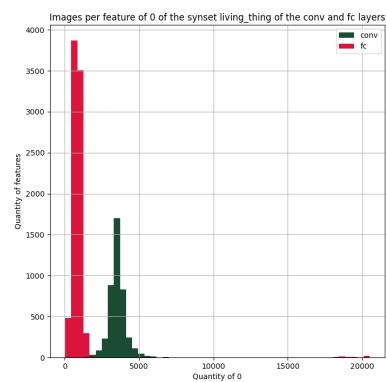
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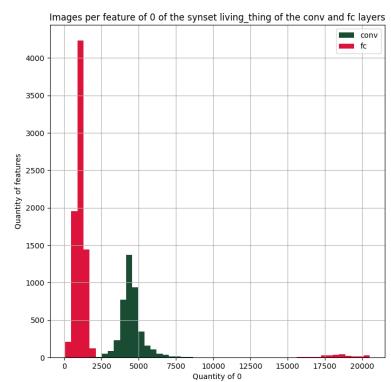
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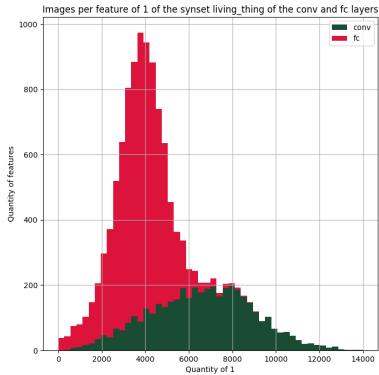
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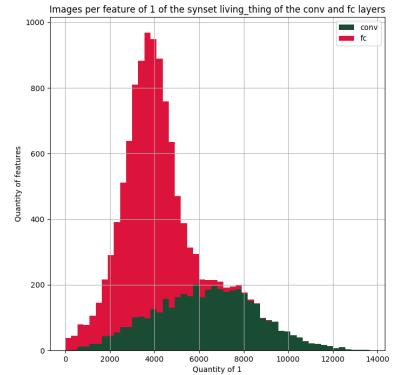
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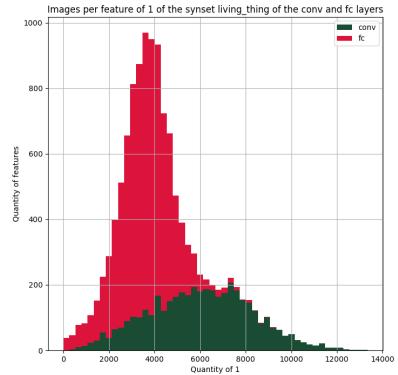
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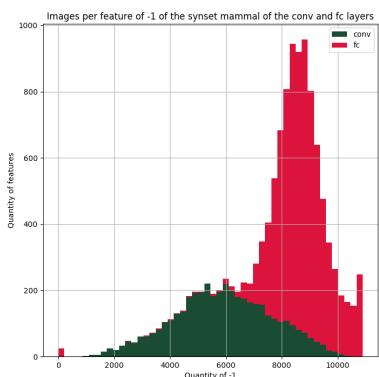
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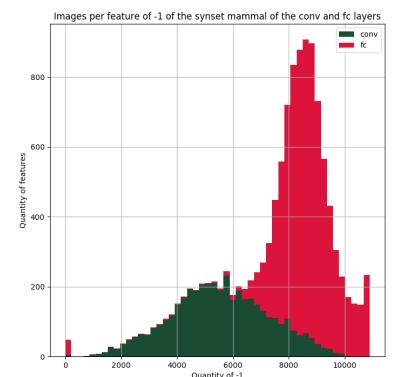
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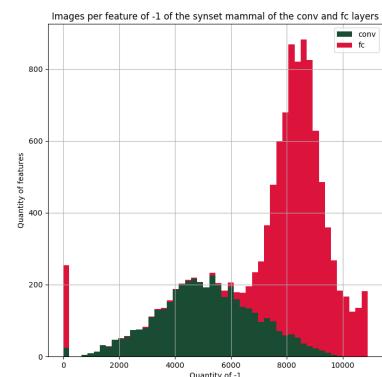
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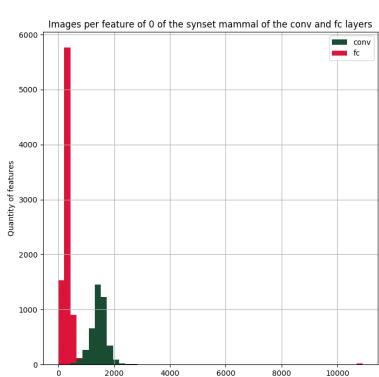
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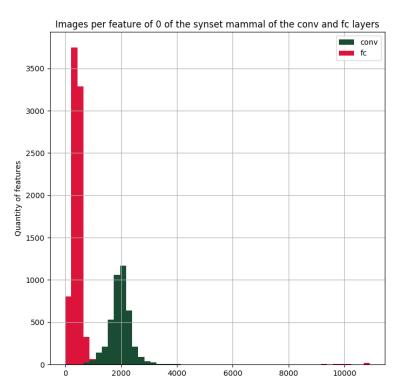
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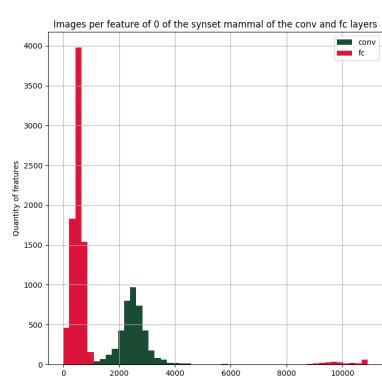
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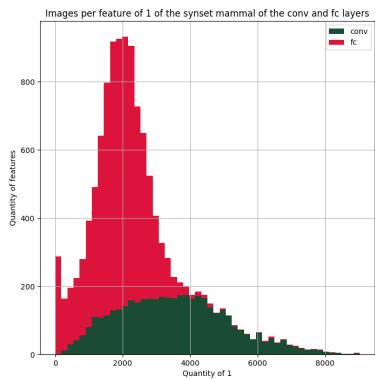
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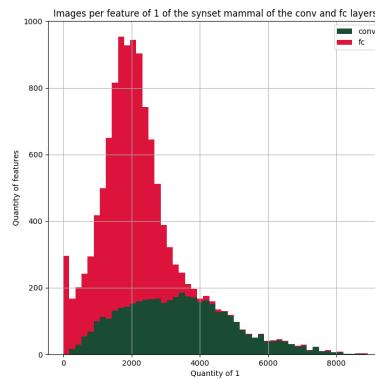
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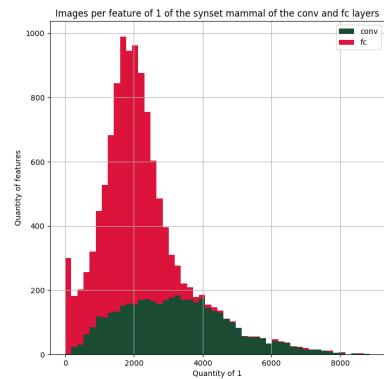
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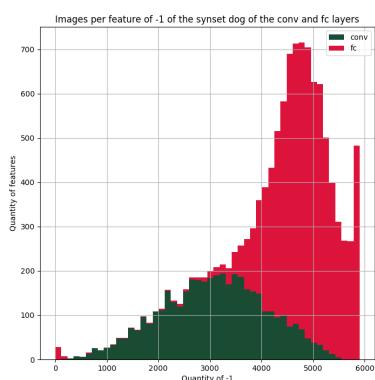
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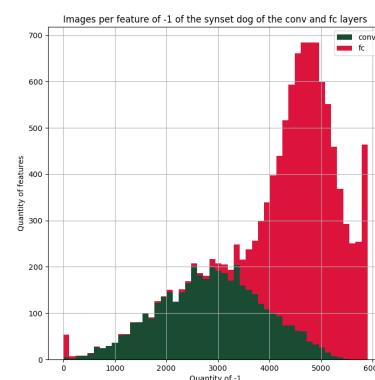
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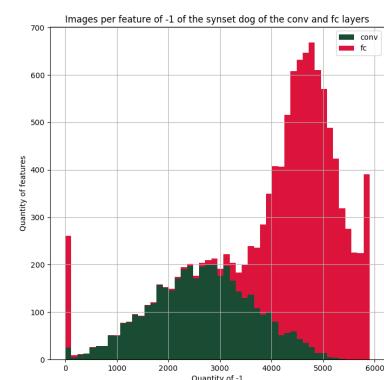
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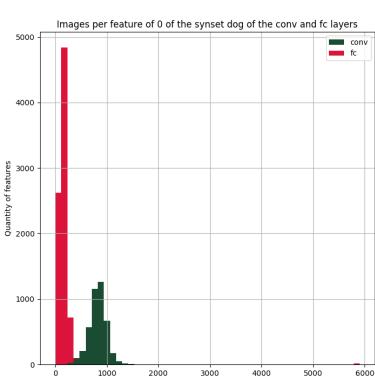
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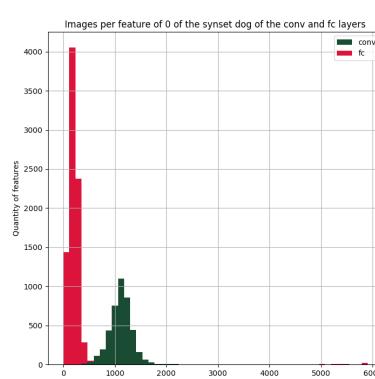
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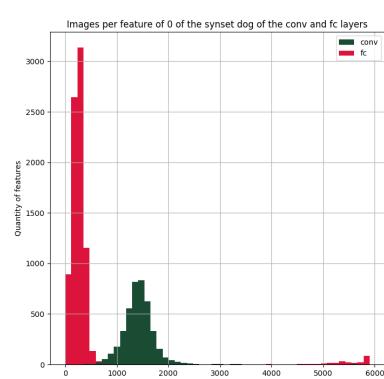
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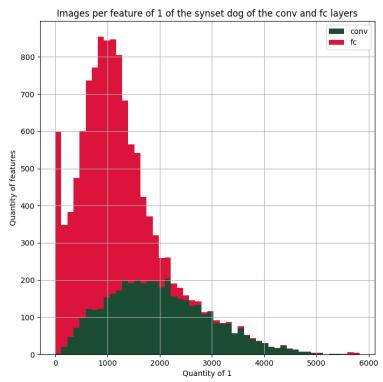
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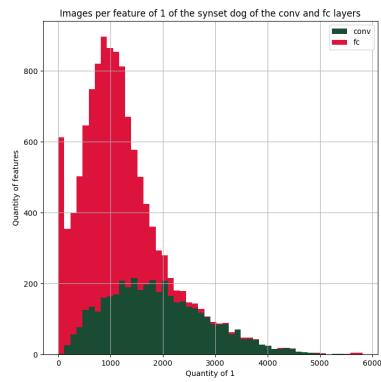
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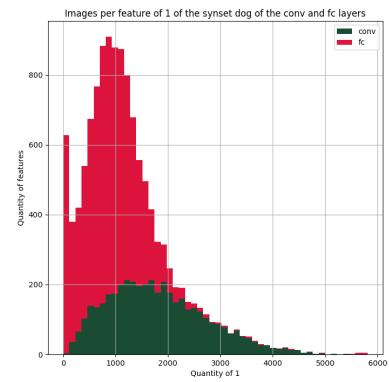
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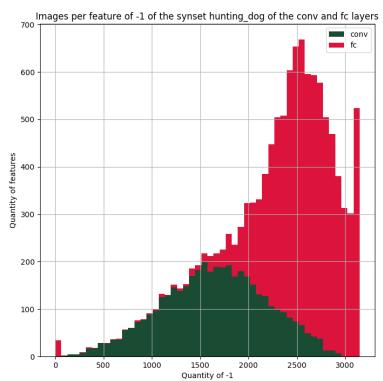
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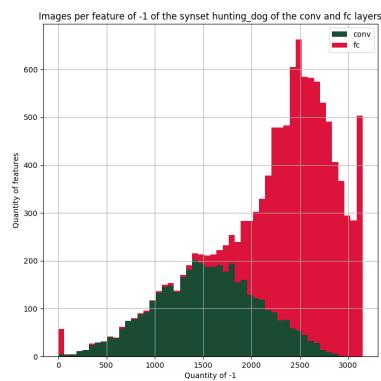
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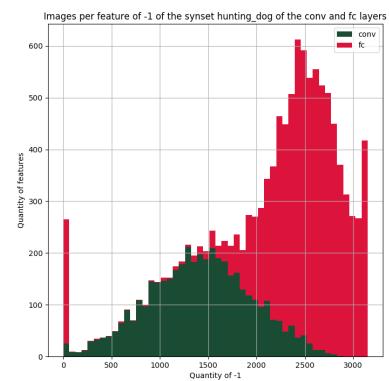
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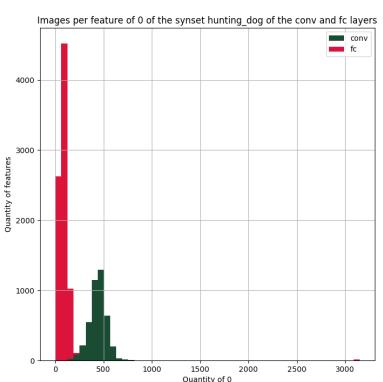
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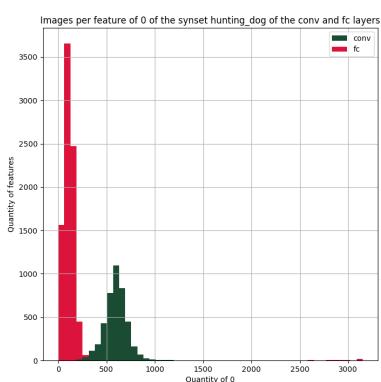
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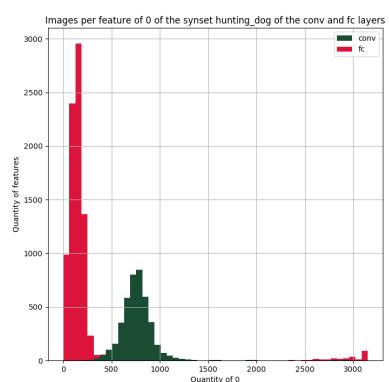
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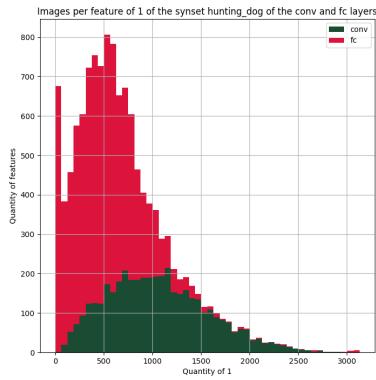
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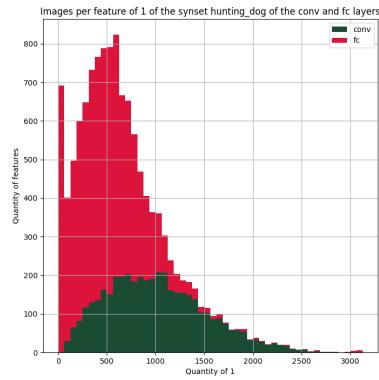
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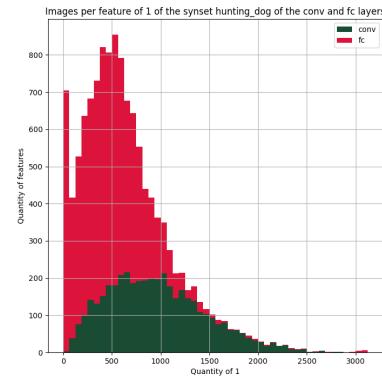
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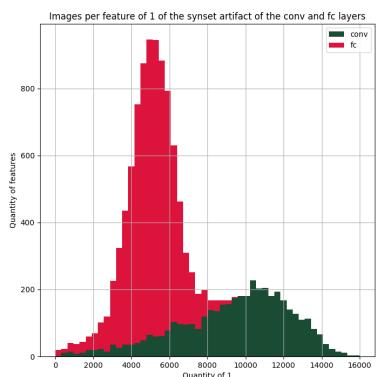
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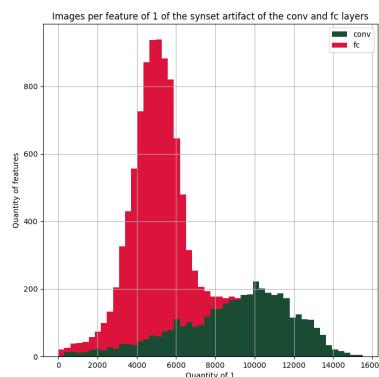
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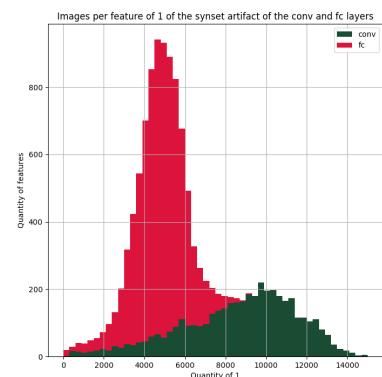
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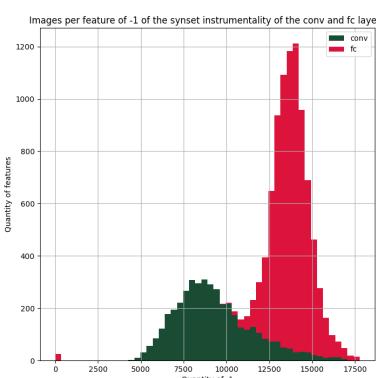
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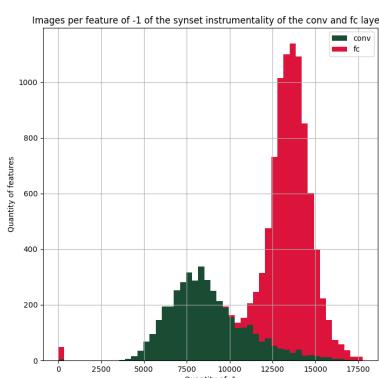
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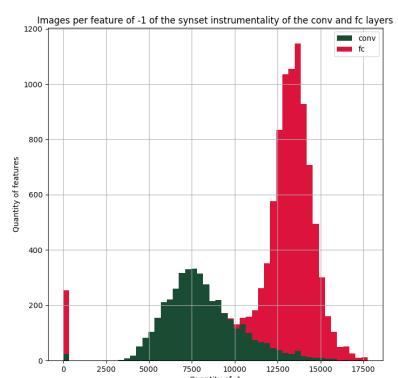
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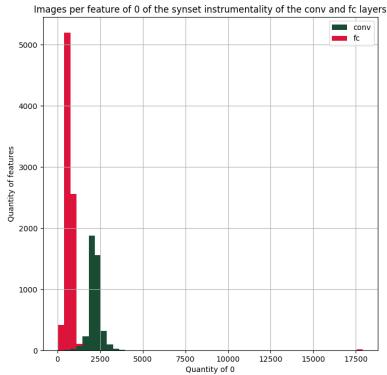
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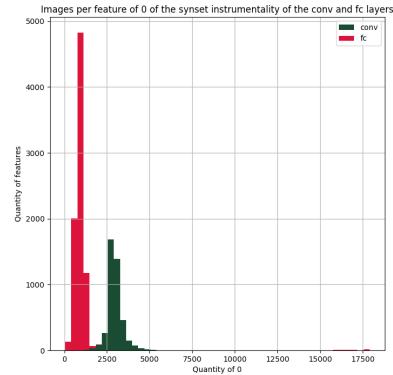
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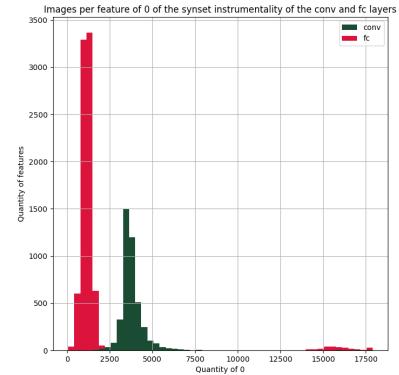
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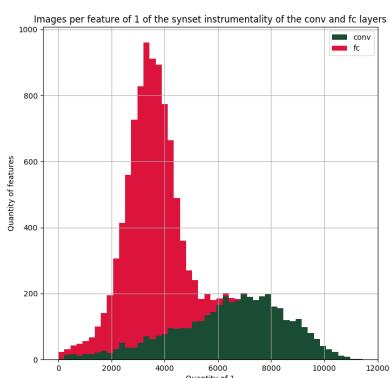
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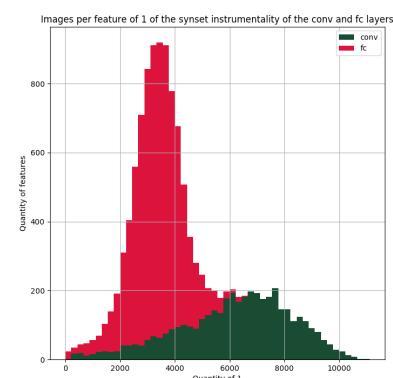
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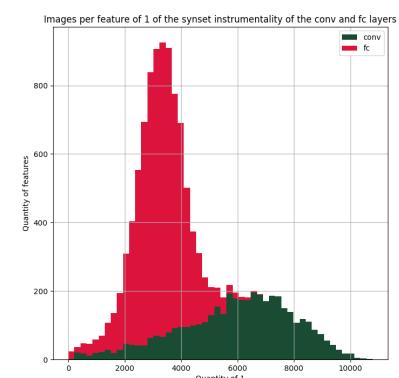
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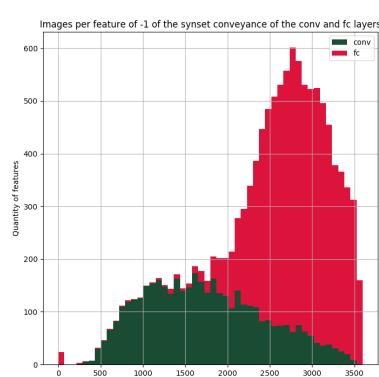
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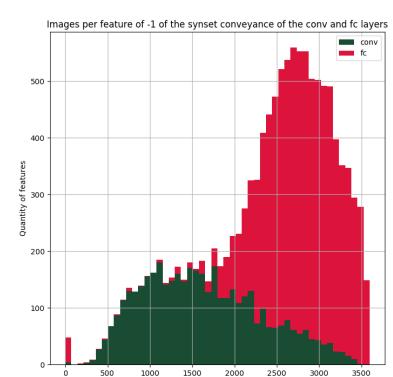
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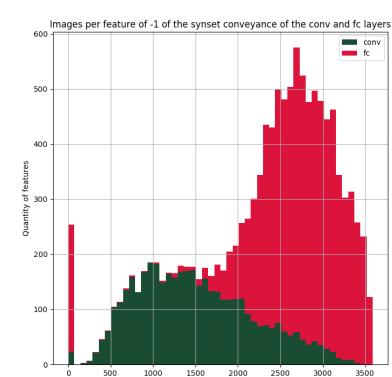
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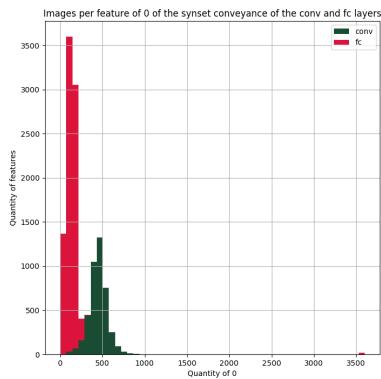
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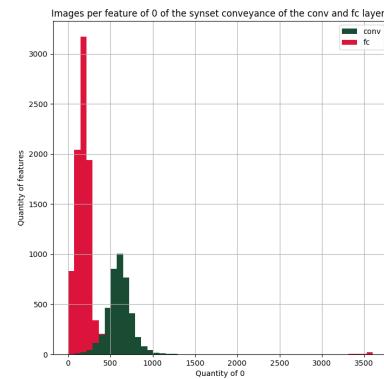
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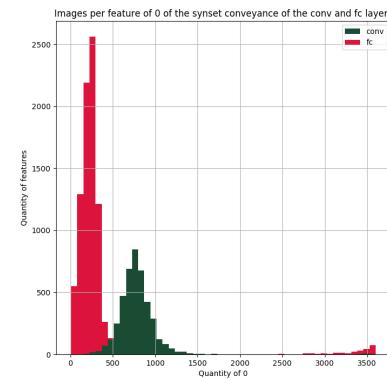
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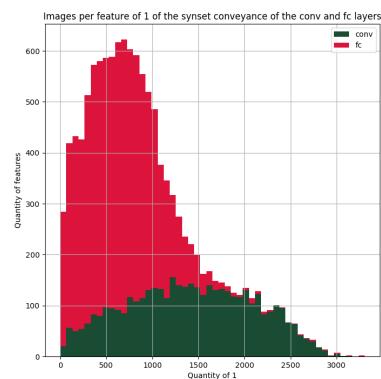
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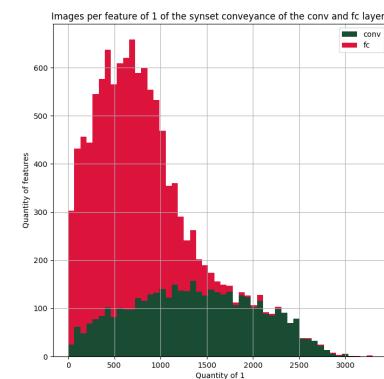
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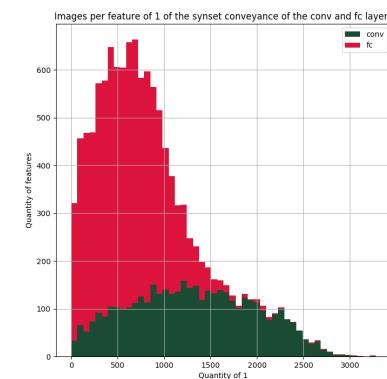
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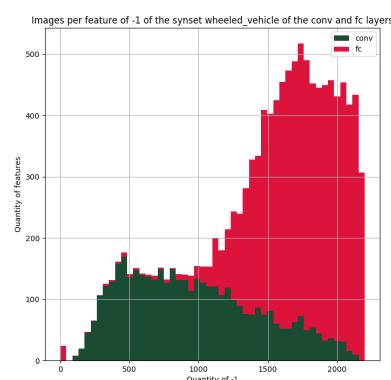
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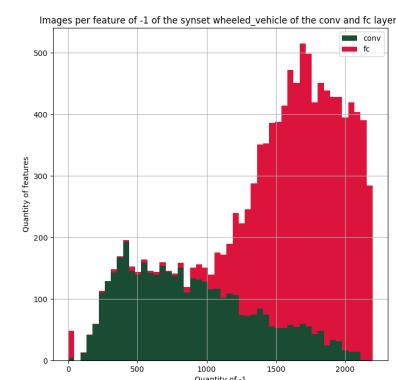
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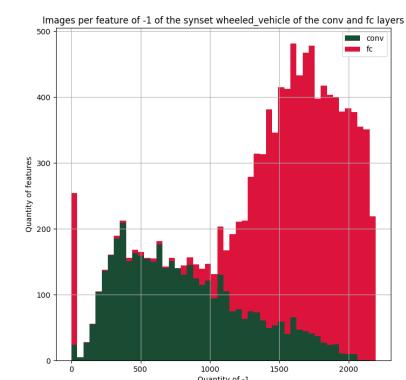
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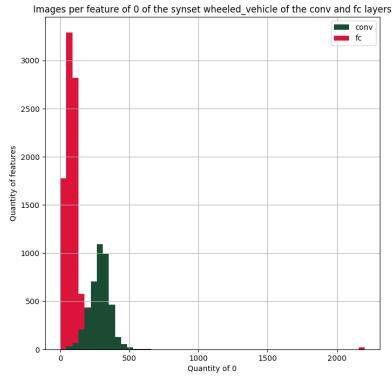
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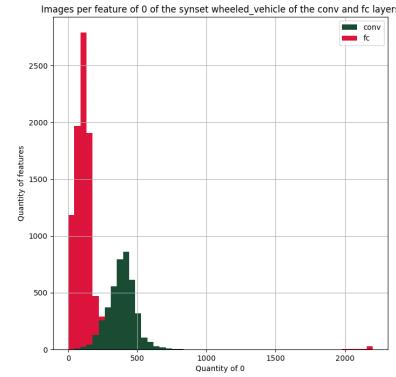
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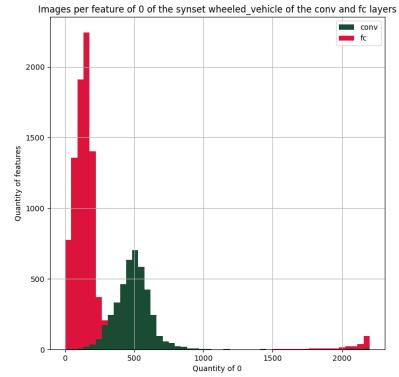
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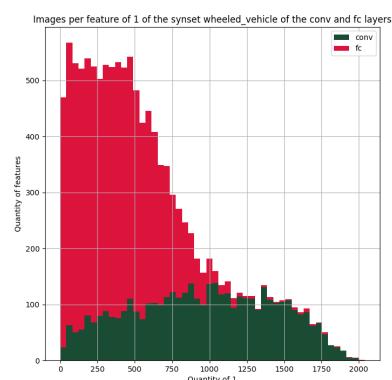
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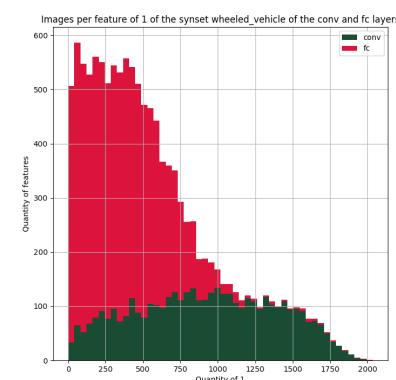
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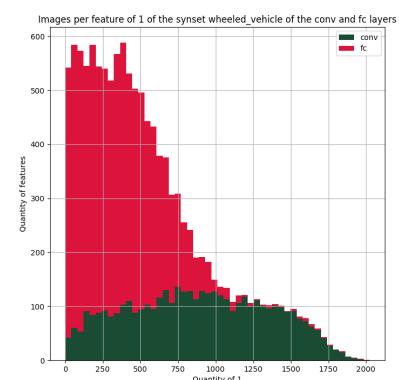
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Embedding 19



Embedding 25



Embedding 31

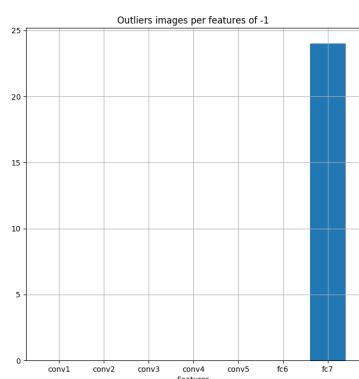
3.8 Comprobación de que las cosas tienen sentido

- Hay alguna imagen que no tenga ninguna feature con valor cero? No, ninguna
- Hay algún synset que tenga valor 1 y -1 para la misma feature? Si, bastantes. Estamos tomando:

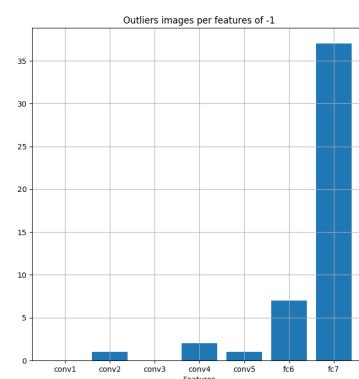
La feature tiene el valor i para el synset si lo tiene para alguna imagen del synset(Estamos estudiando la submatriz correspondiente al synset)

3.9 Estudio de los outliers de imágenes por feature

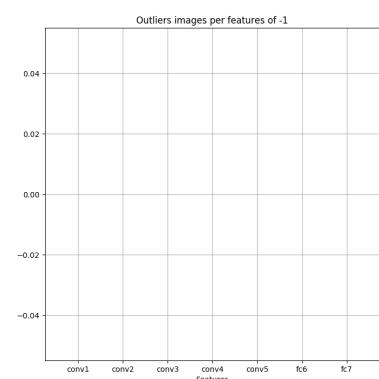
3.9.1 Living Things



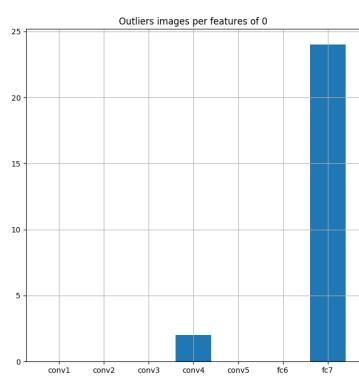
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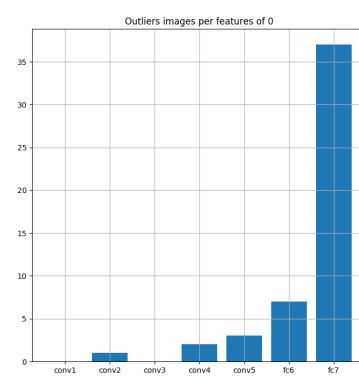
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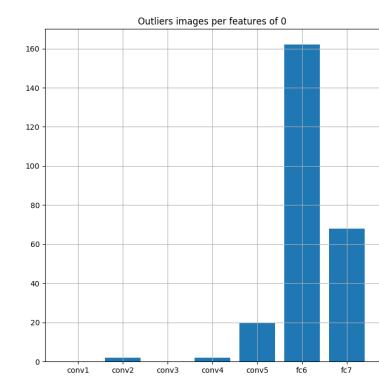
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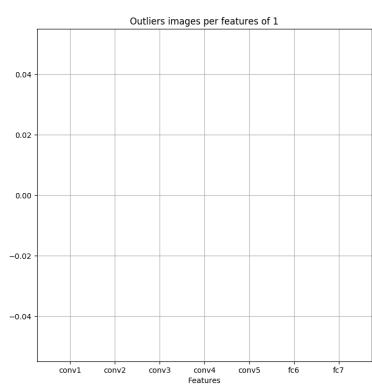
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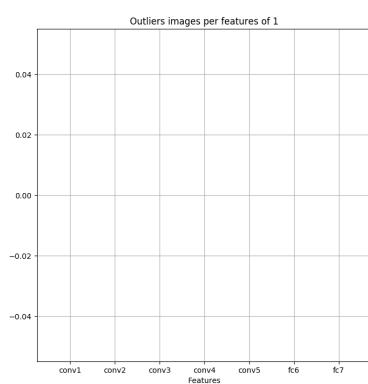
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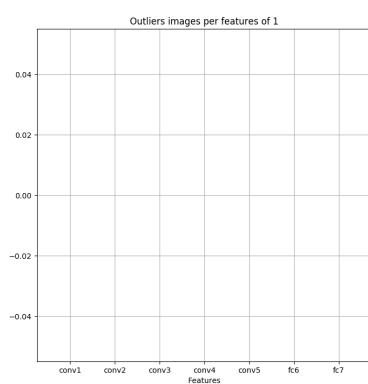
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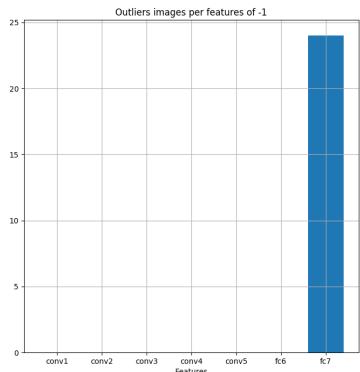


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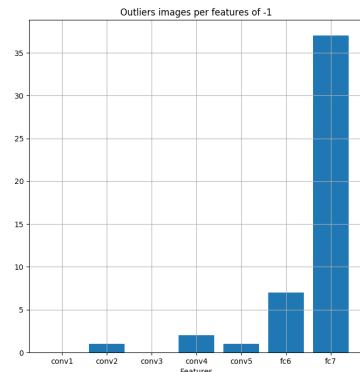


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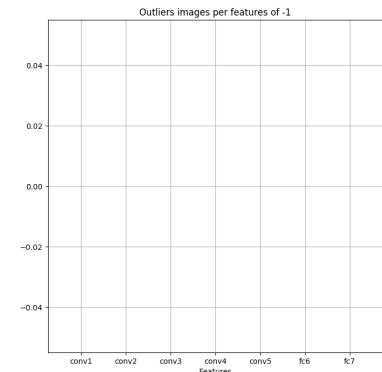
3.9.2 Non living Things



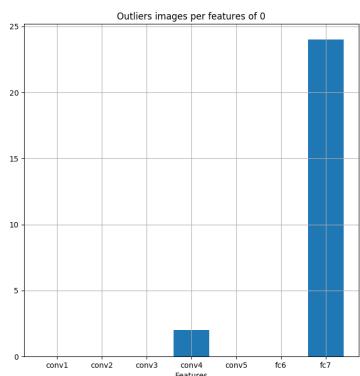
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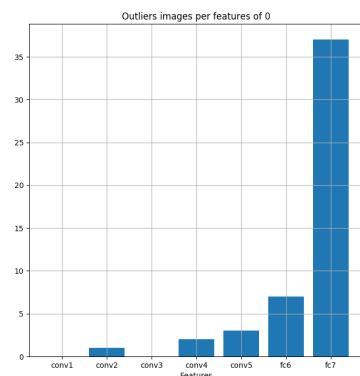
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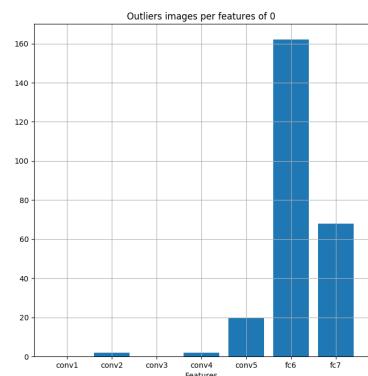
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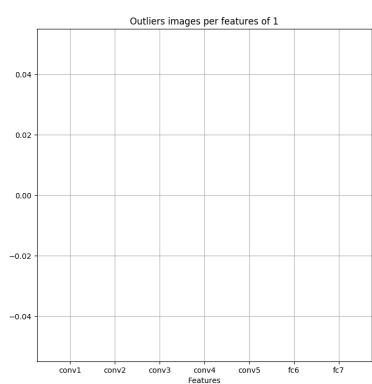
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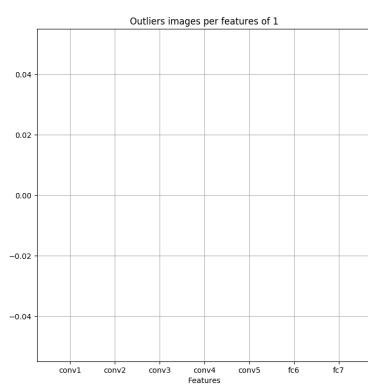
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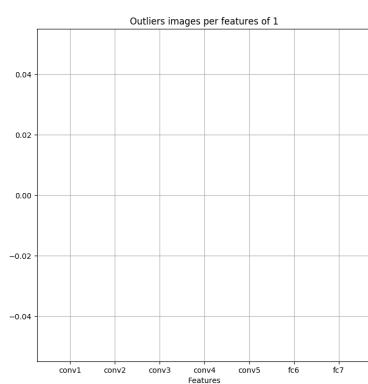
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3.10 Matrices de cambio



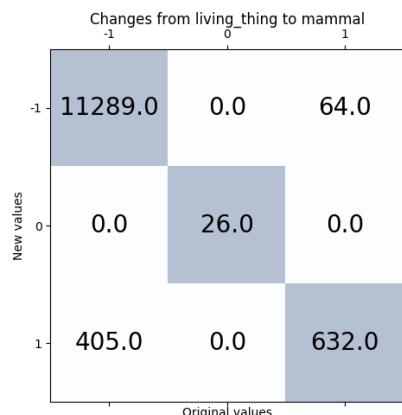
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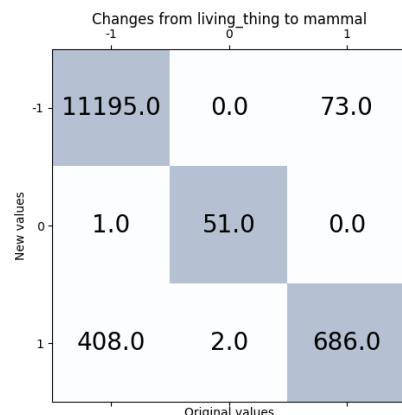
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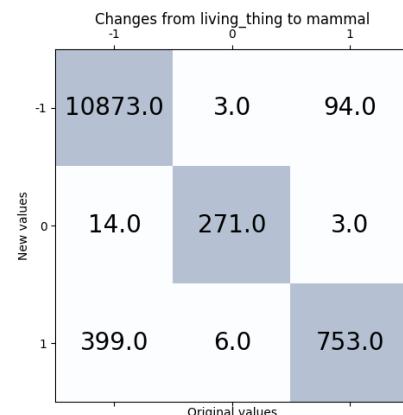
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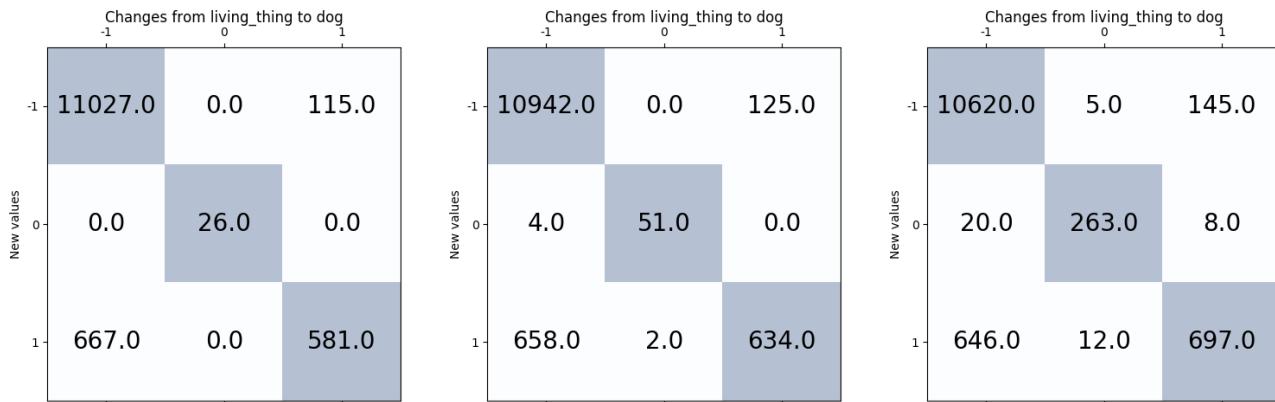
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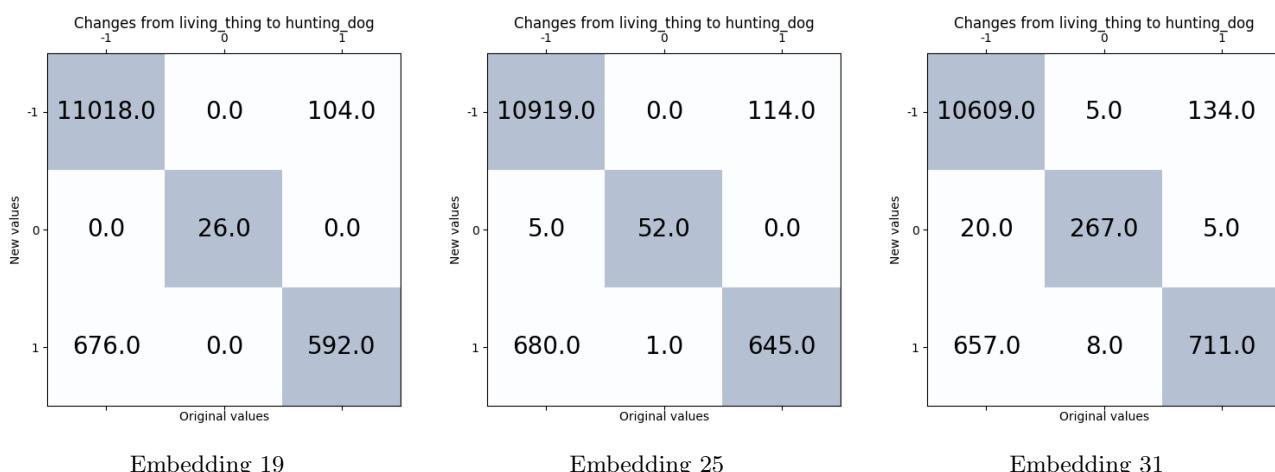
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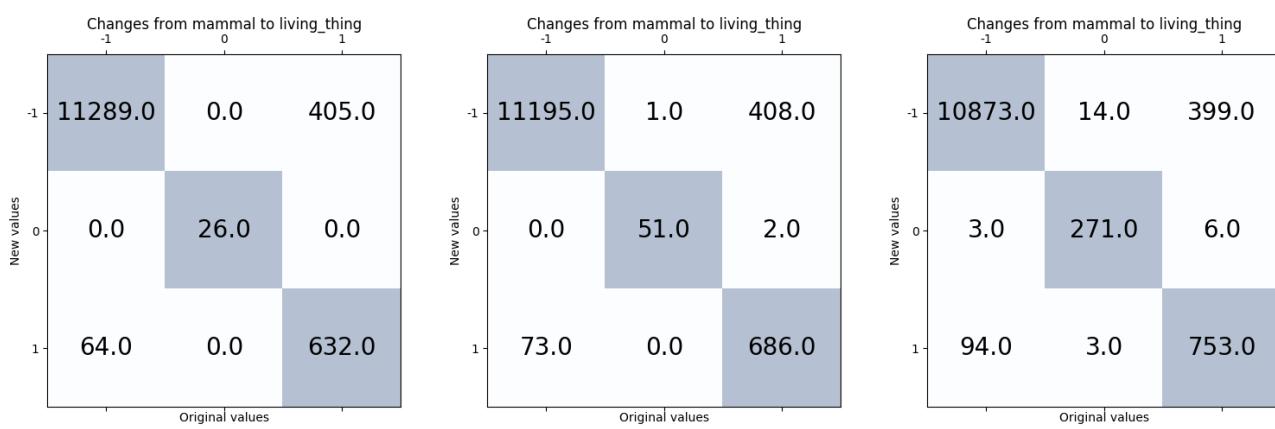
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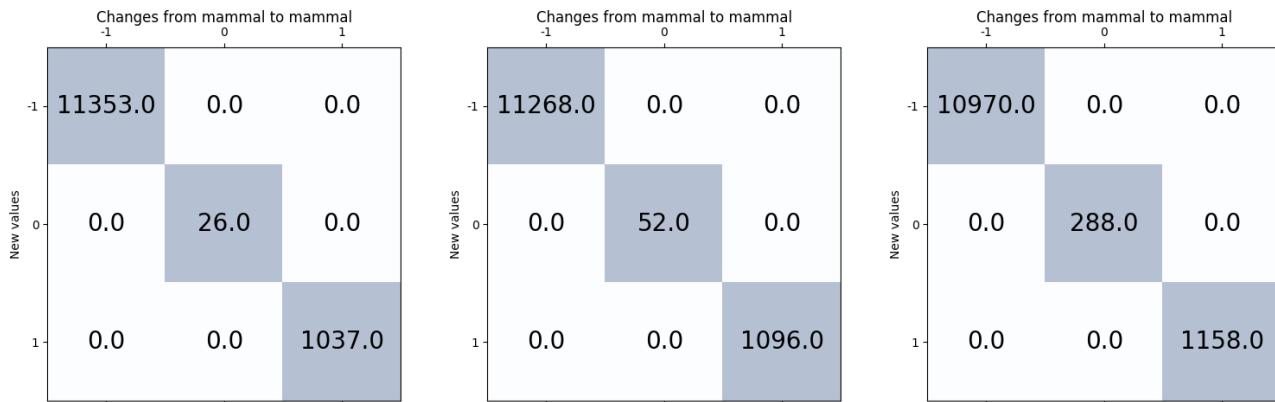
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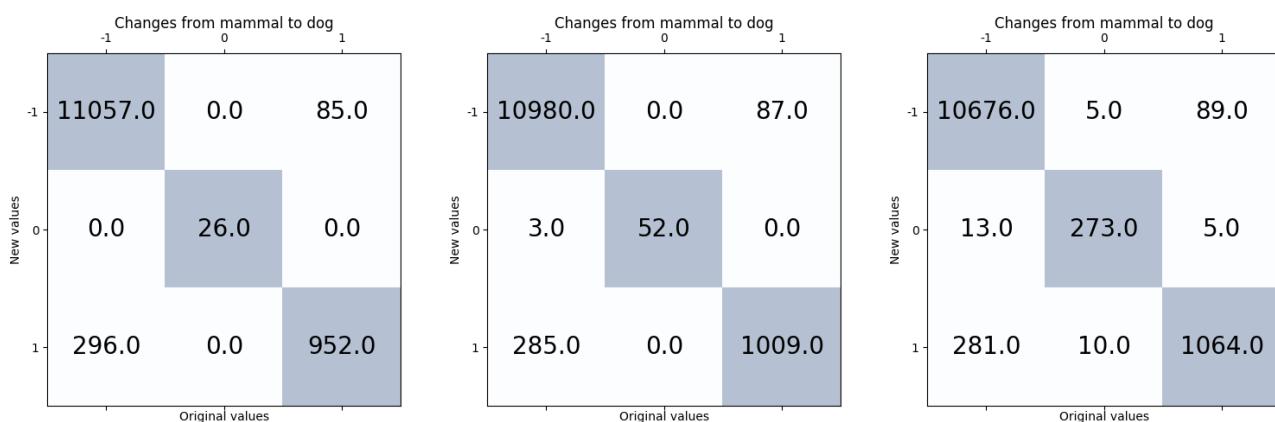
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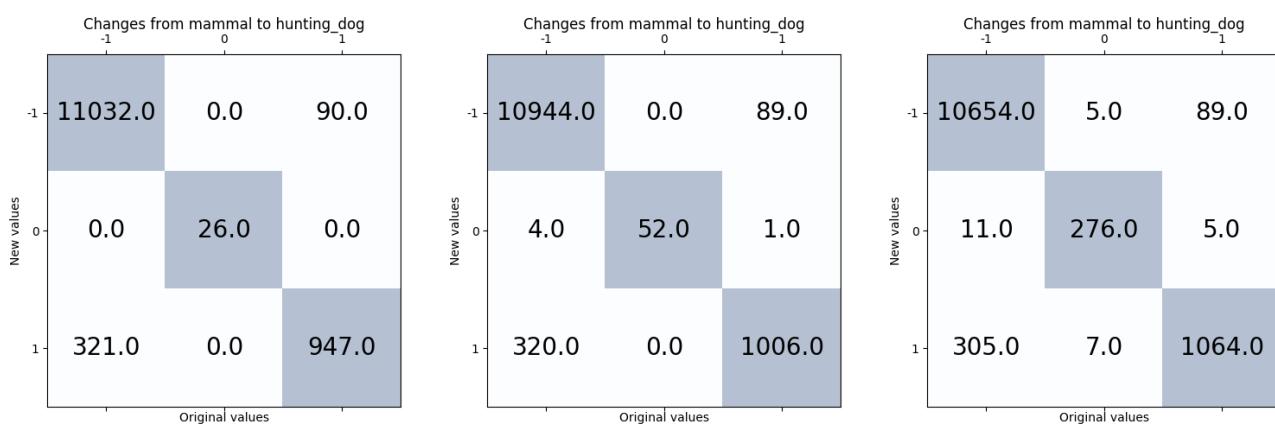
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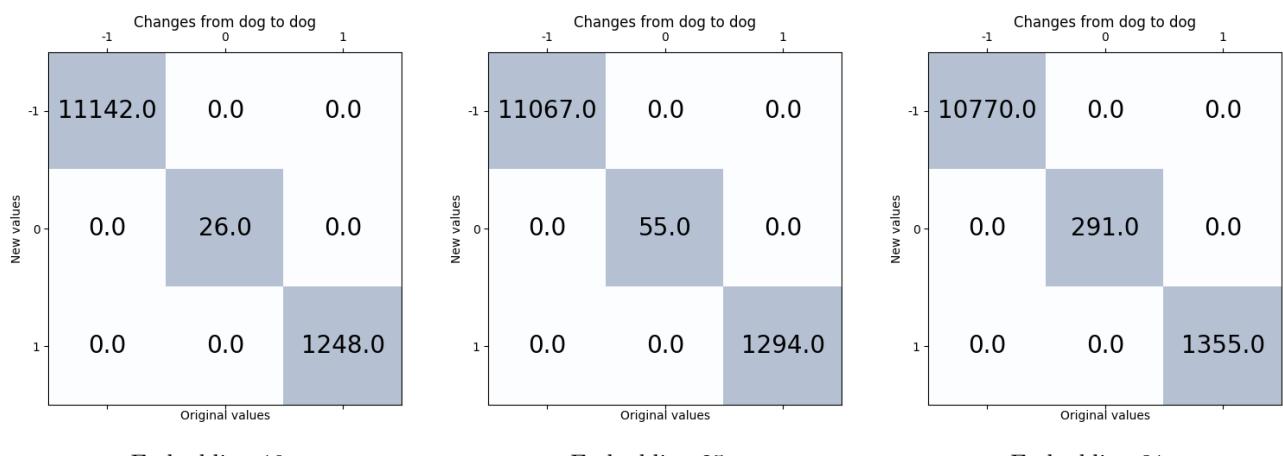
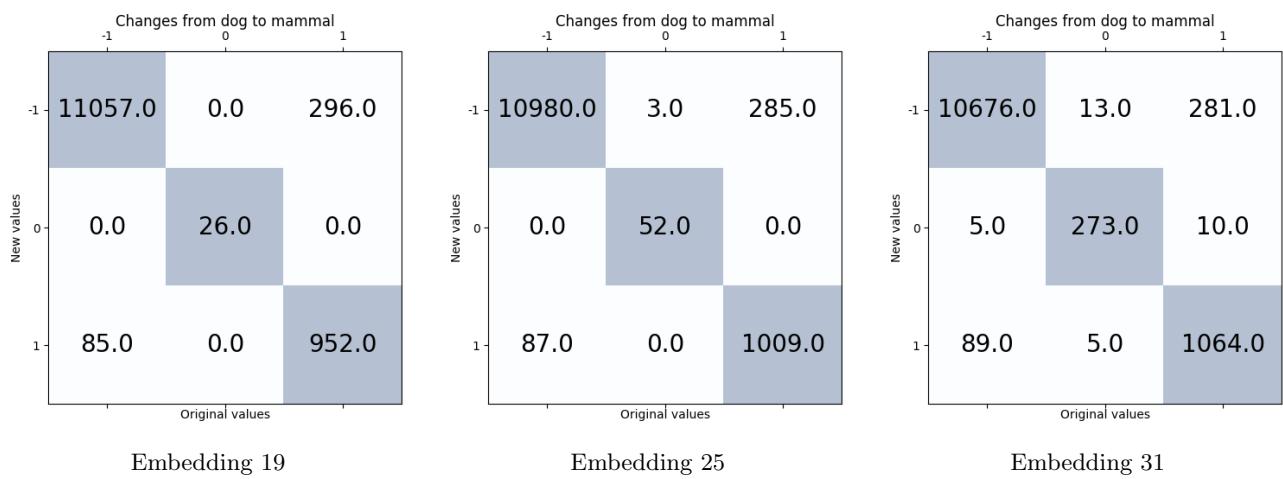
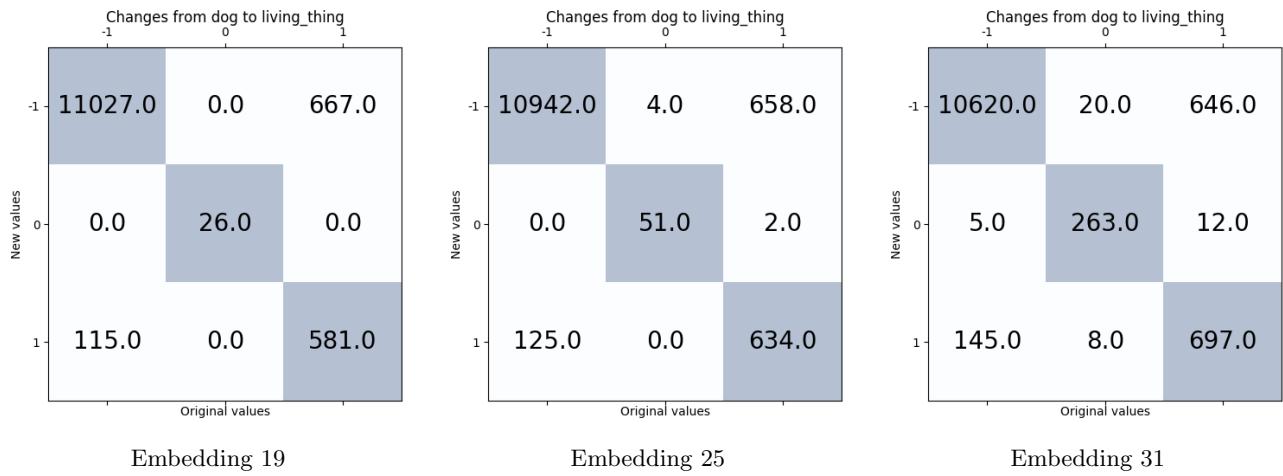
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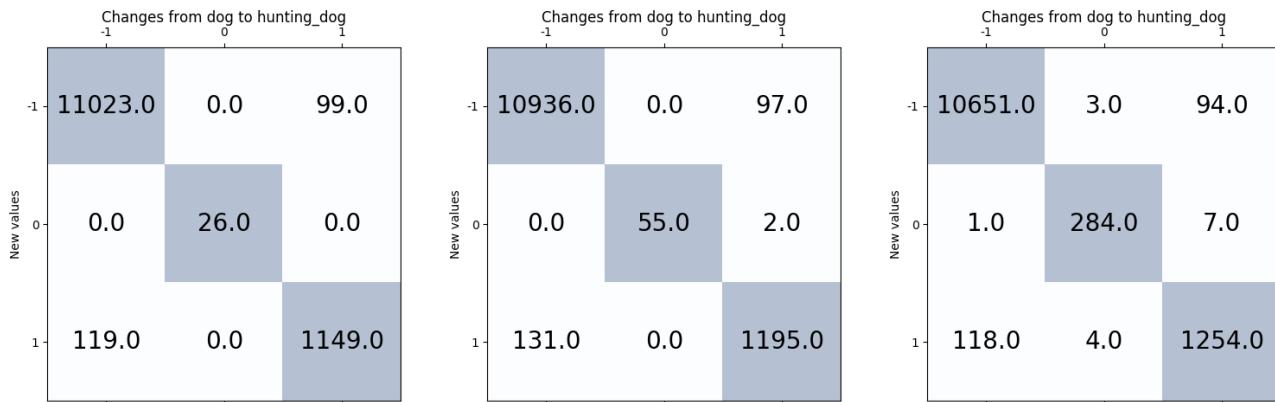


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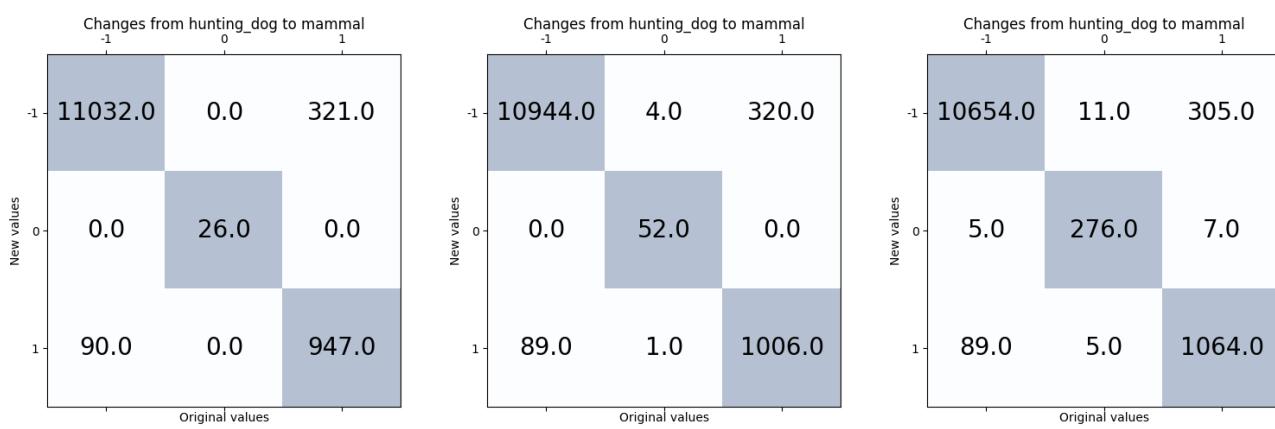
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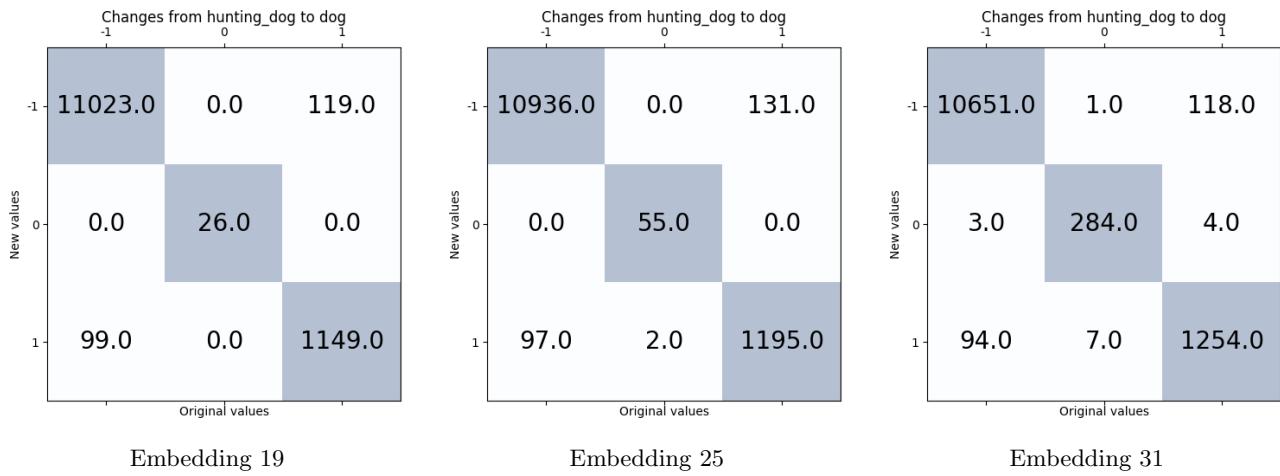
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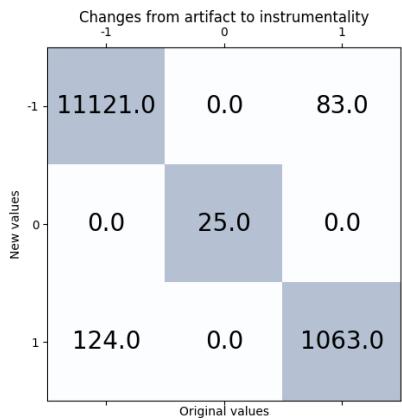


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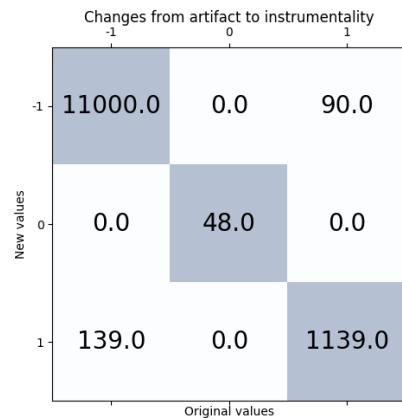
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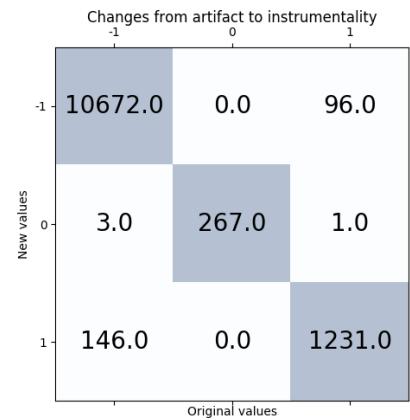




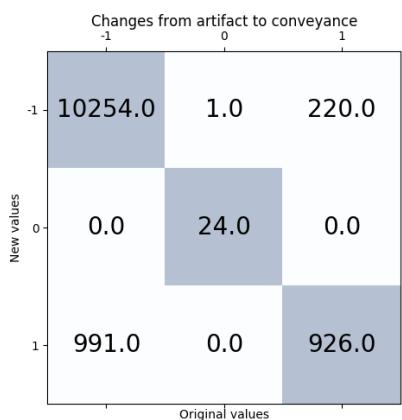
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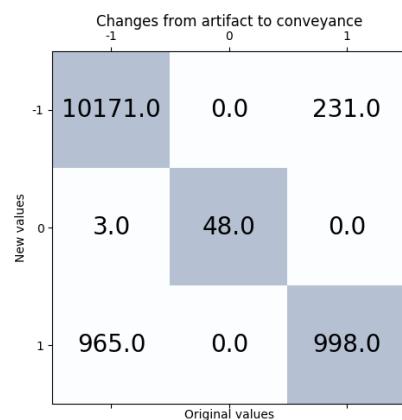
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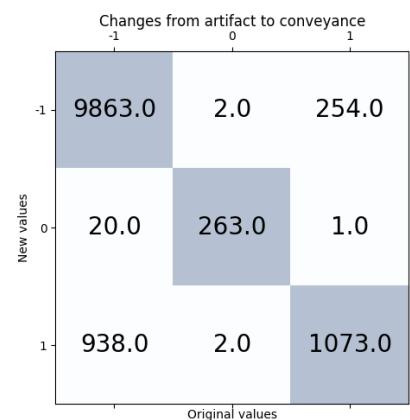
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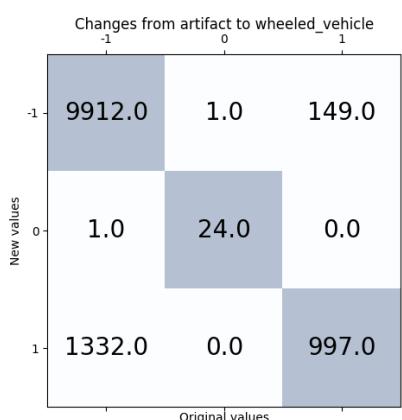
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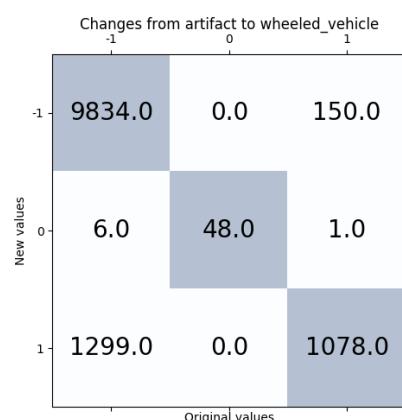
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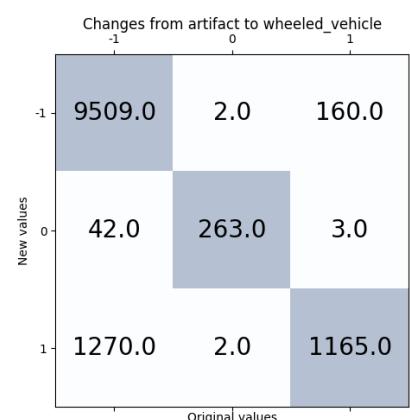
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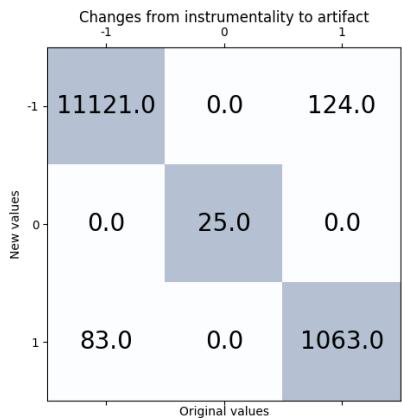
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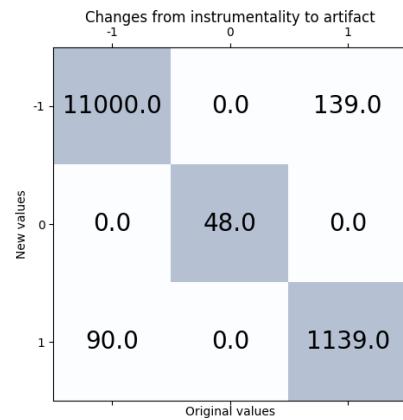
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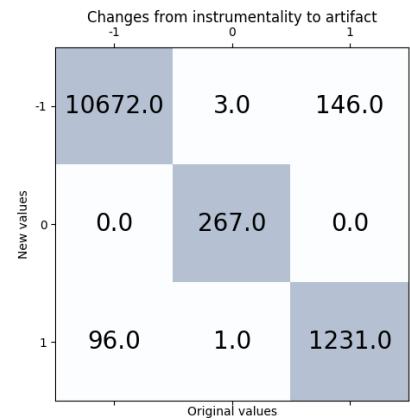
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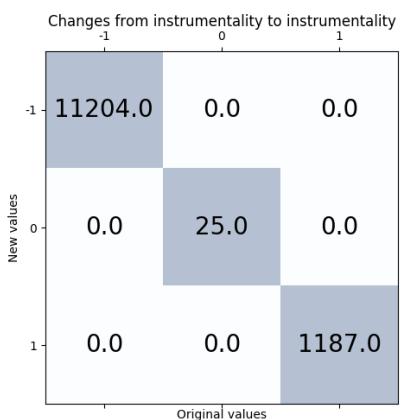
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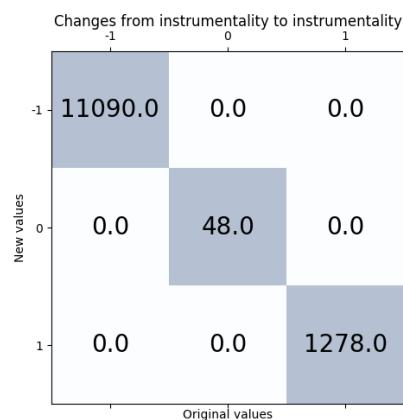
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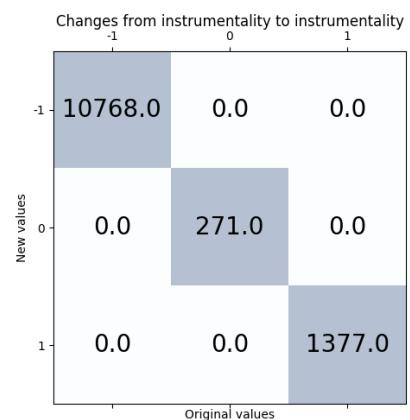
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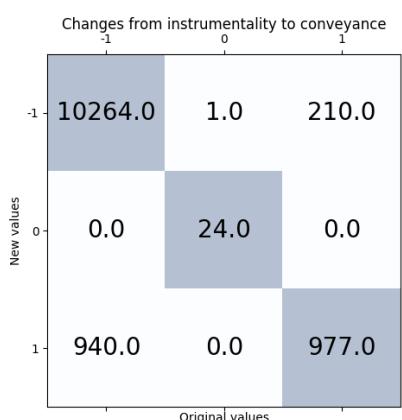
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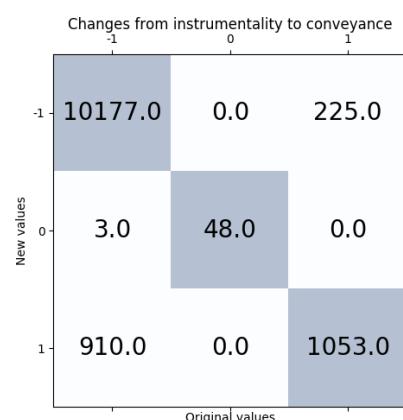
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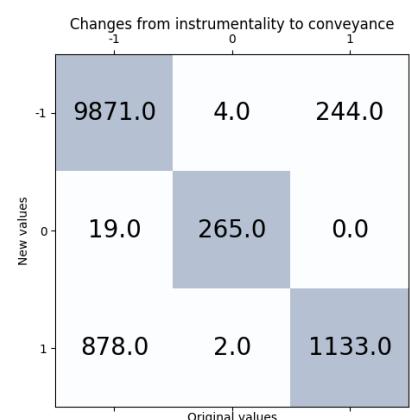
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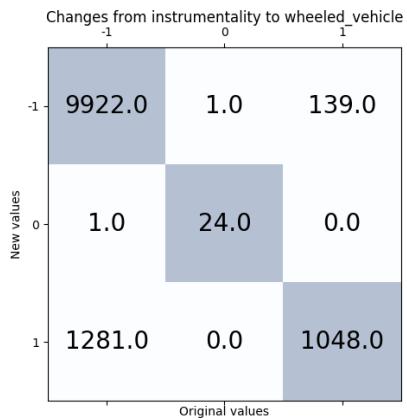
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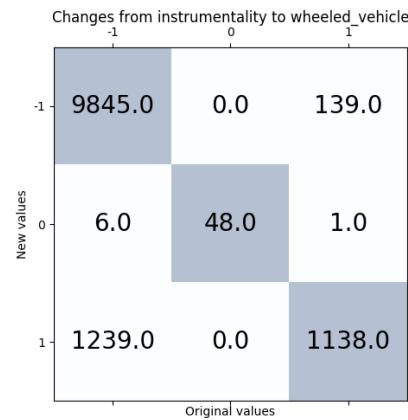
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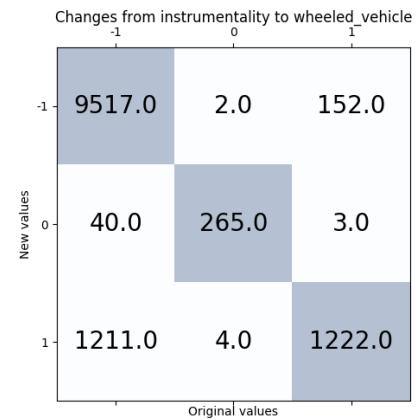
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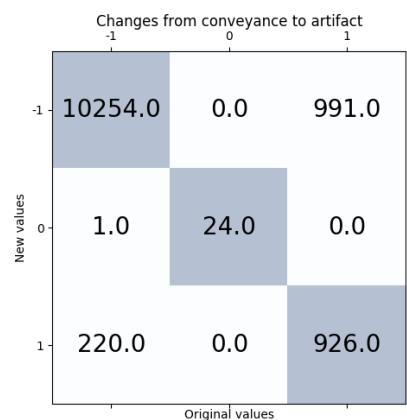
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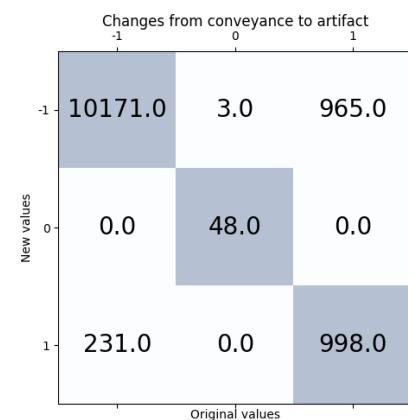
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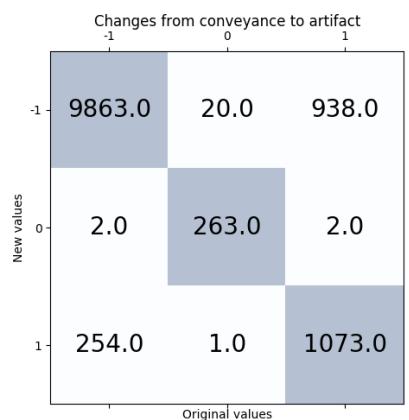
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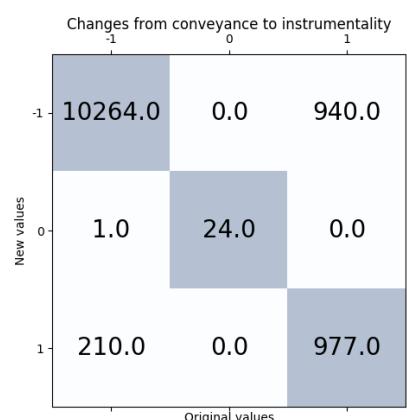
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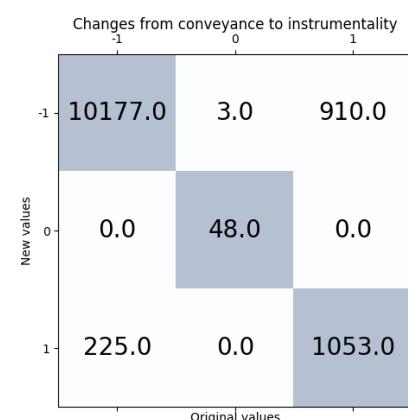
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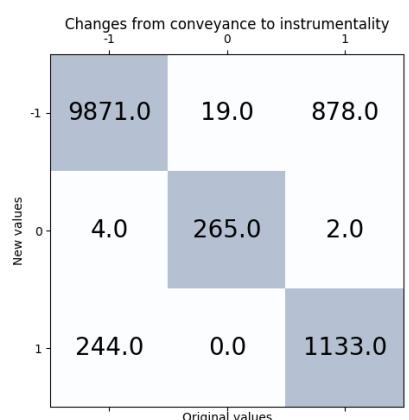
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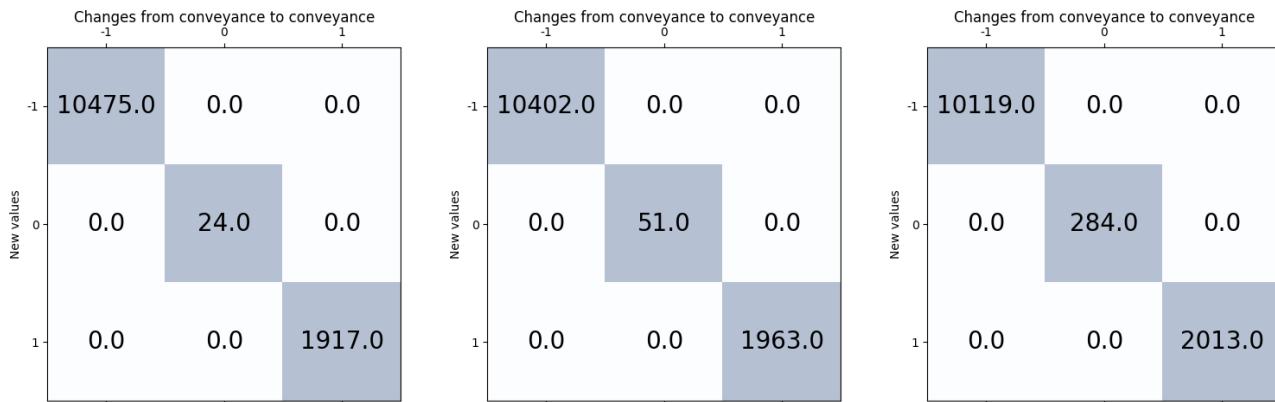
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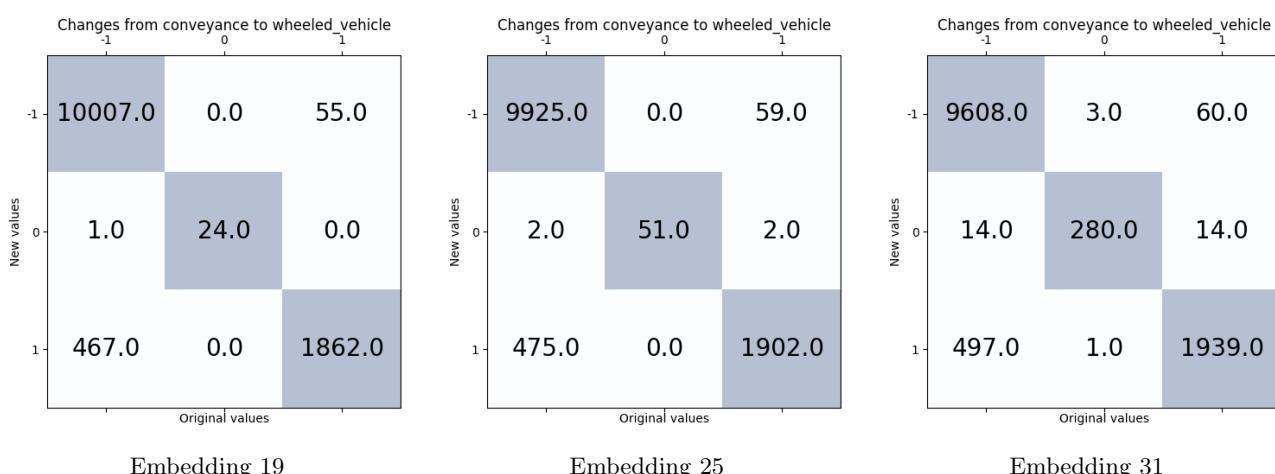
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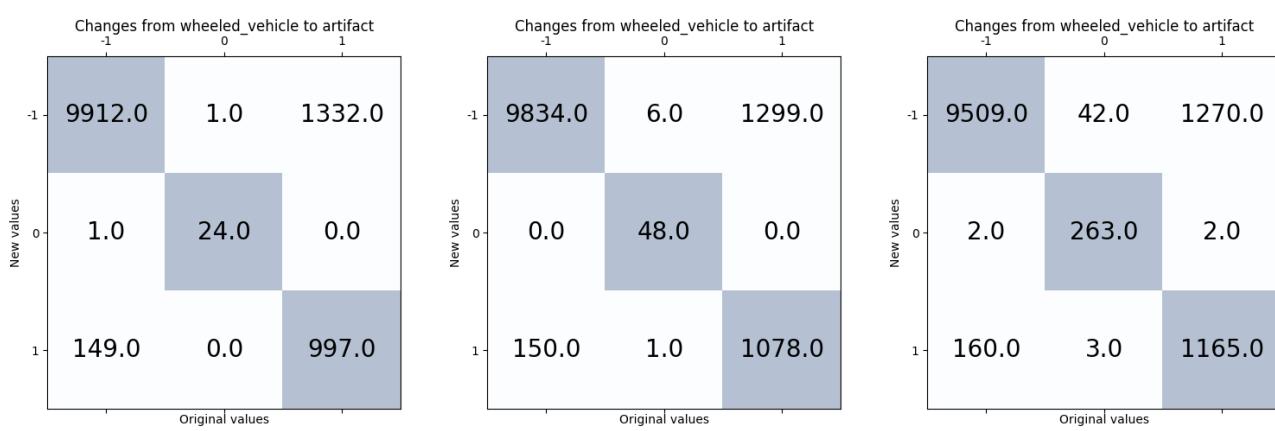
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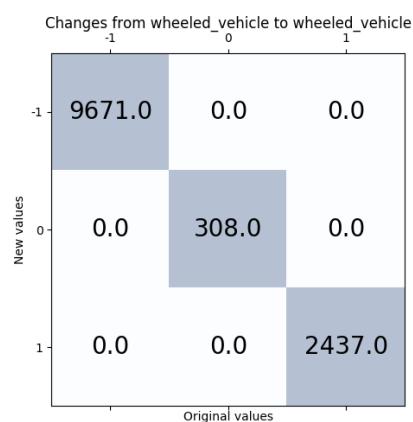
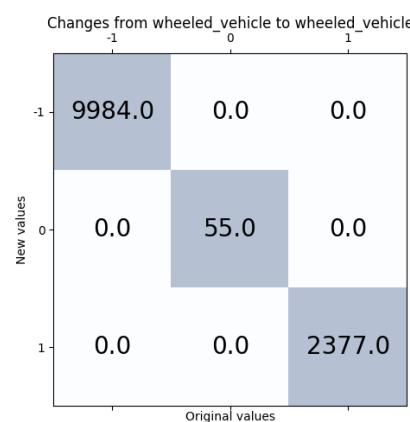
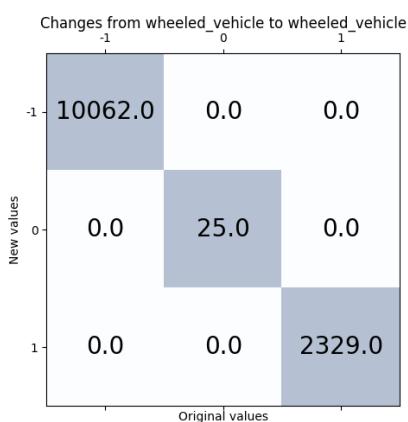
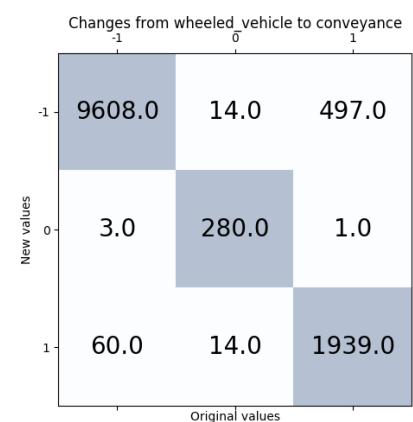
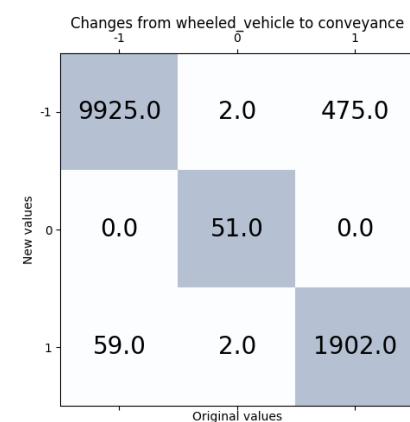
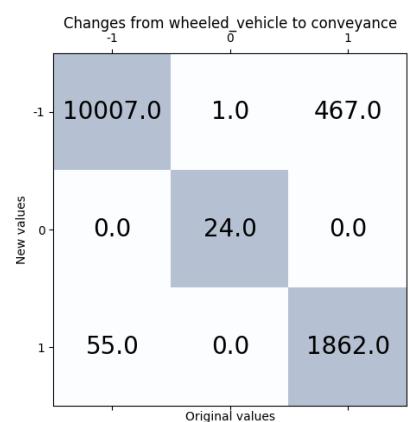
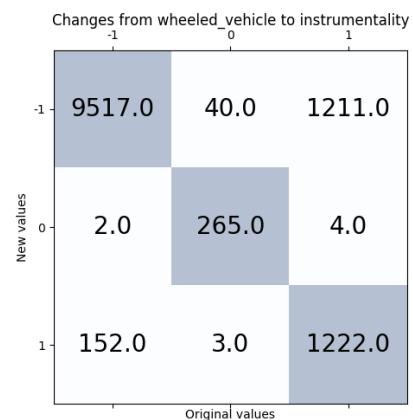
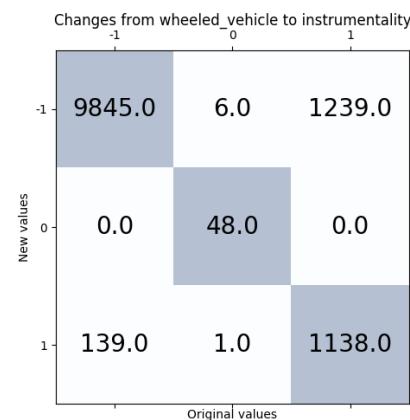
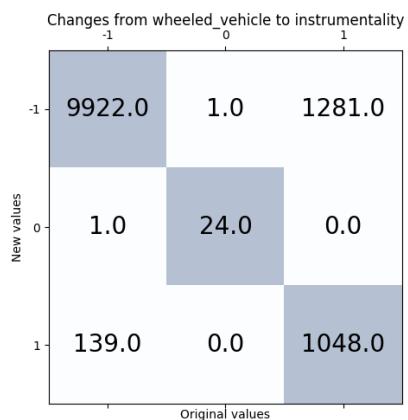
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