Proyecto Redes Neuronales 2020-2

Clasificador de Dibujos

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12 de junio de 2020

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Introducción

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¿Cómo nos comunicamos?

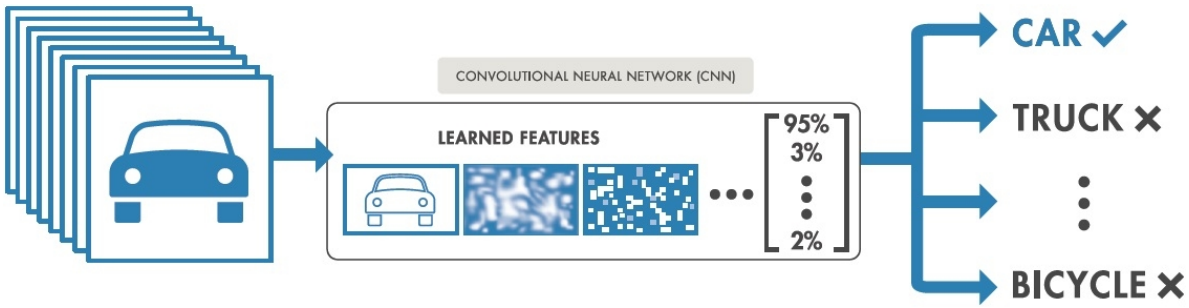
Cuando necesitamos comunicarnos y el idioma se transforma en muros, necesitamos buscar otras opciones tal como las señas y los dibujos.

Objetivo

Objetivo

¿Cómo lo resolvemos?

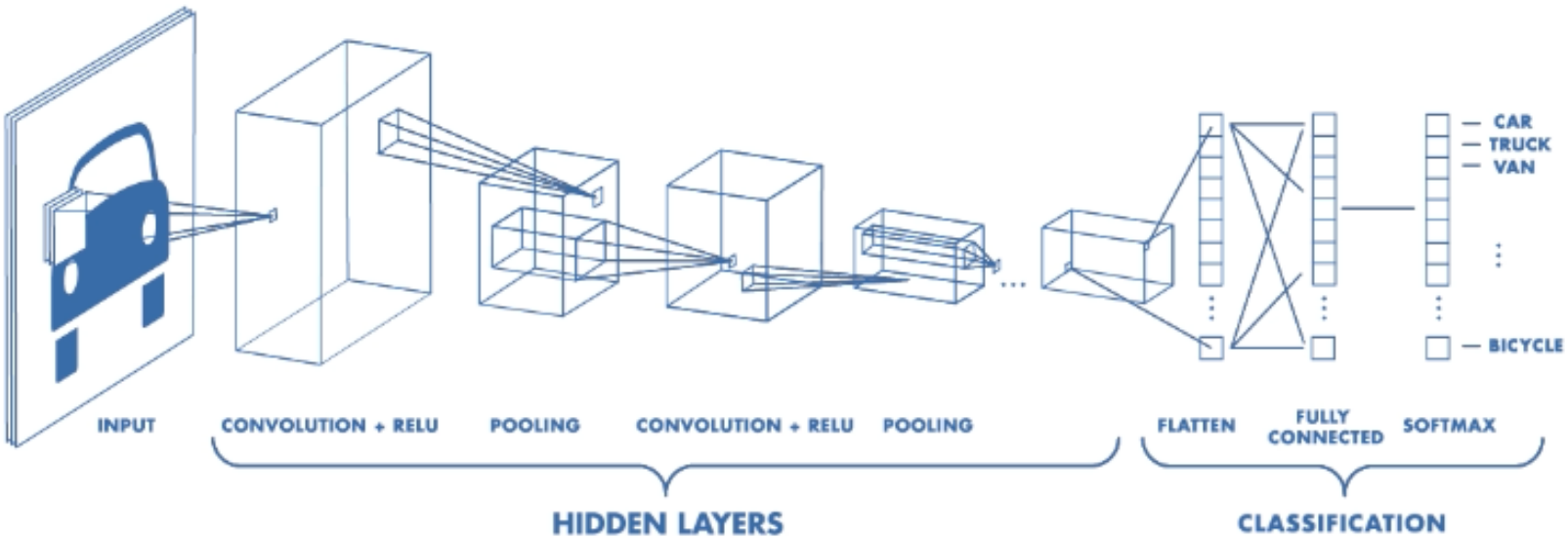
Buscamos generar una red neuronal convolusional tal que tenga la capacidad de identificar distintos objetos por medio de dibujos escenciales o en otras palabras garabatos.



Modelo

Base de Datos

Modelo


CAR
TRUCK
VAN
BICYCLE
INPUT
CONVOLUTION + RELU
POOLING
CONVOLUTION + RELU
POOLING
FLATTEN
FULLY CONNECTED
SOFTMAX
HIDDEN LAYERS
CLASSIFICATION

Modelo

Modelo

In [30]:

```
import numpy as np
import tensorflow as tf
from tensorflow.keras.models import Sequential
from tensorflow.keras.layers import Dense, Dropout, Flatten, Activation
from tensorflow.keras.layers import Convolution2D, MaxPooling2D
from tensorflow.keras.utils  import to_categorical
import matplotlib
%matplotlib inline
from matplotlib import pyplot as plt

#creamos nuestro modelo
modelo = tf.keras.models.Sequential([
  tf.keras.layers.Convolution2D(16, (3, 3),padding='same',input_shape=x_tr.shape[1:], activatio
n='relu'),
  tf.keras.layers.MaxPooling2D(pool_size=(2,2)),
  tf.keras.layers.Convolution2D(32, (3, 3), activation='relu'),
  tf.keras.layers.MaxPooling2D(pool_size=(2,2)),
  tf.keras.layers.Convolution2D(64, (3, 3), activation='relu'),
  tf.keras.layers.MaxPooling2D(pool_size=(2,2)),
  #aplanamos los datos del modelo hasta este punto
  tf.keras.layers.Flatten(),
  tf.keras.layers.Dense(128, activation='relu'),
  tf.keras.layers.Dropout(0.2),
  tf.keras.layers.Dense(120, activation='softmax')
])


modelo.summary()
```

Modelo

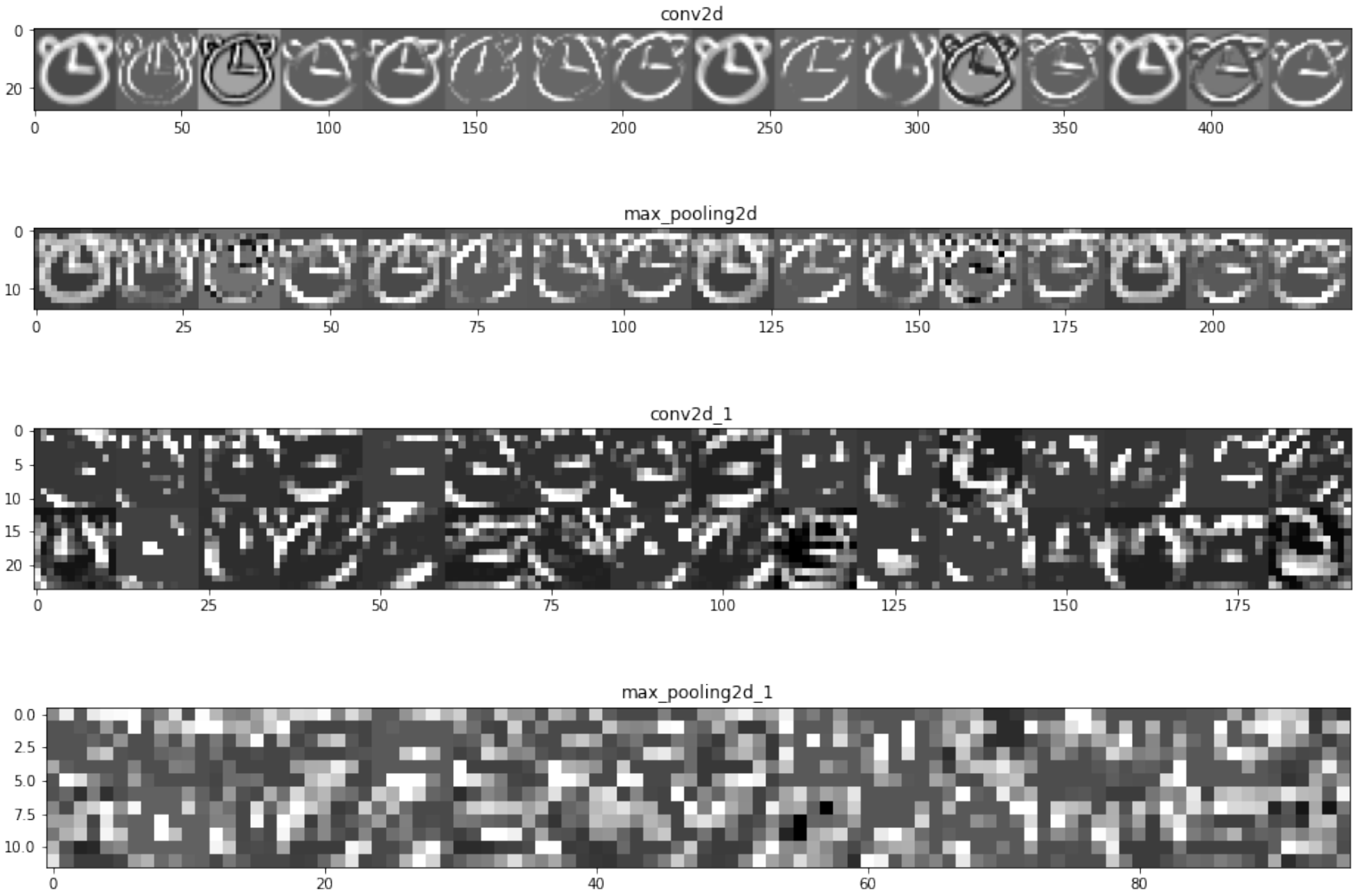
In [31]:
```
#Compilamos nuestro modelo
modelo.compile(optimizer='adam',
               loss='categorical_crossentropy',
               metrics=['top_k_categorical_accuracy'])

#Entrenamos el modelo
H = modelo.fit(x = x_tr, y = y_tr, validation_split=0.1, batch_size = 256, verbose=1, epochs=7)
```

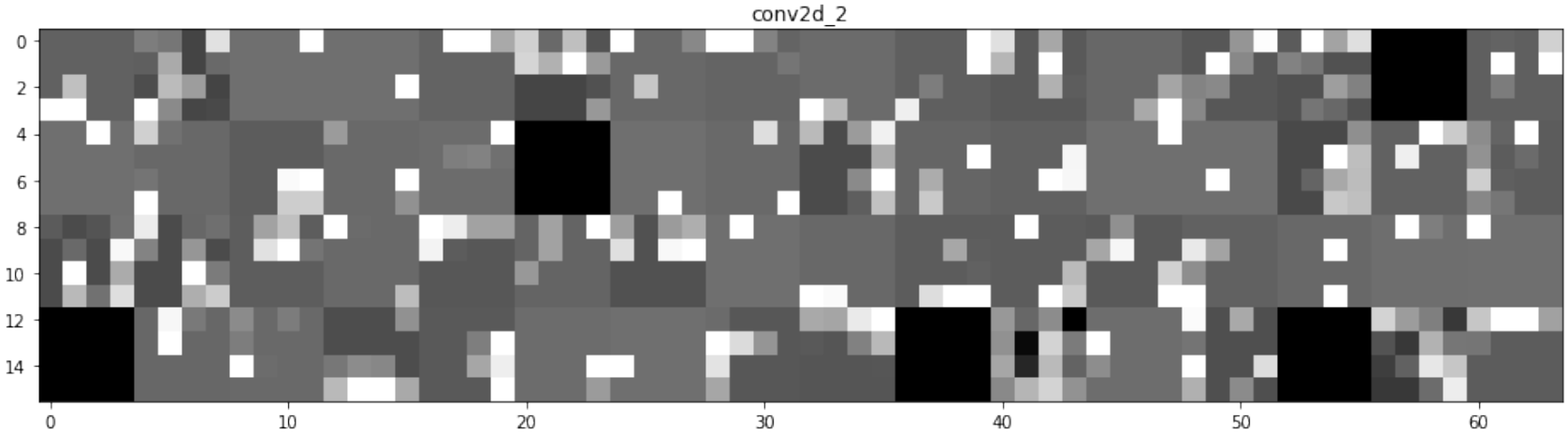
```
Epoch 1/7
1350/1350 [==============================] - 185s 137ms/step - loss: 2.3559 - top_k_categorical_
accuracy: 0.7030 - val_loss: 1.5826 - val_top_k_categorical_accuracy: 0.8484
Epoch 2/7
1350/1350 [==============================] - 185s 137ms/step - loss: 1.6315 - top_k_categorical_
accuracy: 0.8420 - val_loss: 1.3720 - val_top_k_categorical_accuracy: 0.8765
Epoch 3/7
1350/1350 [==============================] - 184s 136ms/step - loss: 1.4727 - top_k_categorical_
accuracy: 0.8640 - val_loss: 1.2899 - val_top_k_categorical_accuracy: 0.8864
Epoch 4/7
1350/1350 [==============================] - 185s 137ms/step - loss: 1.3853 - top_k_categorical_
accuracy: 0.8751 - val_loss: 1.2186 - val_top_k_categorical_accuracy: 0.8953
Epoch 5/7
1350/1350 [==============================] - 184s 136ms/step - loss: 1.3232 - top_k_categorical_
accuracy: 0.8822 - val_loss: 1.1868 - val_top_k_categorical_accuracy: 0.8976
Epoch 6/7
1350/1350 [==============================] - 184s 136ms/step - loss: 1.2781 - top_k_categorical_
accuracy: 0.8874 - val_loss: 1.1341 - val_top_k_categorical_accuracy: 0.9039
Epoch 7/7
1350/1350 [==============================] - 185s 137ms/step - loss: 1.2405 - top_k_categorical_
accuracy: 0.8916 - val_loss: 1.1155 - val_top_k_categorical_accuracy: 0.9054
```

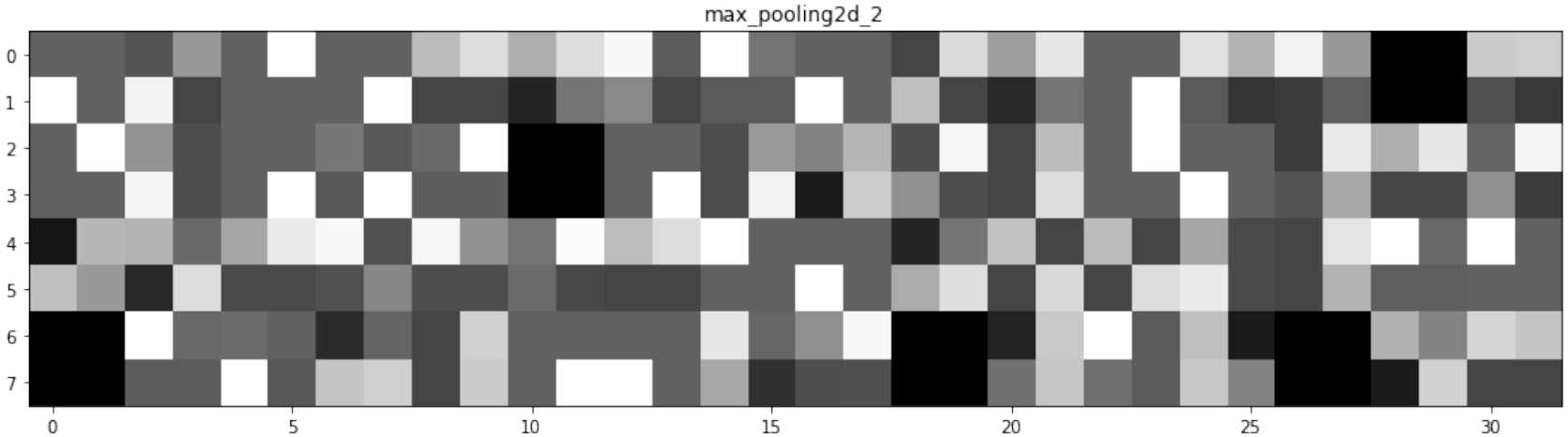
Resultados

Desarrollo de las Capas

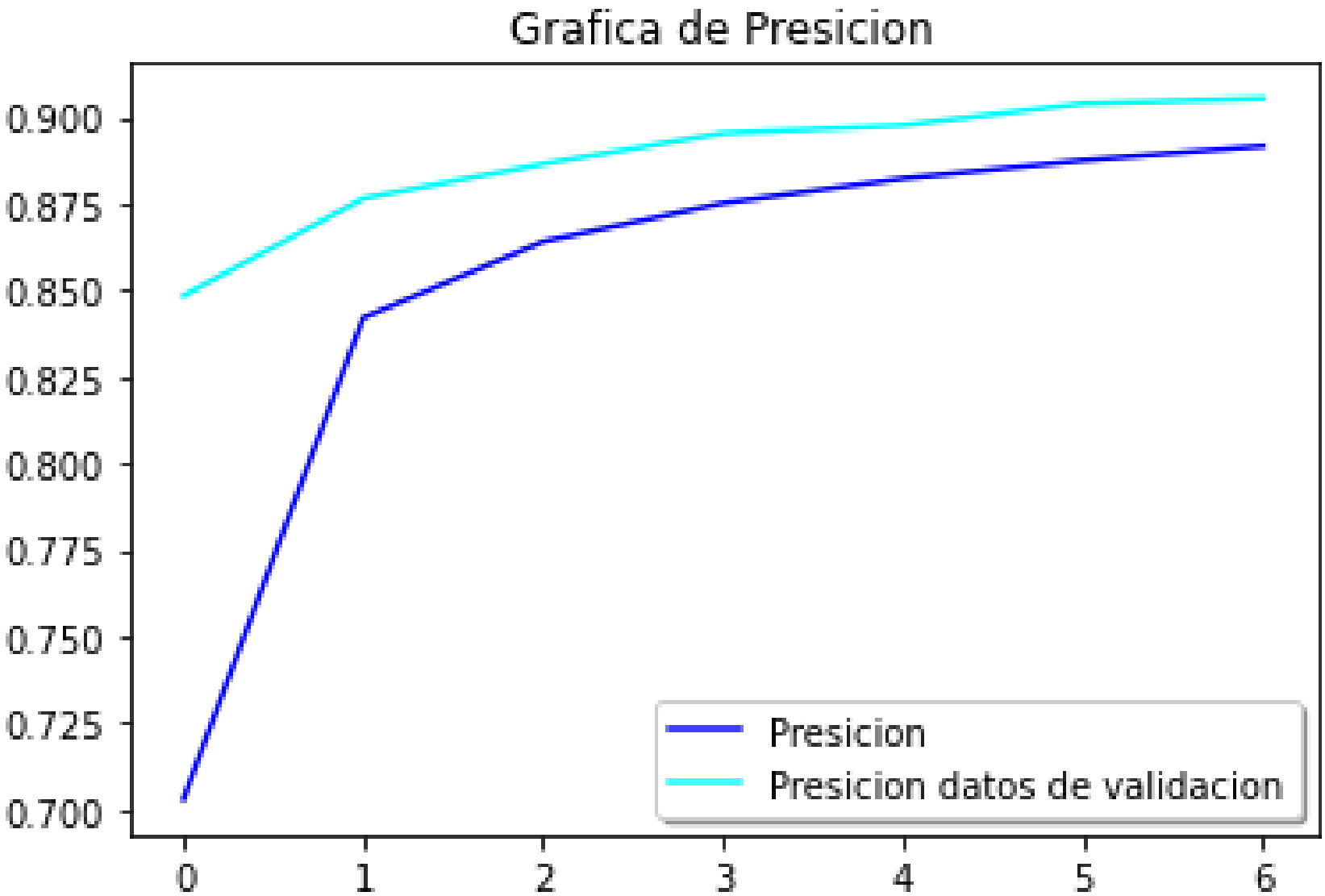


Desarrollo de las Capas

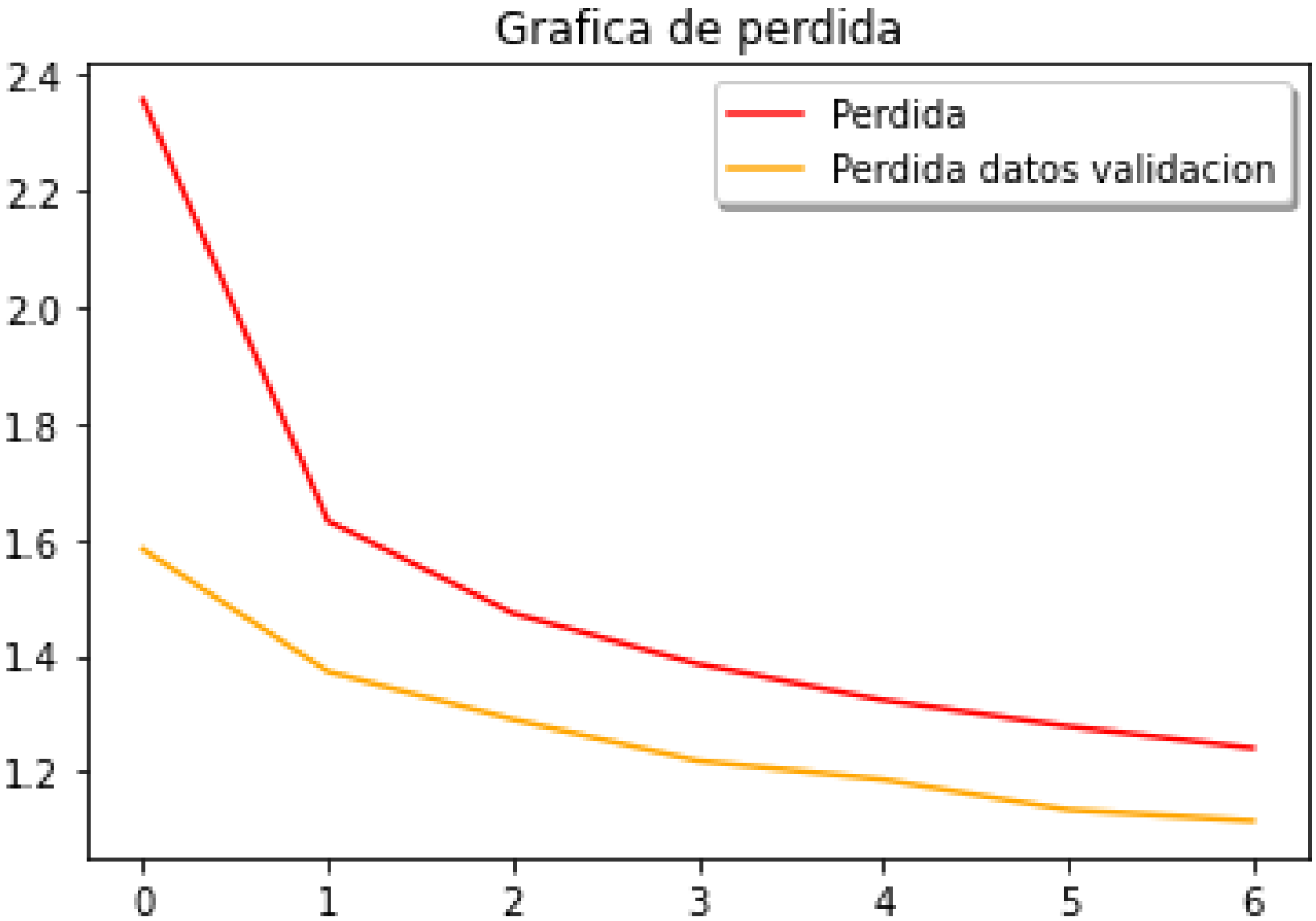




Precisión


Grafica de Presicion
0.900
0.875
0.850
0.825
0.800
0.775
0.750
0.725
0.700
0
1
2
3
4
5
6
Presicion
Presicion datos de validacion

Pérdida


Grafica de perdida
Perdida
Perdida datos validacion
2.4
2.2
2.0
1.8
1.6
1.4
1.2
0
1
2
3
4
5
6

Comparación

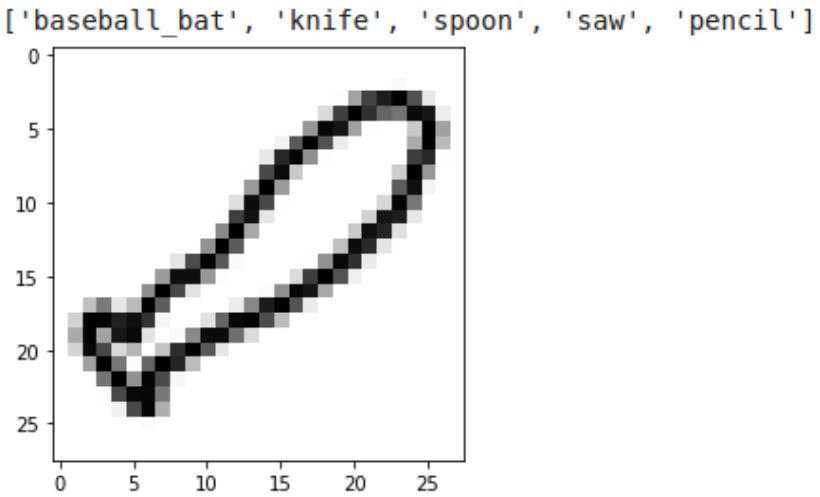


Figure: Imagen digital

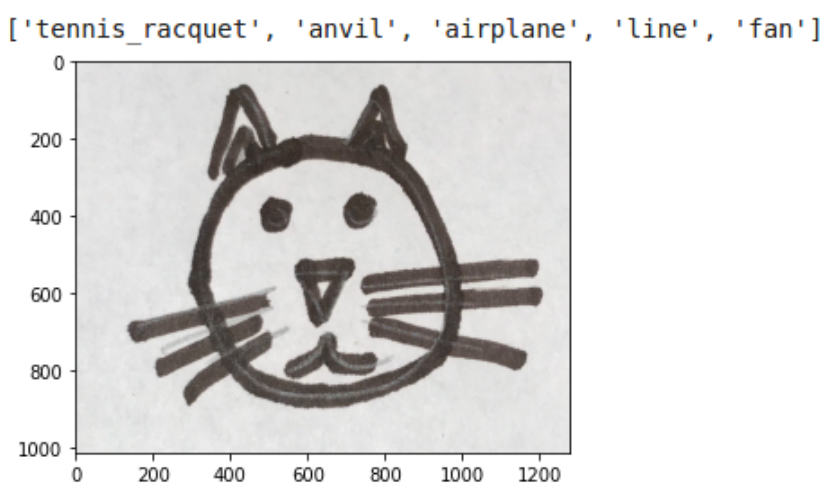


Figure: Fotografía

Interfaz Gráfica

Clasificador de 100 imagenes

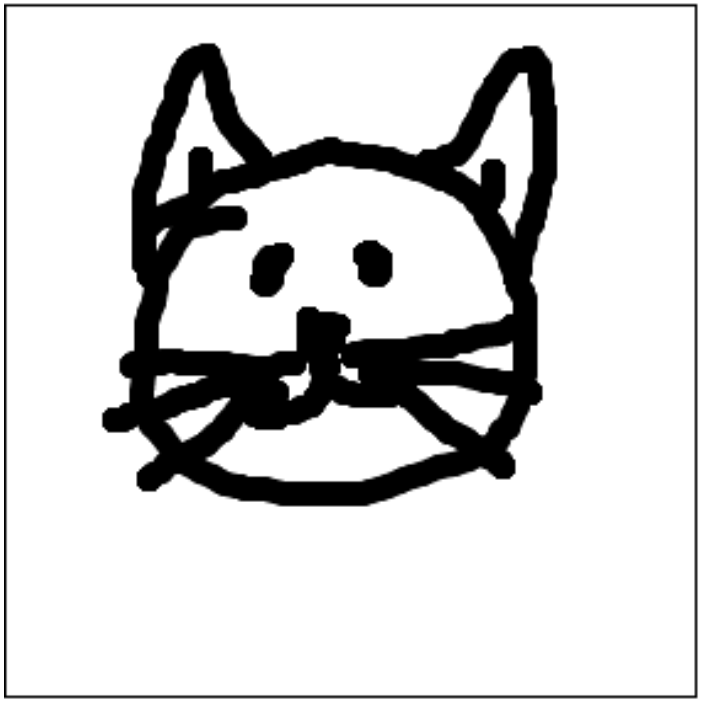
Borrar

butterfly (93.16%),
grapes (2.1399999999999997%),
flower (1.49%),
ceiling_fan (1.37%),
fan (0.79%),
spider (0.21%),
candle (0.16999999999999998%),
lightning (0.13%),
sun (0.1%),
coffee_cup (0.06%)

Interfaz Gráfica

Clasificador de 100 imagenes

Borrar



cat (95.46%),
lightning (1.1900000000000002%),
cloud (0.69%),
face (0.5%),
flower (0.32%),
cookie (0.25%),
diving_board (0.16%),
anvil (0.15%),
coffee_cup (0.13999999999999999%),
grapes (0.11%)

Conclusión

Base de Datos