EGUIVAR VILLCA SHIRLEY CARMINIA - MACHINE LEARNING I

CLASIFICACIÓN DE IMAGENES CON ML

Iniciar

TABLA DE CONTENIDOS

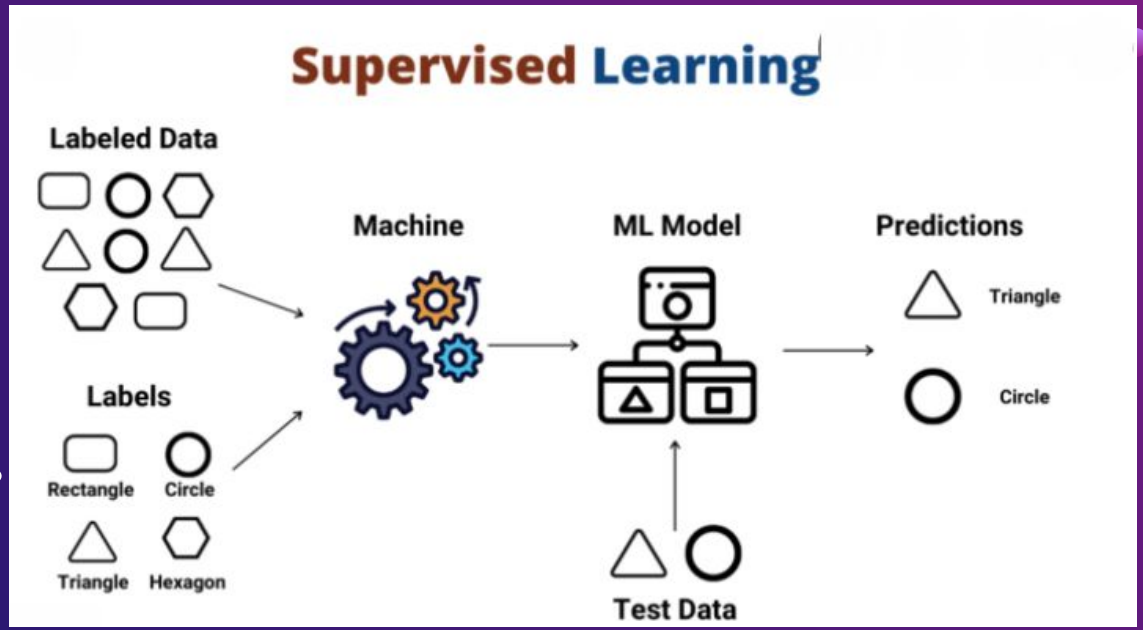
01

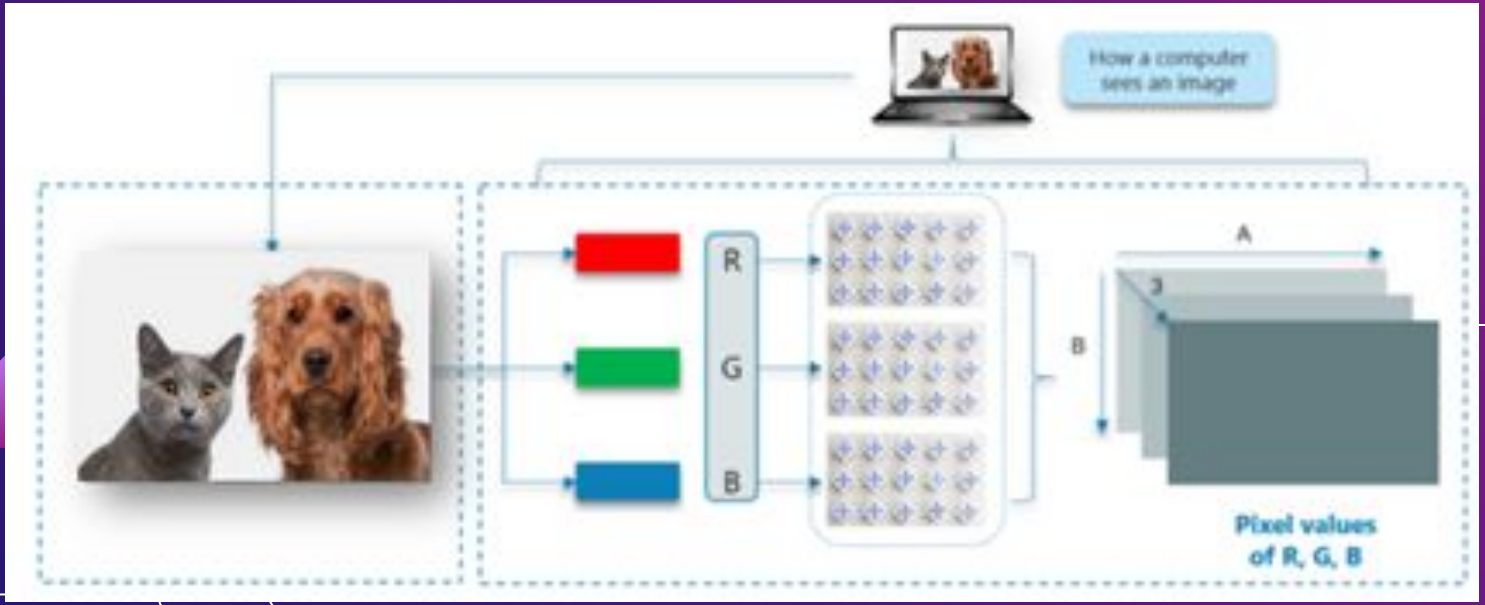
INTRODUCCION

Desarrollo de un modelo ML
supervisado para
Clasificación de imágenes

You can enter a subtitle here if you need it

PROBLEMA VS SOLUCIÓN



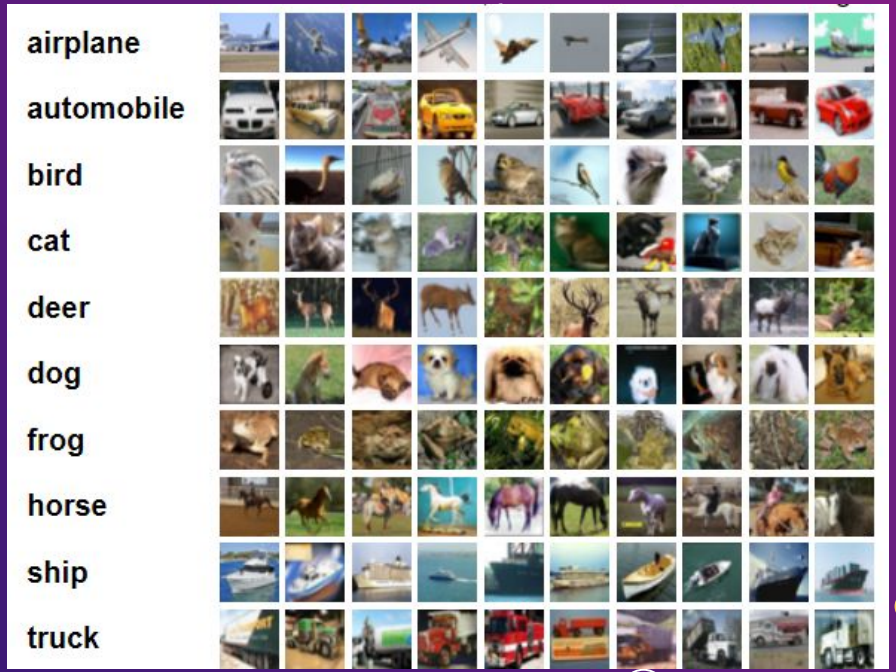

How a computer sees an image
R
G
B
A
B
Pixel values of R, G, B

02

DATASET PARA ENTRENAR EL MODELO

CIFAR-10

- Instituto Canadiense de Investigación Avanzada
- 60000 imágenes en color de 32x32
- 10 clases
- Target : 0-9



CIFAR-10

- Normalizar la data

```
# Parse numbers as floats
train_x=train_X.astype('float32')
test_X=test_X.astype('float32')
# Normalize data
train_X=train_X/255.0
test_X=test_X/255.0
```

```
print("Shape of x_train: {}".format(train_X.shape))
print("Shape of y_train: {}".format(train_Y.shape))
print()
print("Shape of x_test: {}".format(test_X.shape))
print("Shape of y_test: {}".format(test_Y.shape))
```

```
Shape of x_train: (50000, 32, 32, 3)
Shape of y_train: (50000, 1)

Shape of x_test: (10000, 32, 32, 3)
Shape of y_test: (10000, 1)
```

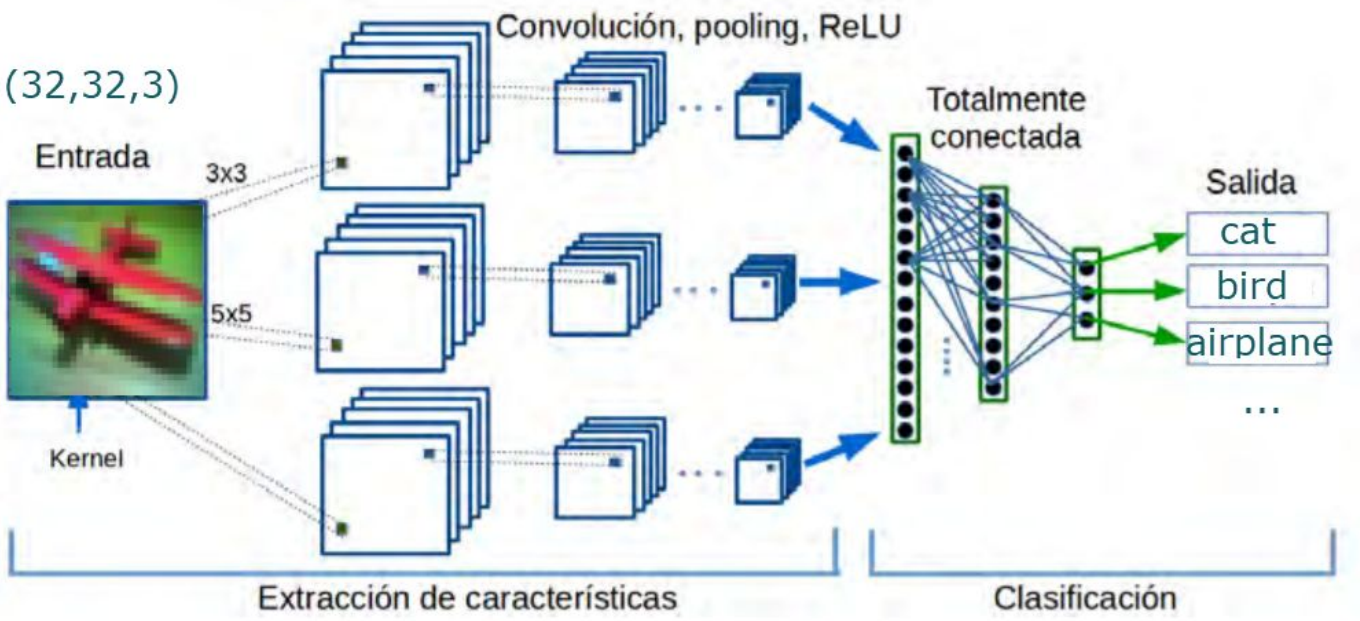
```
train_X = train_X.reshape(50000,32*32*3)
test_X = test_X.reshape(10000,32*32*3)
```

```
(50000, 3072)
(10000, 3072)
```

03

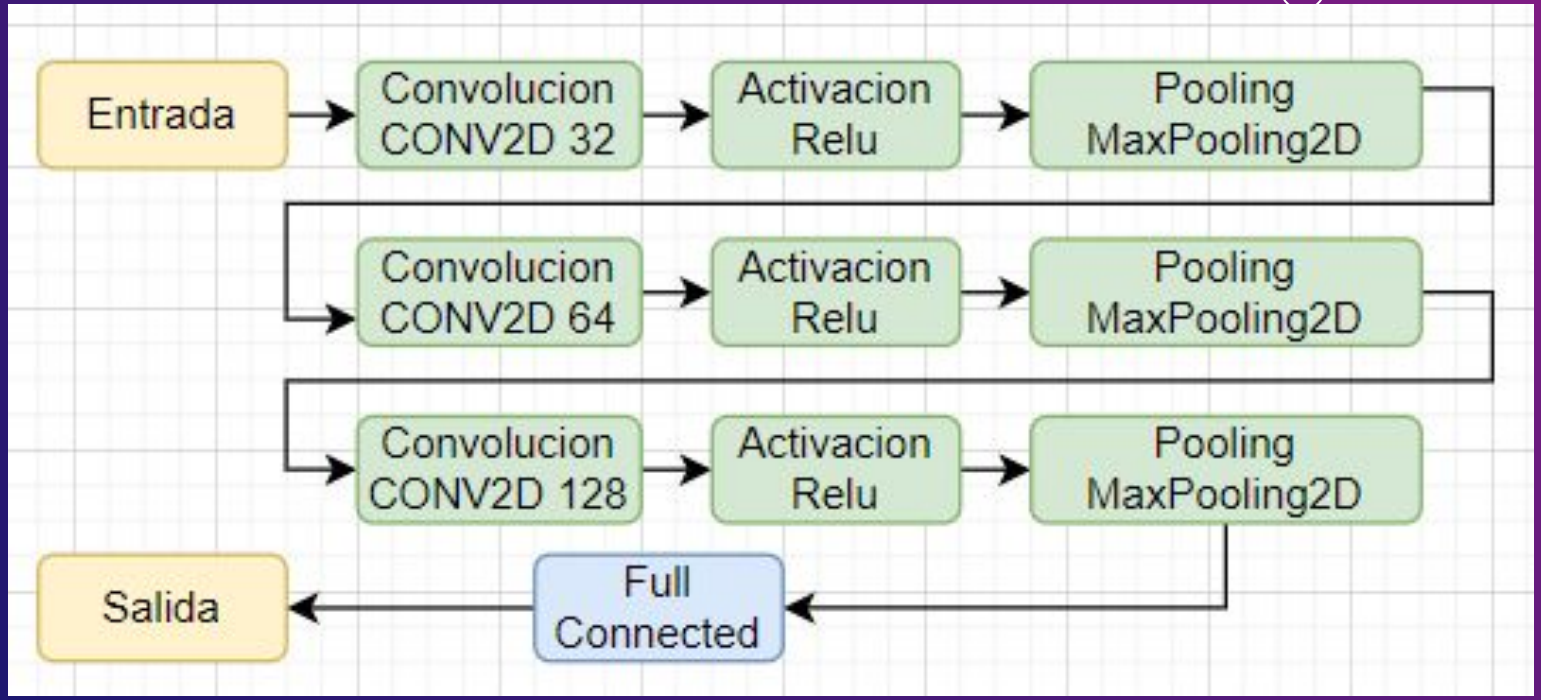
MODELOS ML PARA TRAINNING

REDES CONVOLUCIONALES - CNN



- CONV2
- RELU
- POOLING

REDES CONVOLUCIONALES - CNN

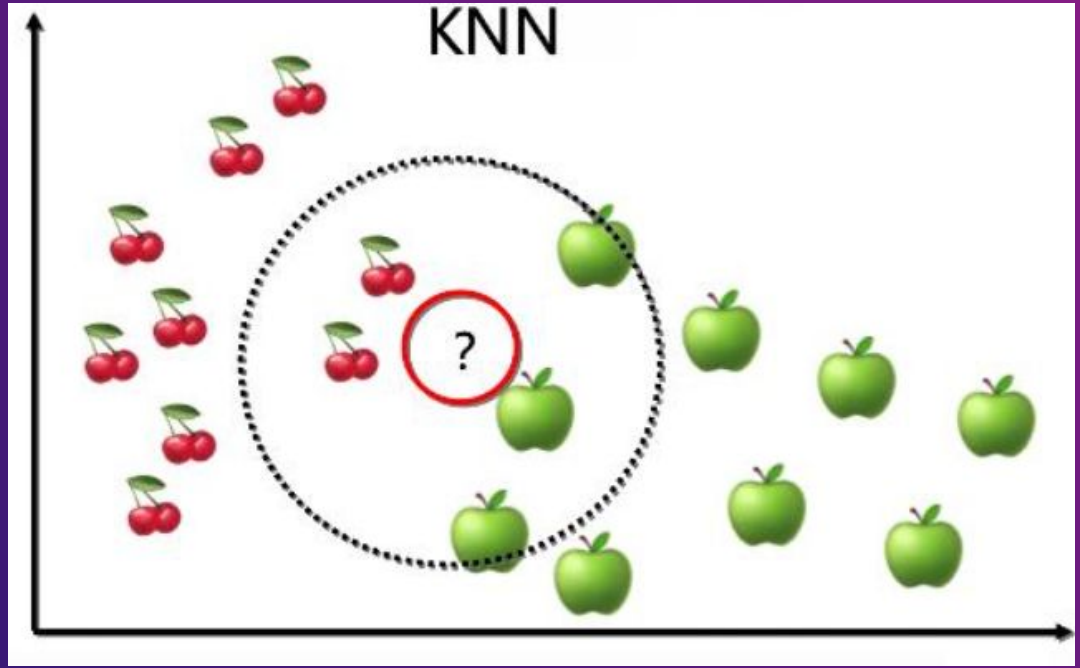


REDES CONVOLUCIONALES - CNN

```
model = Sequential()
model.add(Conv2D(32, kernel_size=(3, 3), activation='relu', input_shape=(32,32,3)))
model.add(MaxPooling2D(pool_size=(2, 2)))
model.add(Conv2D(64, kernel_size=(3, 3), activation='relu'))
model.add(MaxPooling2D(pool_size=(2, 2)))
model.add(Conv2D(128, kernel_size=(3, 3), activation='relu'))
model.add(MaxPooling2D(pool_size=(2, 2)))
model.add(Flatten())
model.add(Dense(256, activation='relu'))
model.add(Dense(128, activation='relu'))
model.add(Dense(num_classes, activation='softmax'))
```

KNN - VECINOS MÁS CERCANOS

- Calcular la distancia entre el item a clasificar y el resto de items
- Seleccionar los “k” elementos más cercanos
- Realizar una “votación de mayoría” entre los k puntos



LIBRERÍAS USADAS

```
from sklearn import metrics
```

```
from sklearn.neighbors import KNeighborsClassifier
```

```
# import dependencies
from keras.models import Sequential
from keras.layers import Dense
from keras.layers import Dropout
from keras.layers import Flatten
from keras.constraints import maxnorm
from keras.layers.convolutional import Conv2D
from keras.layers.convolutional import MaxPooling2D
from keras.datasets import cifar10
```

04

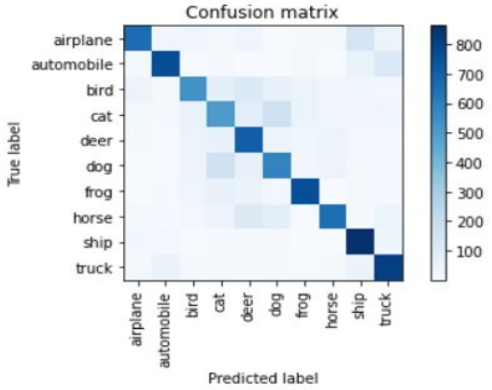
EVALUACION DE MODELOS ML

EVALUACION

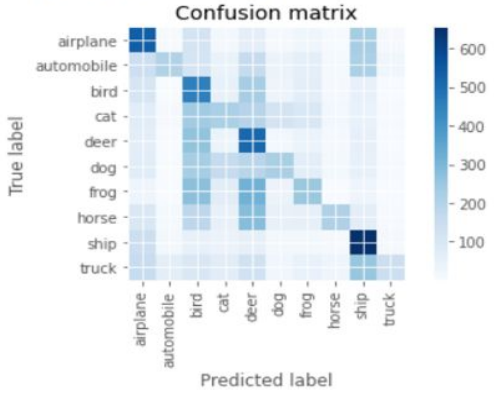
- F1 Score
- Accuracy
- Confusion Matrix

```
----------CNN Summary----------
CNN Time: 72.37 minute
F1 score: 0.6826686917310868
Accuracy score: 0.6838
Confusion matrix:
 [[658  30  35  18  35   6  13   9 147  49]
 [ 17 764   6  11   2   6  16   1  55 122]
 [ 50  11 534  80 118  64  52  30  34  27]
 [ 17  14  61 507  86 174  46  32  28  35]
 [ 14   3  54  61 707  43  33  51  24  10]
 [  7   7  49 173  68 582  25  49  17  23]
 [  4   9  38  66  57  23 760   4  16  23]
 [ 20   8  26  47 111  77   5 652   8  46]
 [ 27  27   6  12  11   9   1   4 863  40]
 [ 21  58  10  13   8  11   5  13  50 811]]
Plotting confusion matrix
```

60 Epochs




```
[51]
----------KNN Summary----------
KNN Time: 1.58 minute
F1 score: 0.3260170986061005
Accuracy score: 0.3398
Confusion matrix:
 [[537   4 117  13  59   7  26   5 225   7]
 [139 205 110  42 155  36  61  10 217  25]
 [107   3 452  52 226  34  66   8  49   3]
 [ 70   8 234 217 193 115  95  17  46   5]
 [ 64   1 262  35 514  21  41   7  53   2]
 [ 71   3 227 155 187 220  66  14  51   6]
 [ 27   2 273  68 314  37 248   2  28   1]
 [ 93  10 181  50 280  52  53 210  67   4]
 [141  14  52  38  54  16  14   8 655   8]
 [153  67  98  68 124  23  46  29 252 140]]
Plotting confusion matrix
```



05

CONCLUSIONES & RECOMENDACIONES

CONCLUSIONES

REDES CONVOLUCIONALES 68%

KNN 33%

KMEANS 8%

RECOMENDACIONES

- Trabajo futuro , mejoras
- Estudiar el algoritmo elegido
- Estudiar procesamiento

MUCHAS GRACIAS!

MENU CONTACT

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