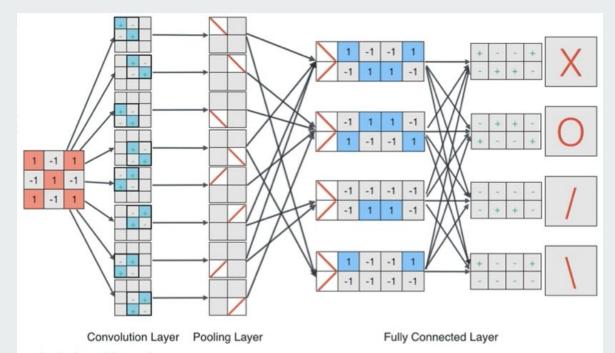
# Detecção de Caligrafia

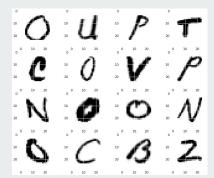
Ana Cláudia Akemi Matsuki de Faria	19264514
Danielle Bezerra Moreira	19012871
Derek Freire Quaresma	18706986
Henrique Sartori Siqueira	19240472
Rafael Silva Barbon	19243633

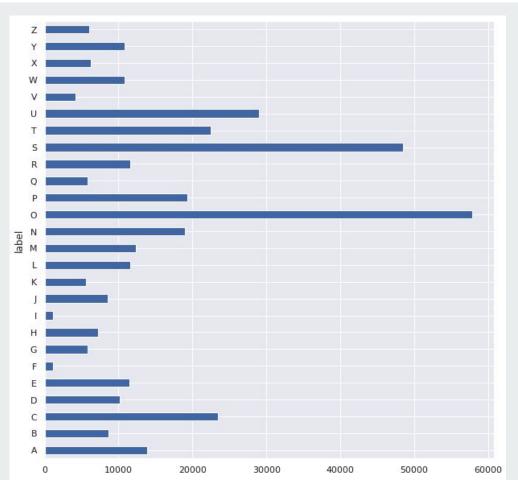
### Redes Neurais Convolucionais (CNN)



## Preparação dos dados

- A\_Z Handwritten Data Kaggle
- Um CSV numérico representando imagens em tons de cinza
- label + dados
- 372.450 exemplos
- Imagens 28x28 = 784





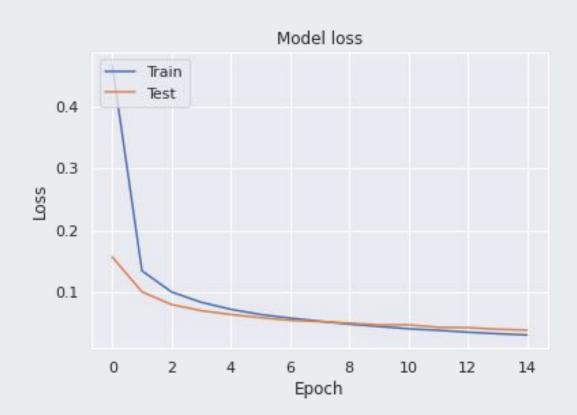
#### Modelo

- Sequentials Model Keras
- 1 layer de convolução relu
- 1 layer de pooling
- 1 layer dropout
- 1 layer de flatten
- 2 layers de dense (relu /softmax)

Layer (type)	Output Shape	Param #
conv2d (Conv2D)	(None, 24, 24, 32)	832
max_pooling2d (MaxPooling2D )	(None, 12, 12, 32)	0
dropout (Dropout)	(None, 12, 12, 32)	0
flatten (Flatten)	(None, 4608)	0
dense (Dense)	(None, 128)	589952
dense_1 (Dense)	(None, 26)	3354

#### **Treinamento**

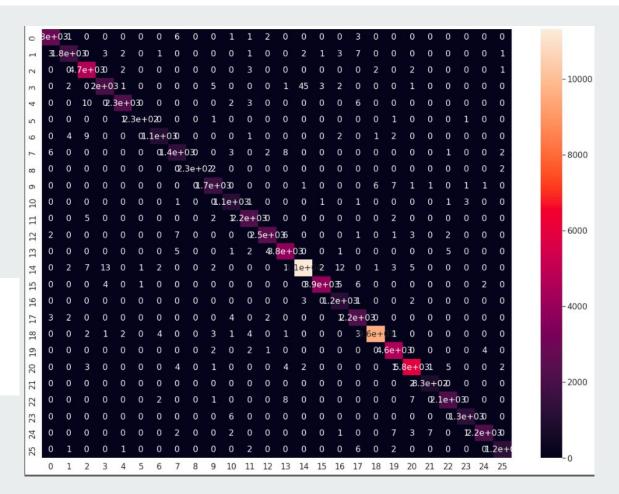
- 30 épocas de treinamento
- Batch size de 1200
- Dados
  - 80% Treino
  - o 20% Teste



#### Resultado

Melhor resultado obtido
- 0,9939 de acurácia

$$Acuracia = \frac{\sum PredicoesCorretas}{\sum Predicoes}$$

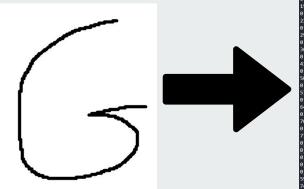




[[2.7642557e-02 2.4734737e-02 8.3159041e-03 1.5964091e-02 1.1003187e-01 6.0770866e-03 5.5320293e-01 2.7320914e-03 1.0235796e-03 3.2766936e-03 4.7664177e-03 4.1897739e-03 8.2782476e-04 1.7637479e-04 1.3326975e-02 5.3255144e-03 1.5538538e-01 3.3668845e-03 3.5080750e-02 1.4465855e-03 2.9499286e-03 1.2993334e-04 1.2861828e-02 1.6965422e-04 5.6560603e-03 1.3386323e-03]]

# Preparação imagem para predição

- Imagem em formato png
- Redimensionar para 28x28 px
- Inverter as cores e transformar em escala de cinza
- Cabeçalho do CSV + dados



8.1, 0.2, 0.3, 0.4, 0.5, 0.6, 0.7, 0.8, 0.9, 0.10, 0.11, 0.12, 0.13, 0.14, 0.15, 0.16, 0.17, 0.18, 0.19, 0.20, 0.21, 0.22, 0.23, 0.24, 0.25, 0.26, 0.27, 0.28, 0.29, 0.30, 0.31, 0.32, 0.33, 0.34, 0.35, 0.36, 0.37, 0.38, 0.39, 0.40, 0.41, 0.42, 0.43, 0.44, 0.45, 0.46, 0.47, 0.48, 0.49, 0.49, 0.5, 0.55, 0.55, 0.55, 0.55, 0.55, 0.57, 0.58, 0.59, 0.69, 0.61, 0.62, 0.63, 0.64, 0.65, 0.66, 0.67, 0.68, 0.69, 0.70, 0.10, 0.12, 0.13, 0.15

