

Categorization



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Our team



Keyla Nolazco



Samuel Martínez

Challenge

In this challenge you will be building classifiers for handwritten digits in the MNIST database. The state of the art **error rate** on this dataset is roughly **0.5**.



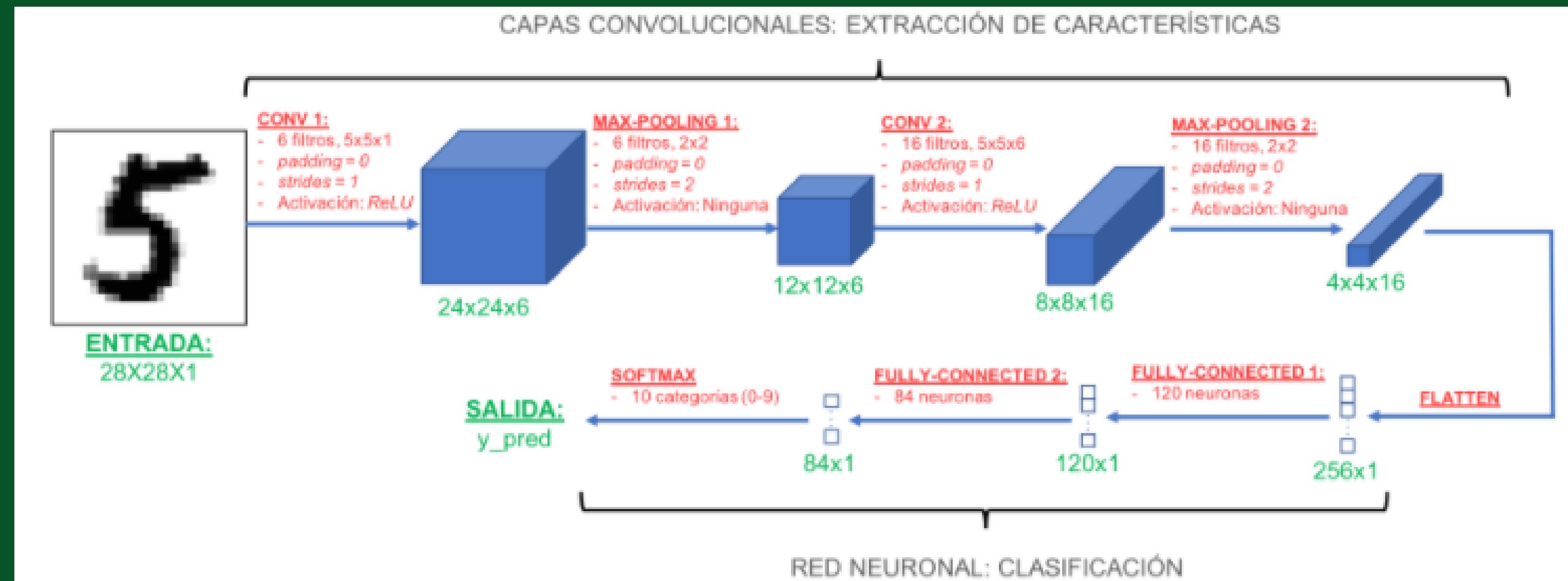
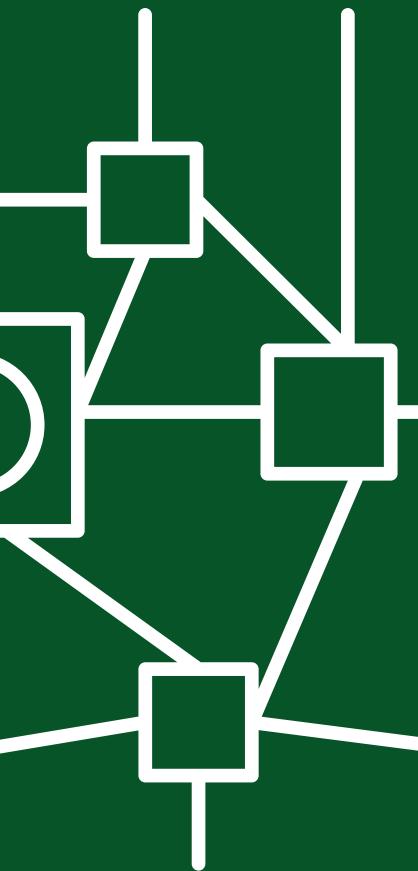
Our Challenges

- What to do?
- How to handle information?
- Which classifier to use?
- How to make a neural network?
- Which libraries to use?
- How to use libraries?
- How to make the model?
- How to use the model?

why did we choose convolutional nets?

Classifiers)	Test error rate (%)
Convolutional Nets	1.7- 0.23
Linear classifiers	12-7.6
K-Nearest Neighbors	5-1.6
Boosted Stumps	7.7-0.87
Non linear classifiers	3.6-3.3
SVMs	1.4-0.56

Neural Network



Source: Codificandobits. <https://www.codificandobits.com/>

Libraries



```
from tensorflow.keras.datasets import mnist
from tensorflow.keras.utils import to_categorical
from tensorflow.keras.models import Sequential
from tensorflow.keras.layers import Conv2D
from tensorflow.keras.layers import MaxPooling2D
from tensorflow.keras.layers import Dense
from tensorflow.keras.layers import Flatten
from tensorflow.keras.optimizers import SGD
```

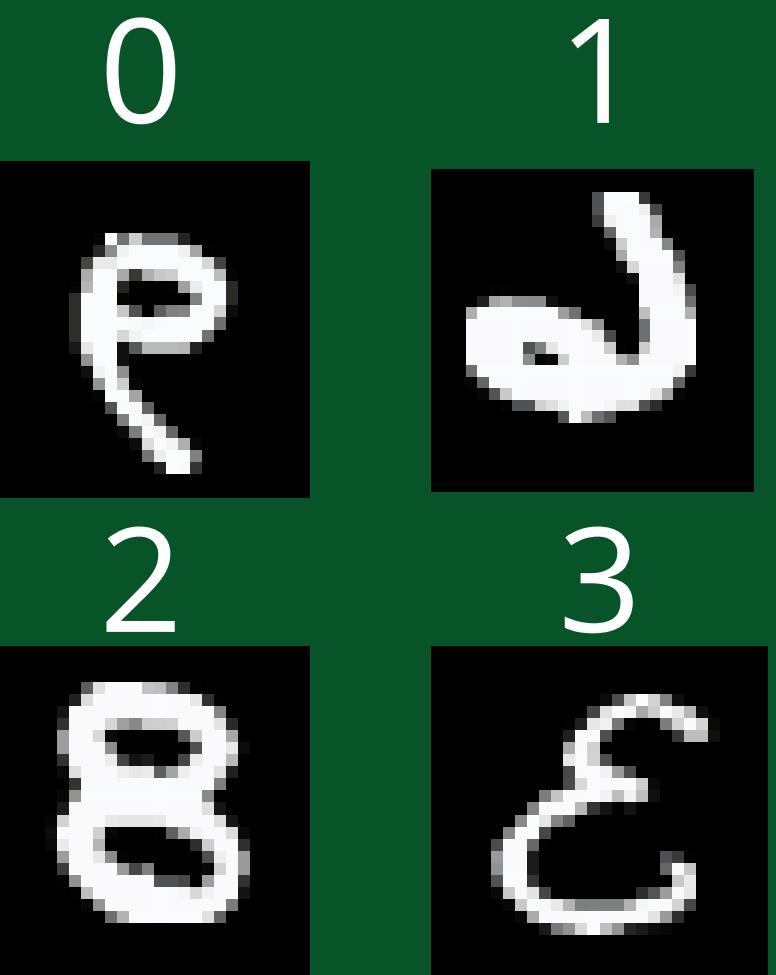
Test Harness

```
In [53]: runfile('C:/Users/52487/Documents/Caracterization/datoss/Test/modelo.py',  
wdir='C:/Users/52487/Documents/Caracterization/datoss/Test')  
> 98.980
```

accuracy 98.98%

Results
(Predictions)

id	Category
0	8
1	2
2	8
3	8



If we had the opportunity to do it again we should...

1. Implement libraries such as **ImageDataGenerator**, so that our machine learns that **images can be** rotated, with zoom, inverted or flipped.
2. Make tests with a **larger** number of **convolutional layers and filters**.
3. **Increase** the **Epoch** to generate additional iterations and **reduce** the **batch size**
4. Change the **learning rate** so that it can classify images with more variables.
5. Try **another algorithms** and compare their **performance**