

# Sistemas de Inteligencia Artificial

## TP3

# Deep Learning

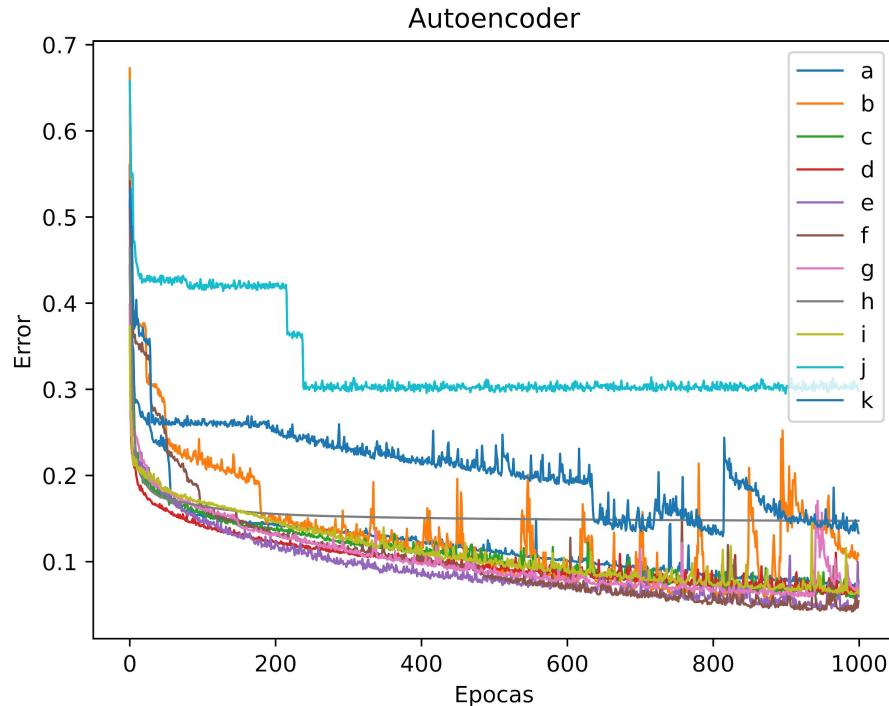
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Ferraris Santiago, Legajo Nº 60129  
Ruiz Mateo, Legajo Nº 60358

# Ejercicio 1

# Configuración del autoencoder

```
{  
    "cot": 100,  
    "n": 0.15,  
    "b": 0.8,  
    "config_by_code": true,  
    "momentum" : false,  
    "adaptative": false,  
    "powell" : false,  
    "delta": 0.1,  
    "layers" : [35, 20, 8, 5, 8, 20, 35],  
    "custom_font": true  
}
```

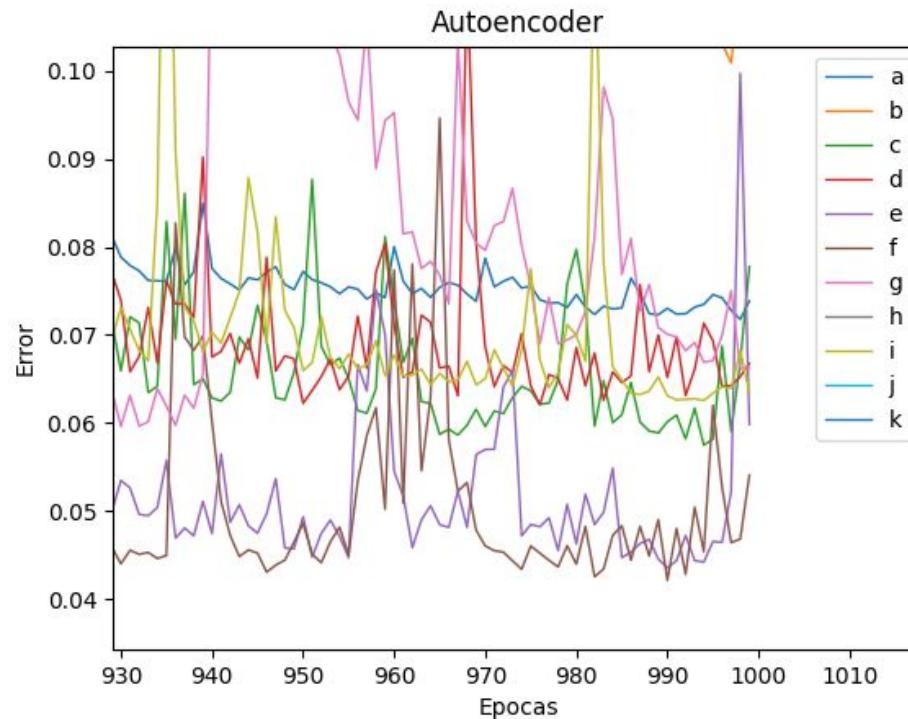
# Arquitectura



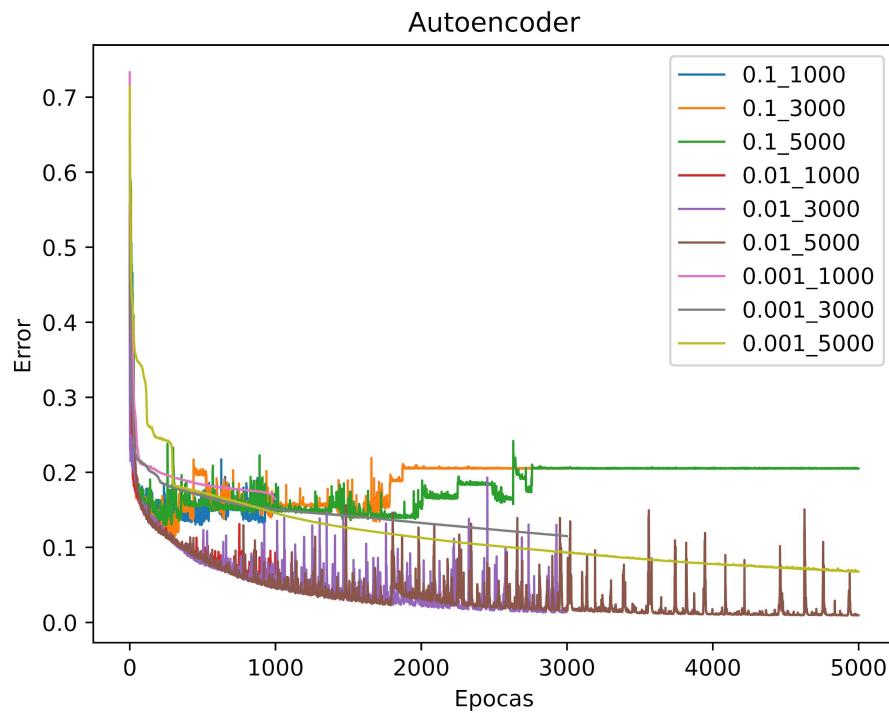
## Arquitecturas:

- a: [35, 20, 8, 2, 8, 20, 35]
- b: [35, 30, 25, 20, 15, 10, 5, 2, 5, 10, 15, 20, 25, 30, 35]
- c: [35, 25, 15, 5, 2, 5, 15, 25, 35]
- d: [35, 24, 13, 2, 13, 24, 35]
- e: [35, 27, 19, 11, 2, 11, 19, 27, 35]
- f: [35, 28, 15, 7, 2, 7, 15, 28, 35]
- g: [35, 19, 11, 7, 5, 2, 5, 7, 11, 19, 35]
- h: [35, 2, 35]
- i: [35, 20, 10, 5, 2, 5, 10, 20, 35]
- j: [35, 34, 33, ... 2 ..., 33, 34, 35]
- k: [35, 31, 23, 19, 17, 13, 11, 7, 5, 3, 2, 3, 5, 7, 11, 13, 17, 19, 23, 31, 35]

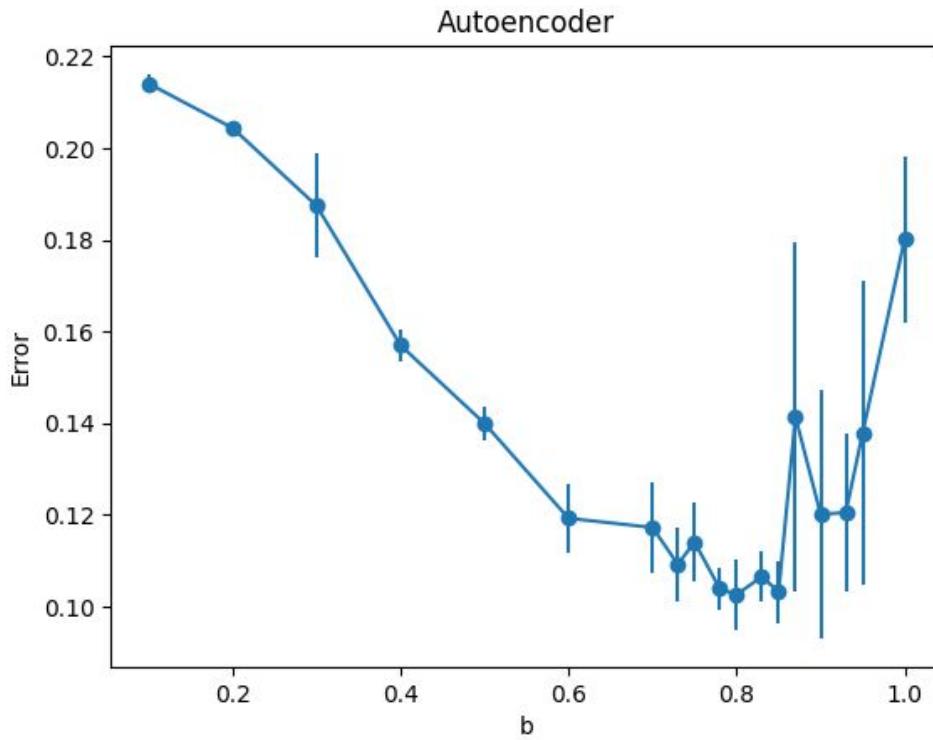
# Arquitectura - Detalle



# Variando learning rate y épocas



# Variando b - tanh



# Optimizaciones

Input:

'ābc defghiijk lmnnoP qrstuvwxyz{|}~■

Output:

Ābc deFghiijk lmnnoP qrstuvwxyz{|}~■

Output Momentum:

Ābc deFghiijk lmnnoP qrstuvwxyz{|}~■

Output Adaptative:

Ābc deFghiijk lmnnoP qrstuvwxyz{|}~■

Output Powell:

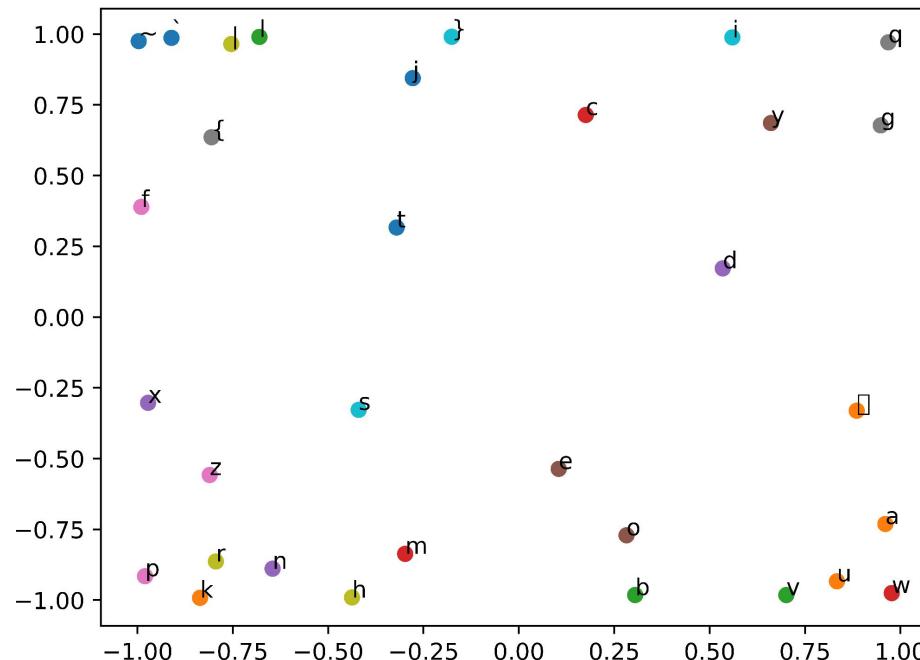
Ābc deFghiijk lmnnoP qrstuvwxyz{|}~■

Layers = [35, 28, 15, 7, 2, 7, 15, 28, 35]

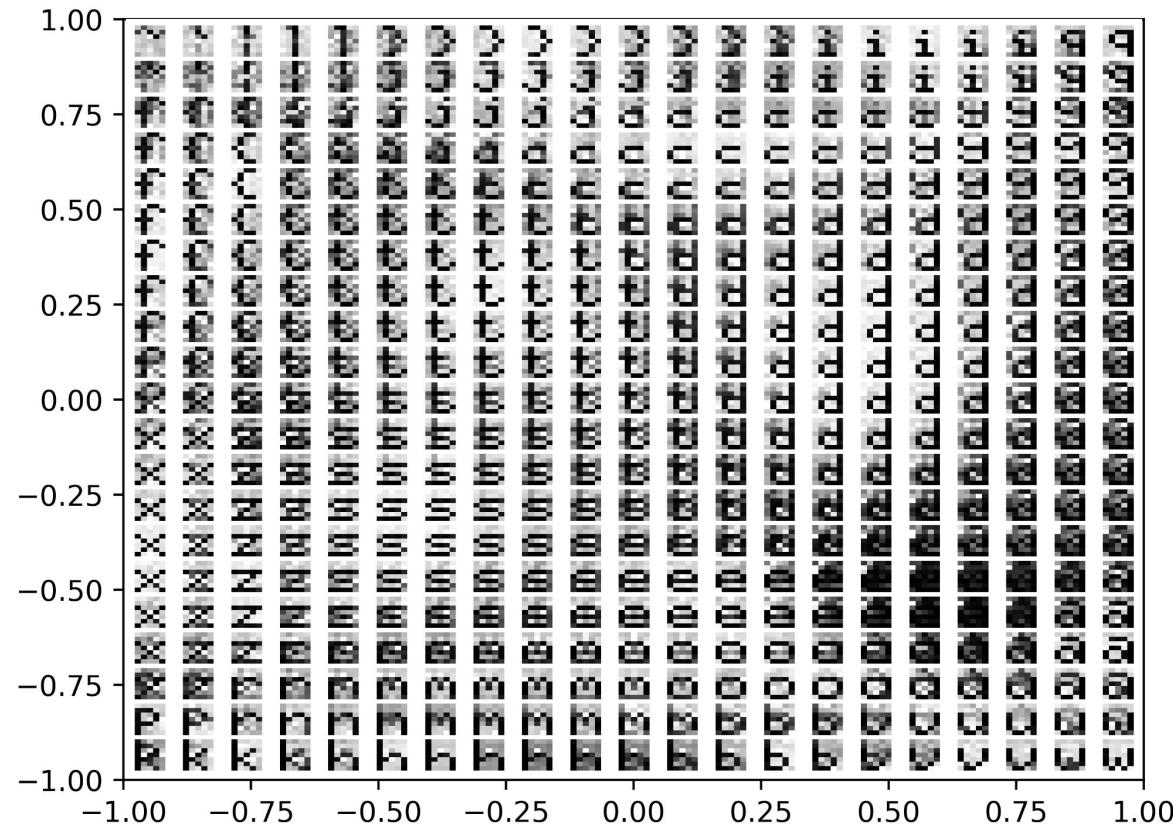
b = 0.8 n=0.01 cot=5000

# Arquitectura - espacio latente

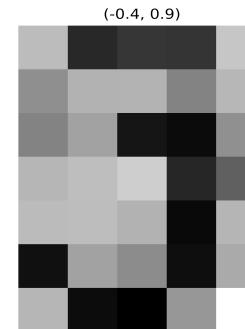
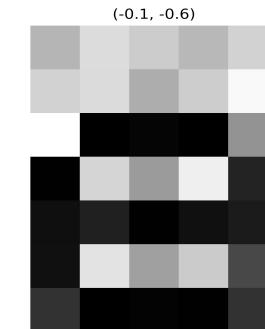
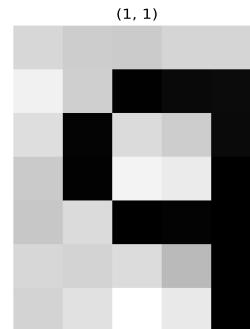
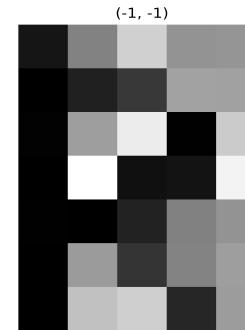
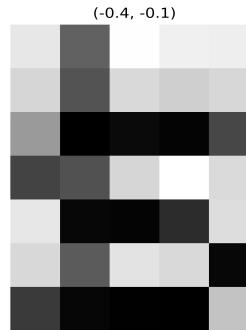
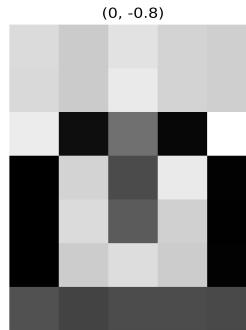
Layers = [35, 28, 15, 7, 2, 7, 15, 28, 35] n = 0.01 cot = 5000 b = 0.8 Powell



# Generación nueva letra

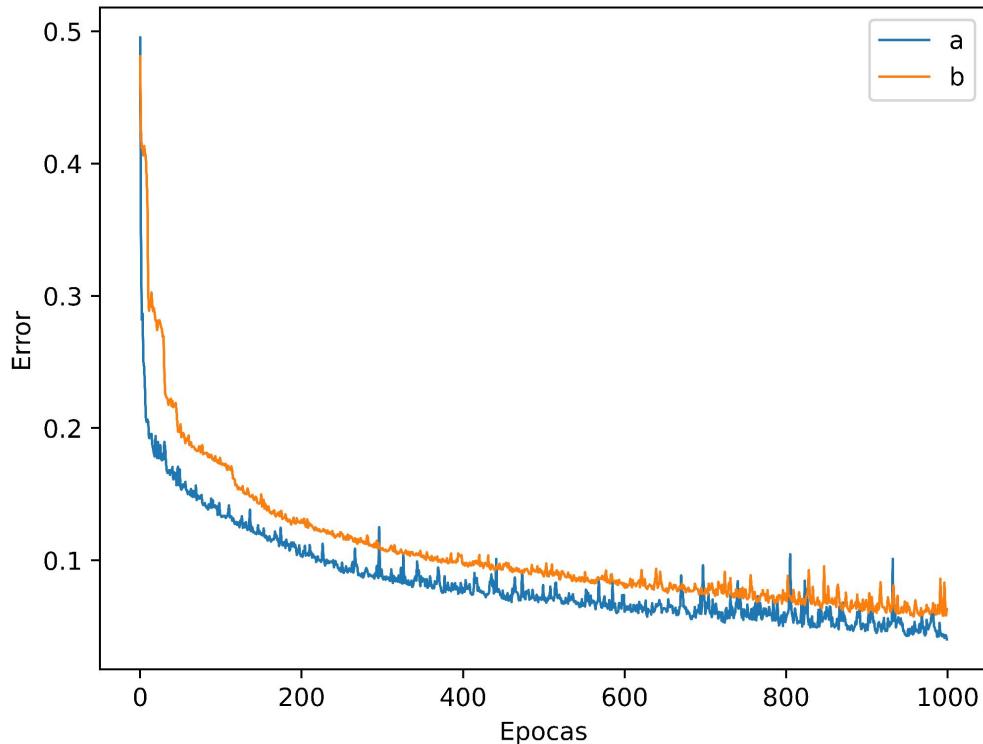


# Generación nueva letra



# Denoising - Arquitectura

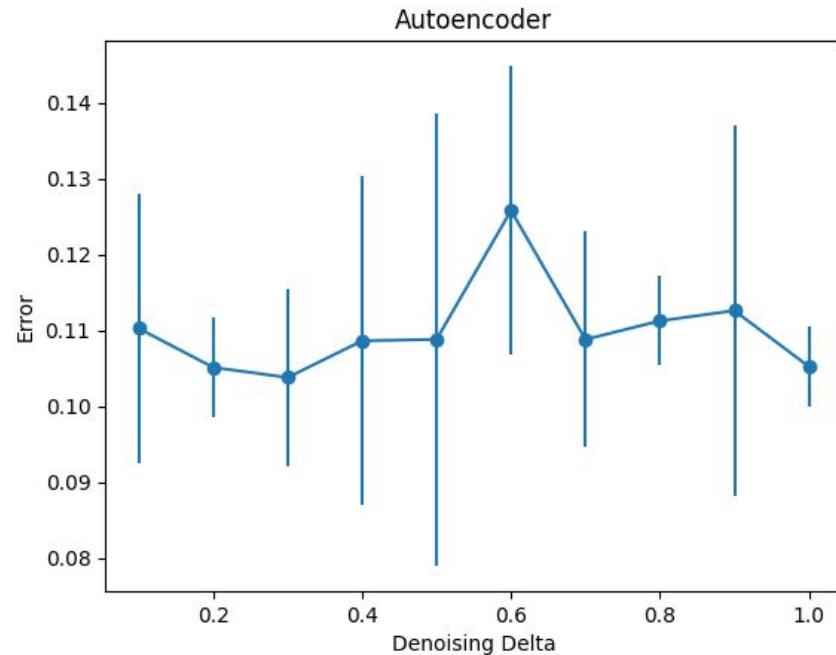
Autoencoder



Arquitecturas:

- a: [35, 27, 19, 11, 2, 11, 19, 27, 35]
- b: [35, 28, 15, 7, 2, 7, 15, 28, 35]

# Variando denoising delta



Layers = [35, 27, 19, 11, 2, 11, 19, 27, 35]  
b = 0.8  
n = 0.01  
cot = 300

# Denoising - Resultados

Layers = [35, 27, 19, 11, 2, 11,  
19, 27, 35] cot = 5000, n = 0.01,  
b = 0.8

Input - delta = 0.2:

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z C 1 2 3 4 5 6 7 8 9

Output:

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z C 1 2 3 4 5 6 7 8 9

Input - delta = 0.8:

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z C 1 2 3 4 5 6 7 8 9

Output:

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z C 1 2 3 4 5 6 7 8 9

# Ejercicio 2

# Alfabeto personalizado

Layers = [9, 6, 3, 2, 3, 6, 9]  
cot = 3000, n = 0.01, b = 0.8

Alfabeto

Julactor

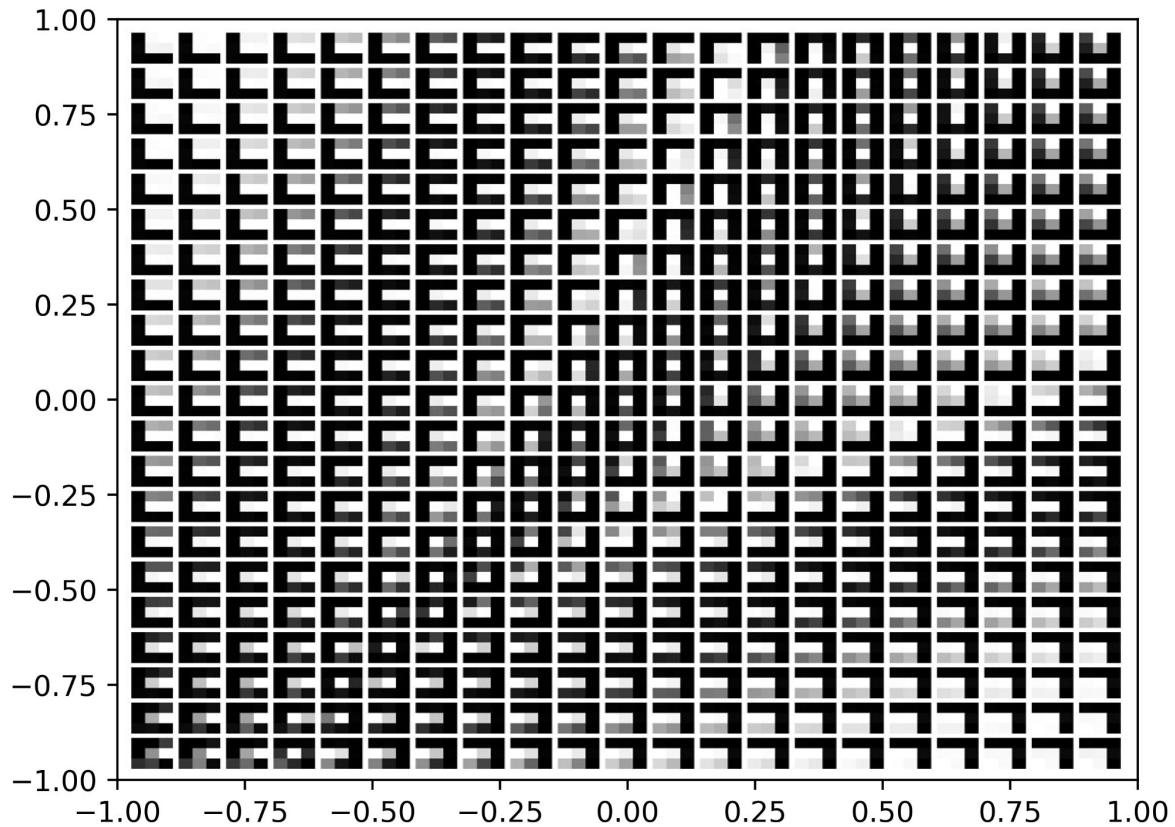
Input

Julactor

Output

Julactor

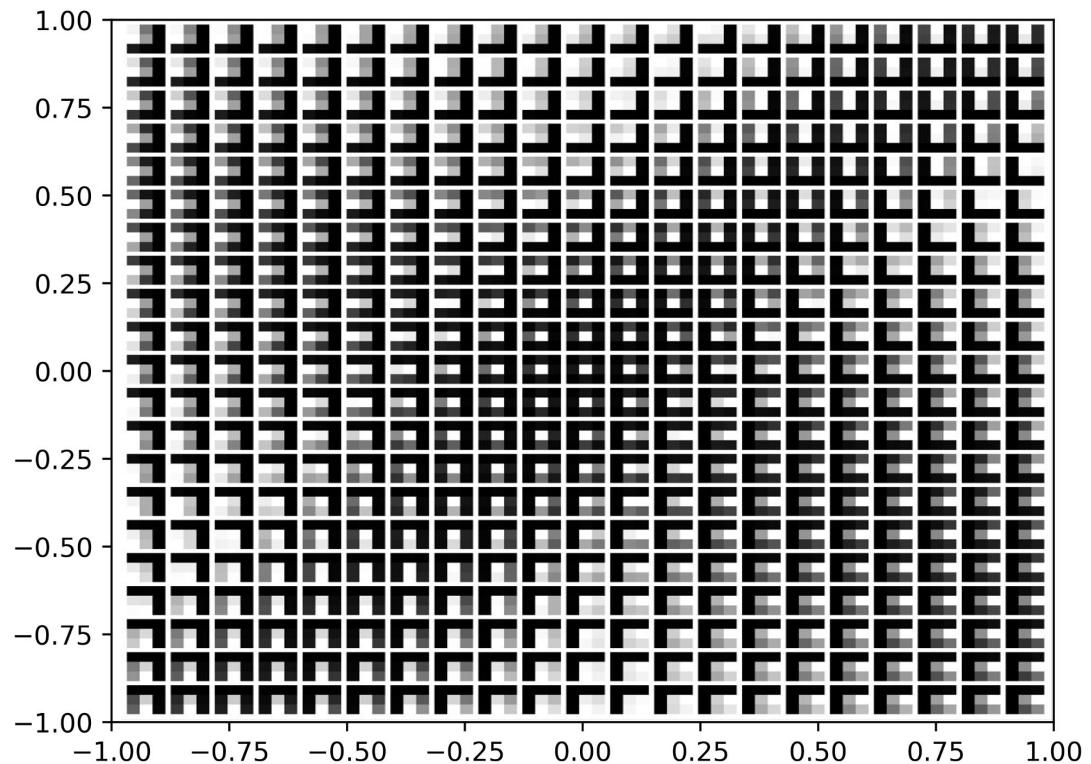
# Espacio Latente



# Alfabeto personalizado

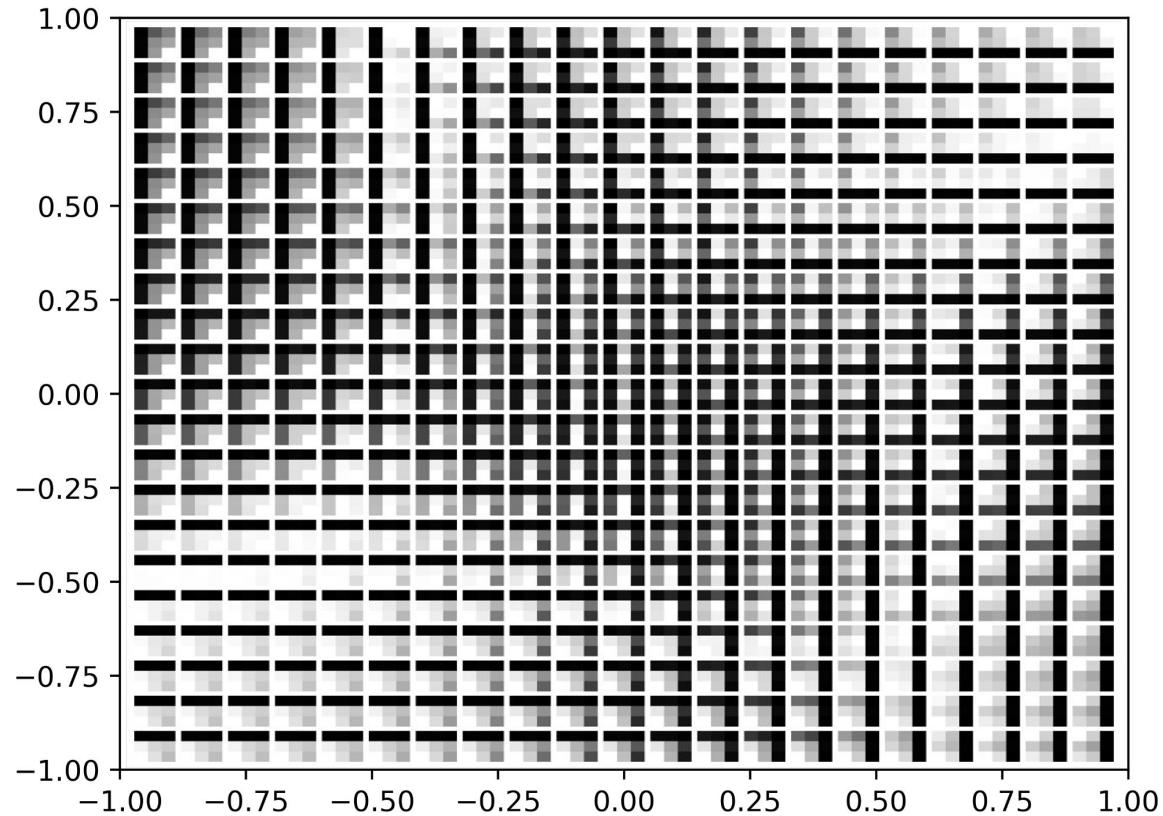
Input

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# Alfabeto personalizado

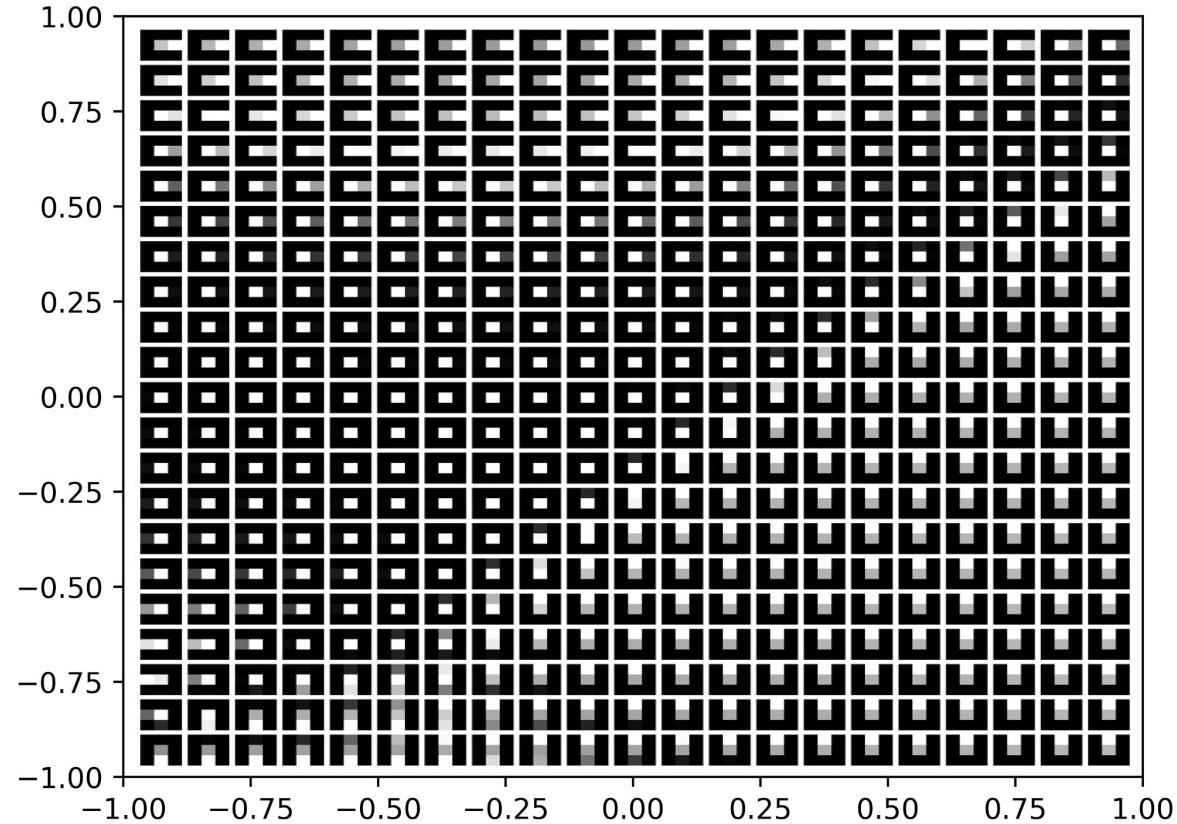
Input



# Alfabeto personalizado

Input

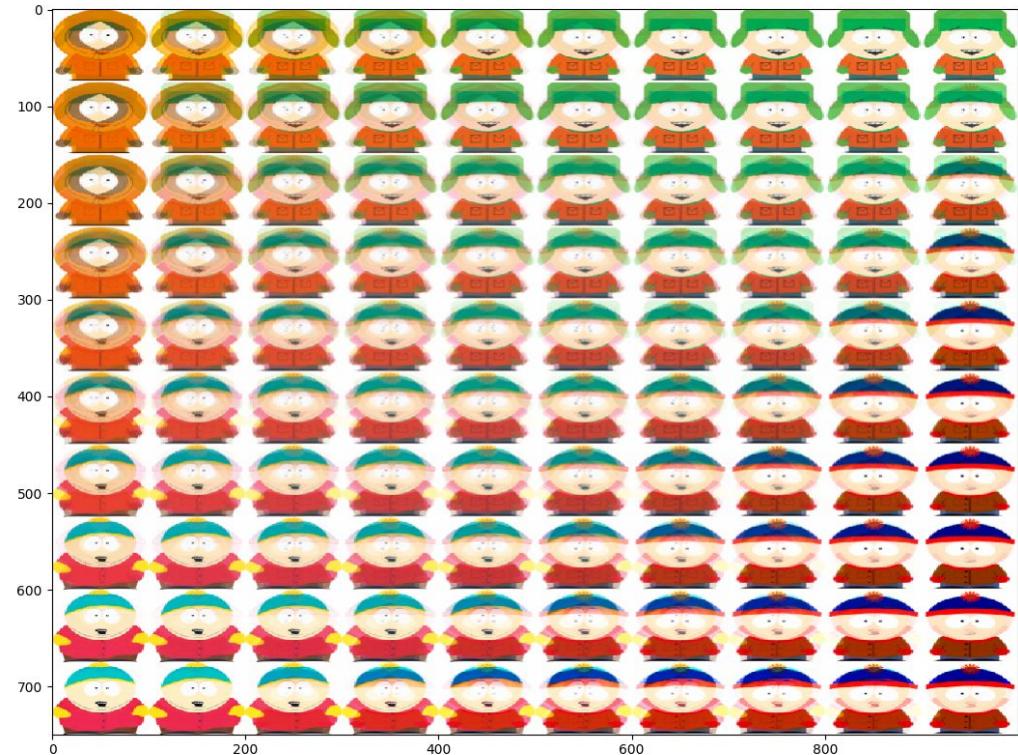
U C C n o



# Keras - South park



Layers = [22500, 1096, 256, 2, 256, 1096, 22500]



# Conclusiones

# Conclusiones

- Powell es efectivo pero tarda mucho tiempo.
- Nuestro Autoencoder pudo aprender bien la fuente que le dimos.
- El espacio latente de dos dimensiones aprende combinaciones de las entradas recibidas para entrenar al autoencoder
- Aumentando la cantidad de ruido, podemos llegar al resultado con un grado de error un poco más grande que sin el ruido.



Muchas gracias!!