

TP5

Deep Learning

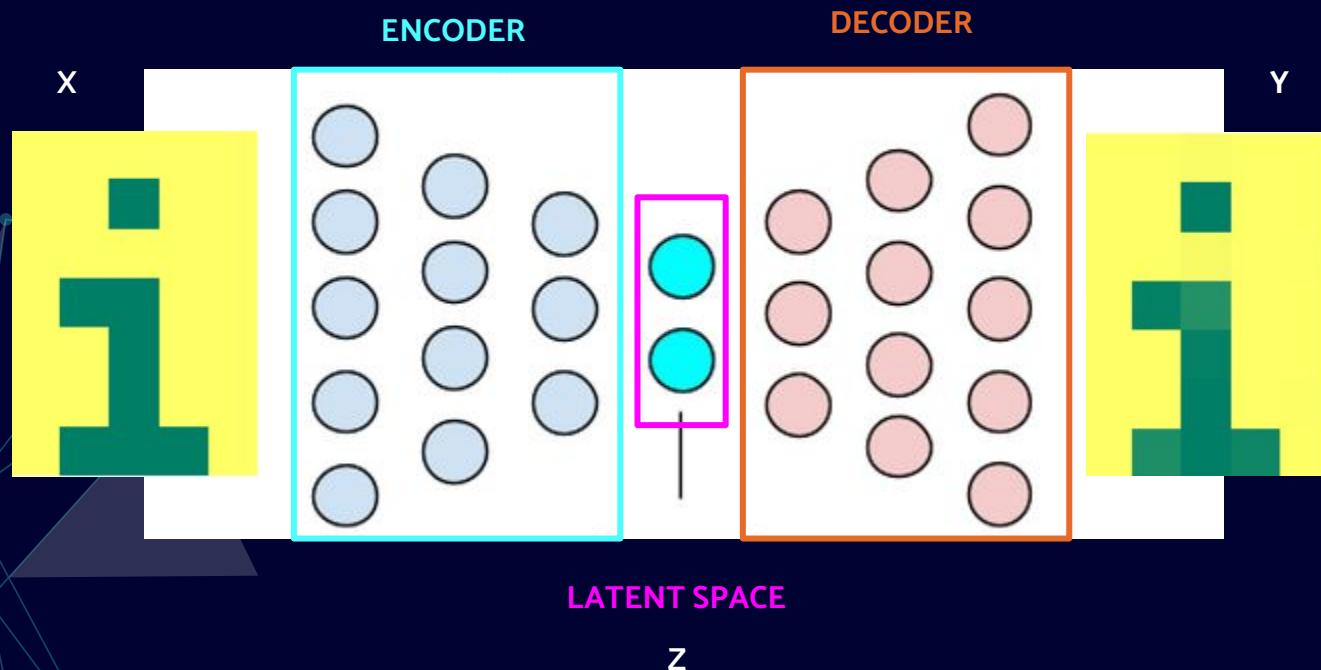
72.27 - Sistemas de Inteligencia Artificial

1.1

Autoencoder Basico

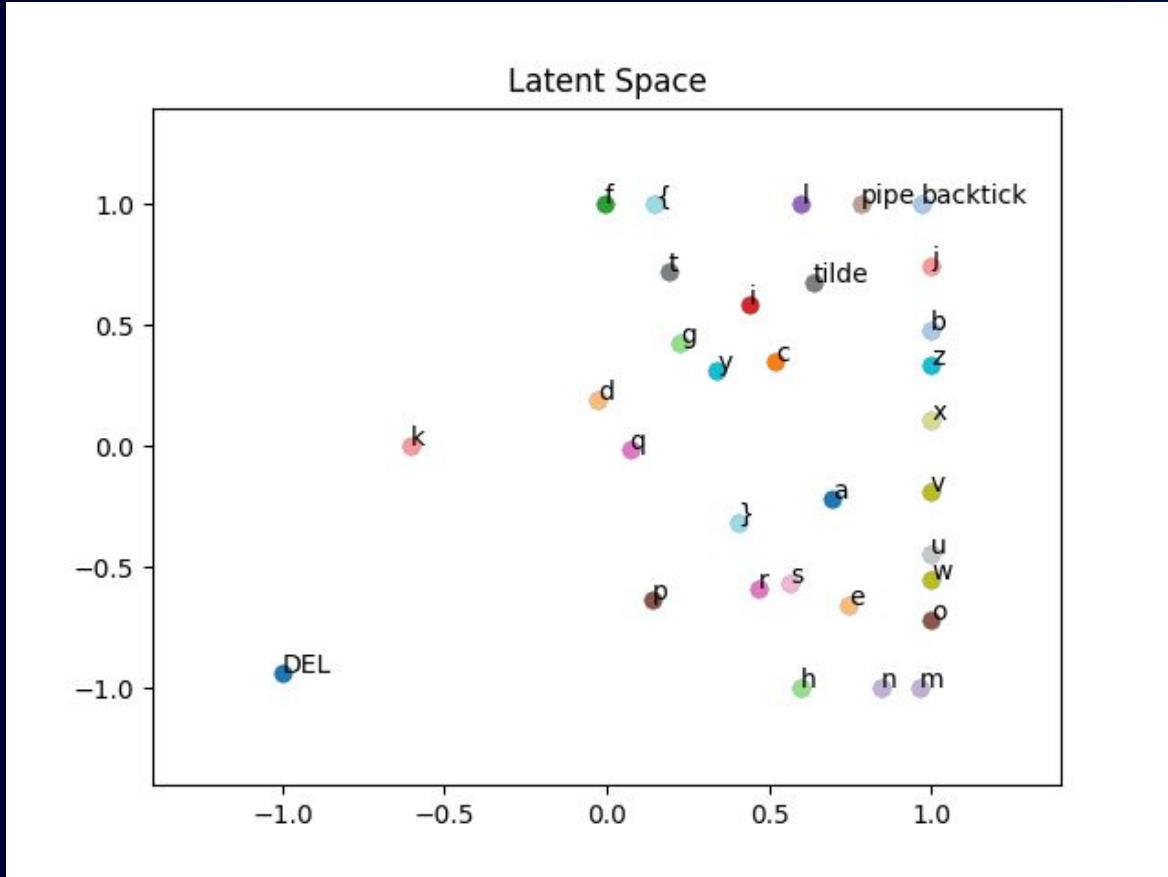


Arquitectura Autoencoder



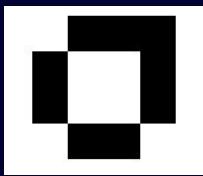
Espacio Latente

Layers: 30, 15
Error: 3 (Discrete)
Optimizer: adam
Batch size: 12
LR: 0.001
LR Decay: 0.9999
Min LR: 0.000001
Beta: 2

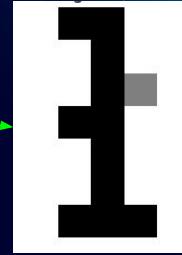
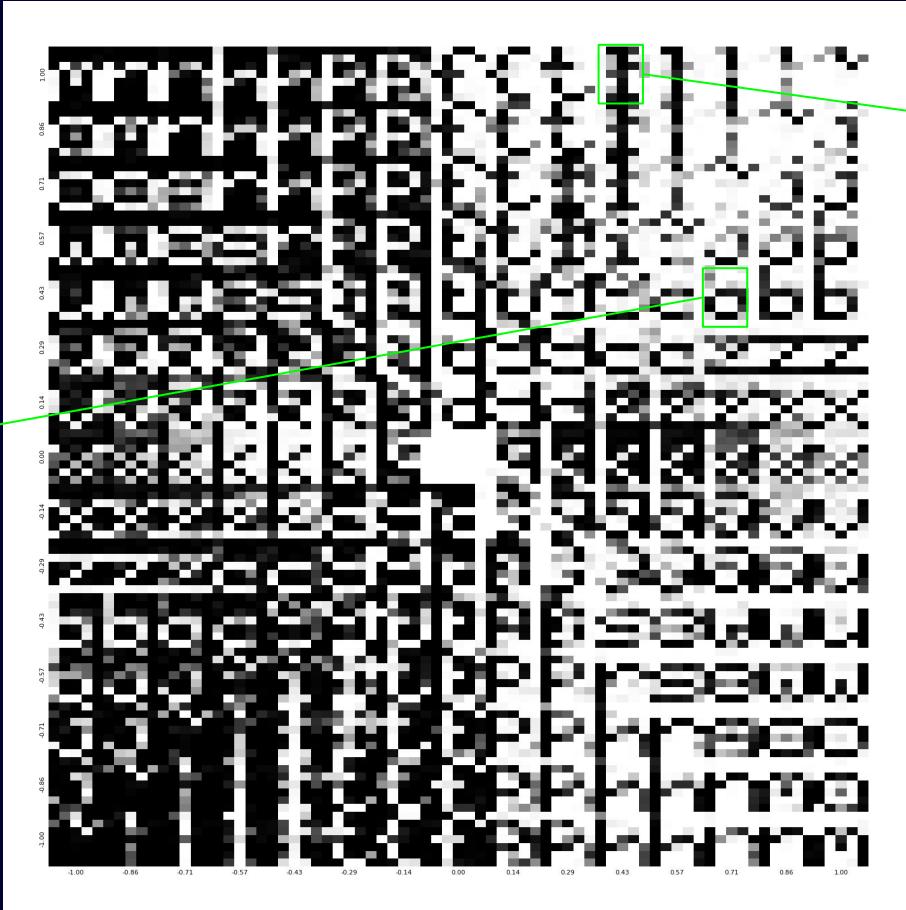


0:01:17.732895

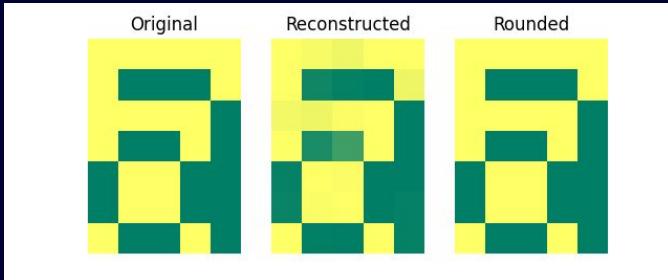
Letras nuevas



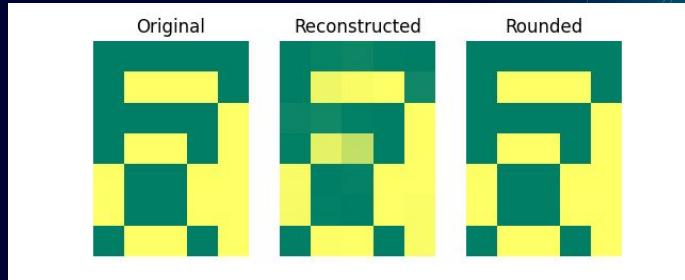
Layers: 30, 15
Error: 3 (Discrete)
Optimizer: adam
Batch size: 12
LR: 0.001
LR Decay: 0.9999
Min LR: 0.000001
Beta: 2



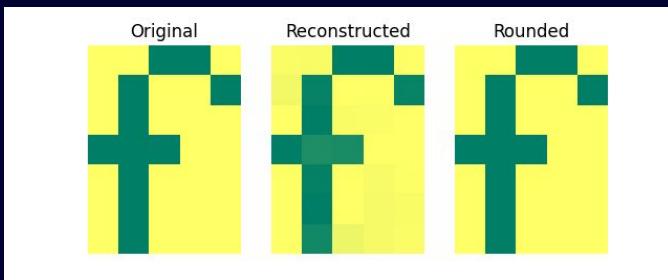
Opuestos de las letras



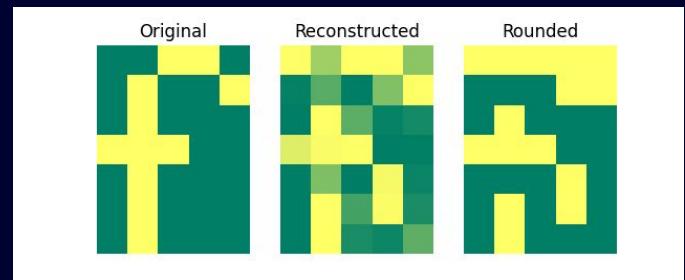
‘a’ normal



‘a’ negada



‘f’ normal

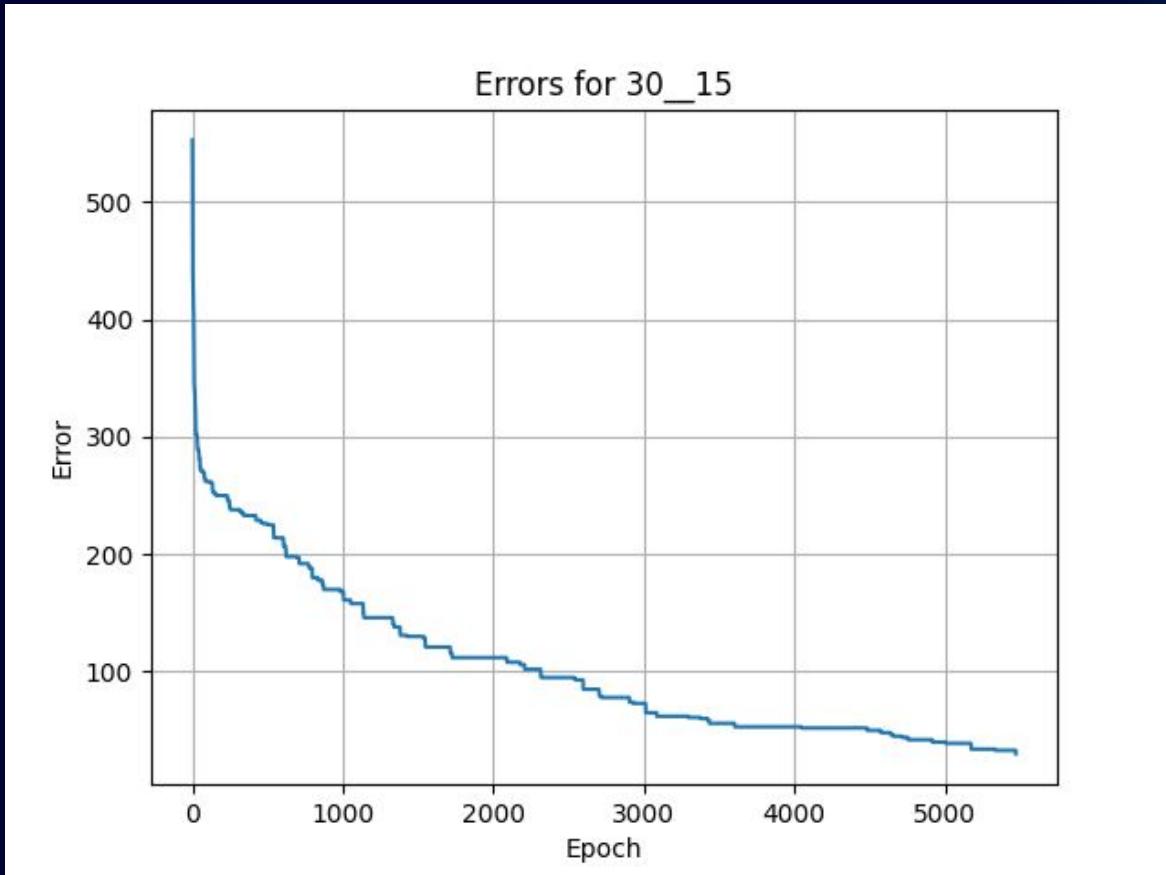


‘f’ negada

Layers: 30, 15
Error: 3 (Discrete)
Optimizer: adam
Batch size: 12
LR: 0.001
LR Decay: 0.9999
Min LR: 0.000001
Beta: 2

Error

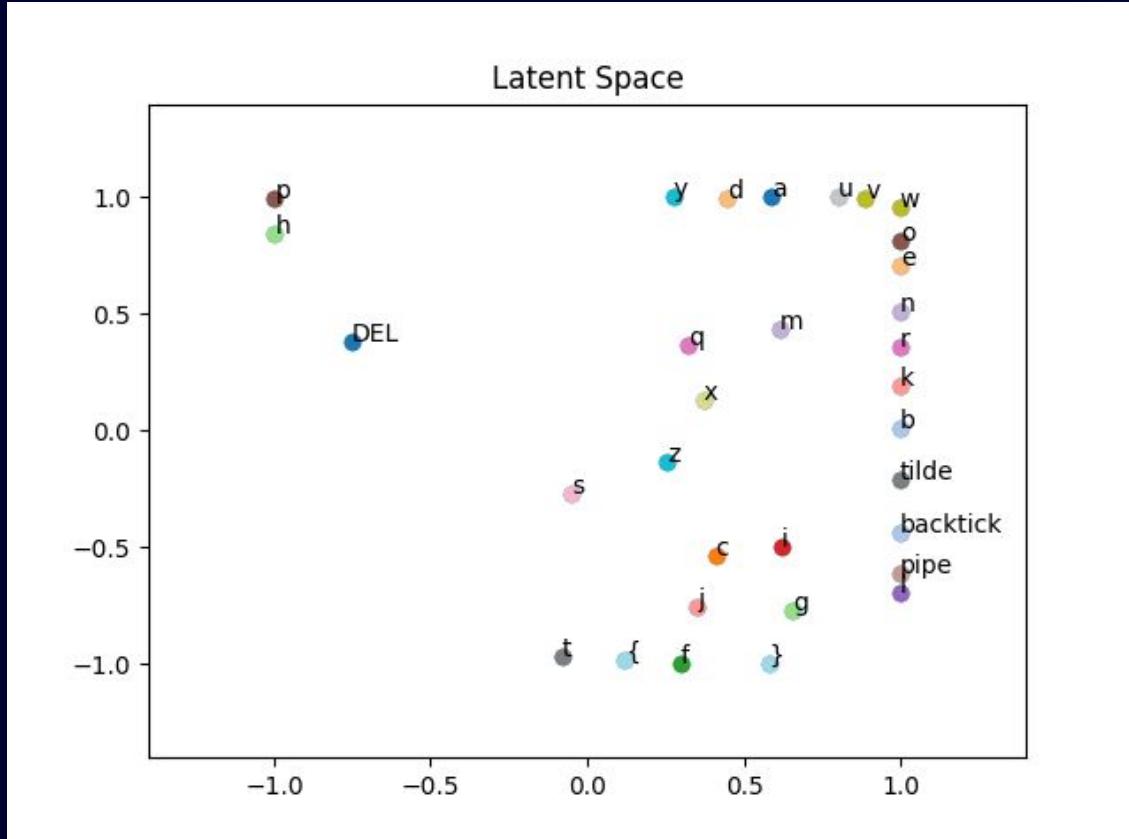
Layers: 30, 15
Error: 3 (Discrete)
Optimizer: adam
Batch size: 12
LR: 0.001
LR Decay: 0.9999
Min LR: 0.000001
Beta: 2



0:01:17.732895

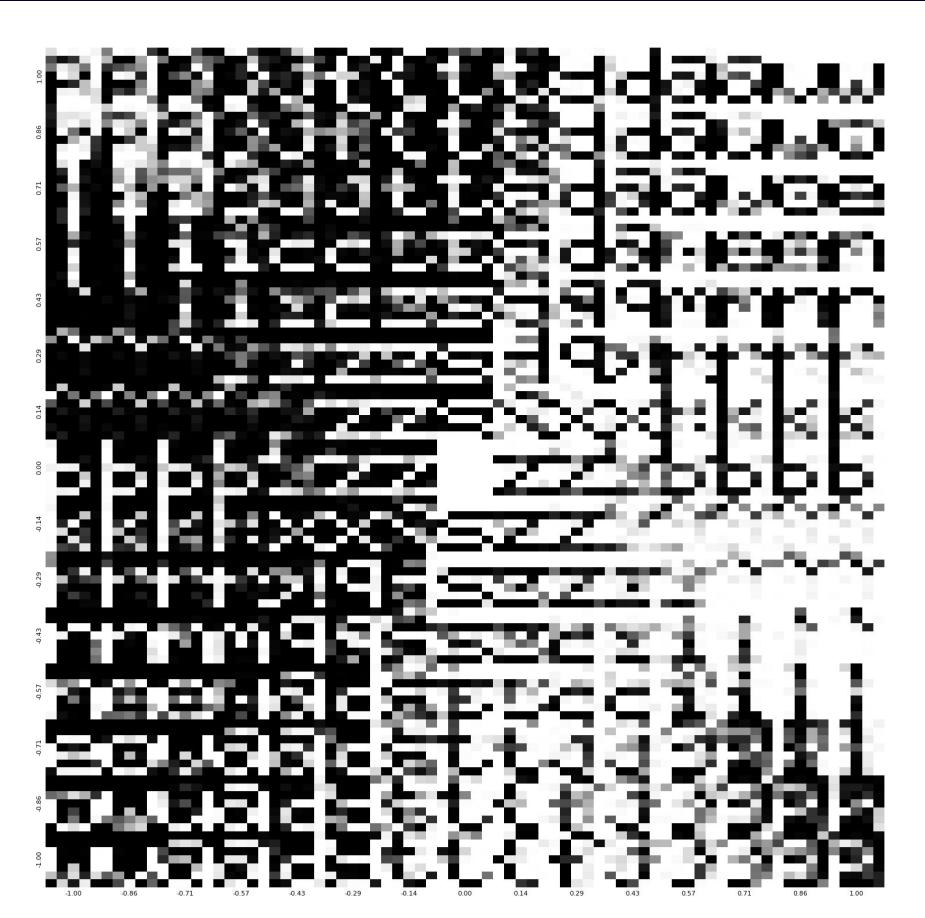
Espacio Latente

Layers: 30, 25, 15
Epsilon: 3 (Discrete)
Optimizer: adam
Batch size: 12
LR: 0.001
LR Decay: 0.9999
Min LR: 0.000001
Beta: 2



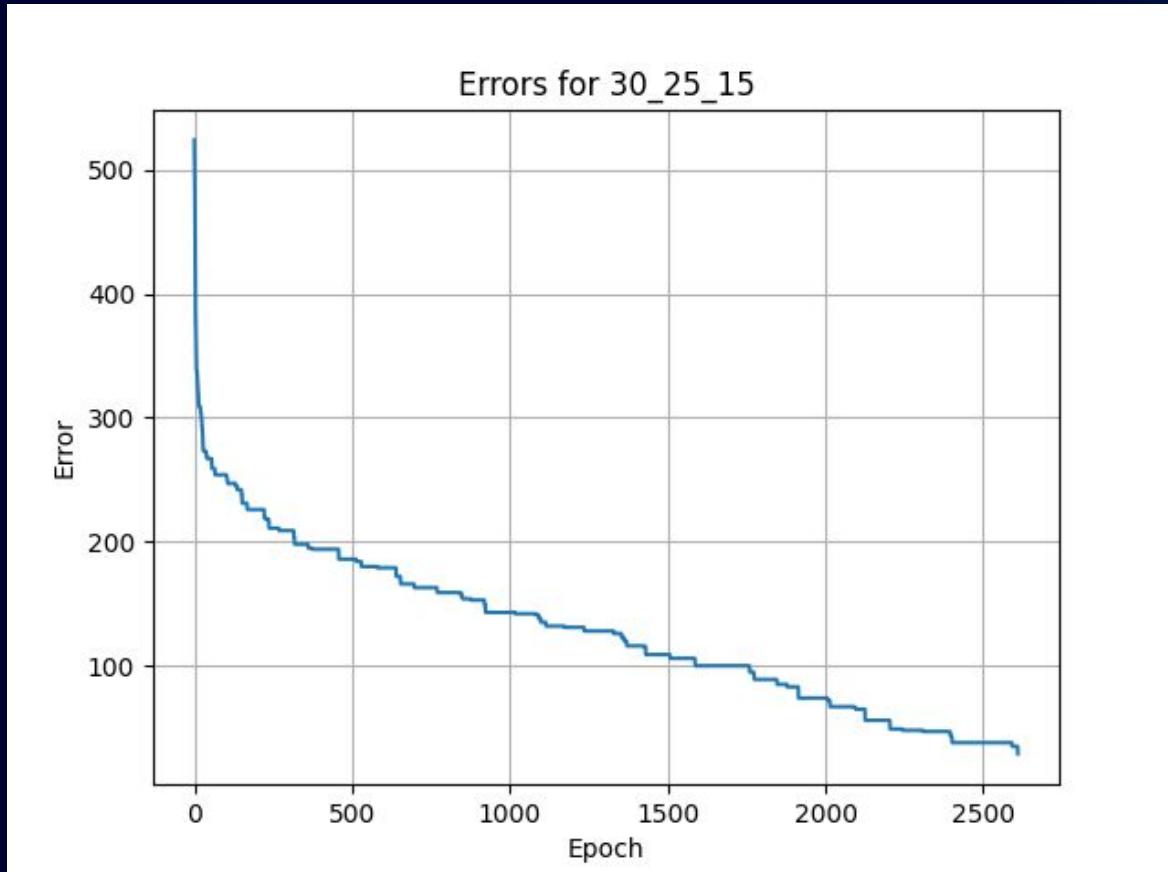
Letras nuevas

Layers: 30, 25, 15
Epsilon: 3 (Discrete)
Optimizer: adam
Batch size: 12
LR: 0.001
LR Decay: 0.9999
Min LR: 0.000001
Beta: 2



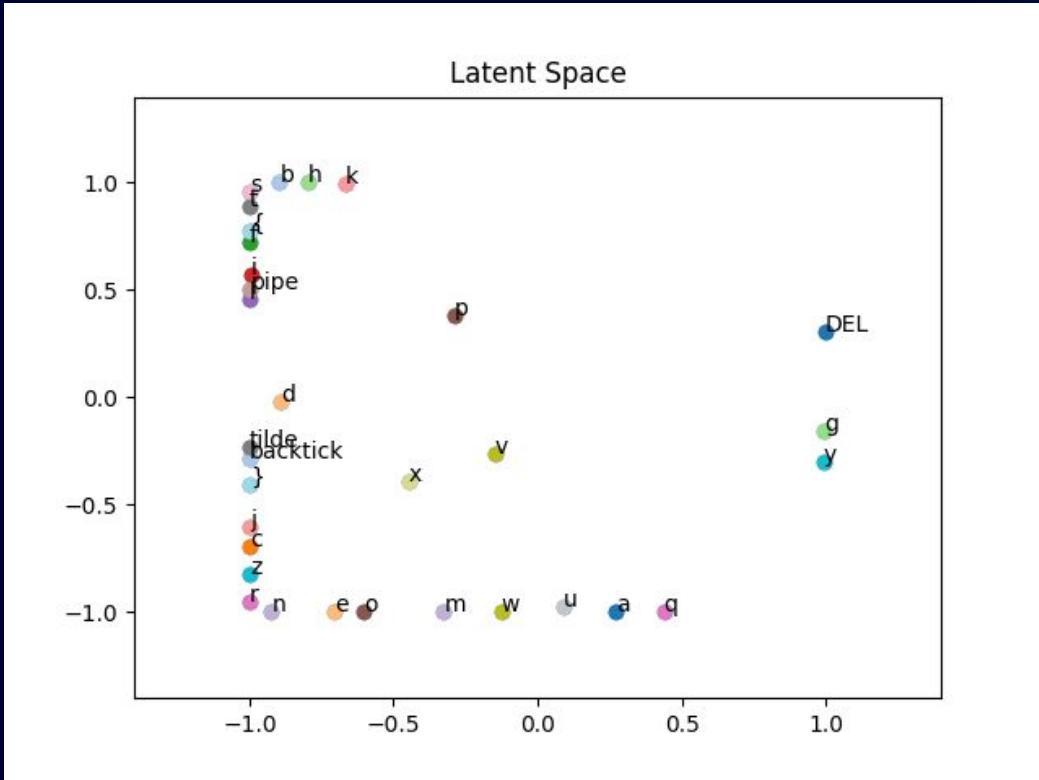
Error

Layers: 30, 25, 15
Epsilon: 3 (Discrete)
Optimizer: adam
Batch size: 12
LR: 0.001
LR Decay: 0.9999
Min LR: 0.000001
Beta: 2



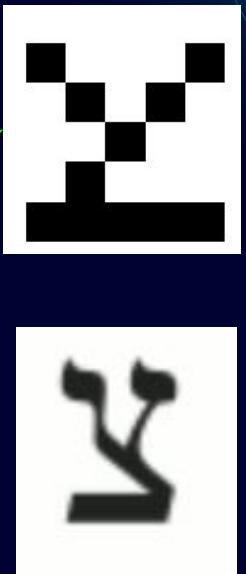
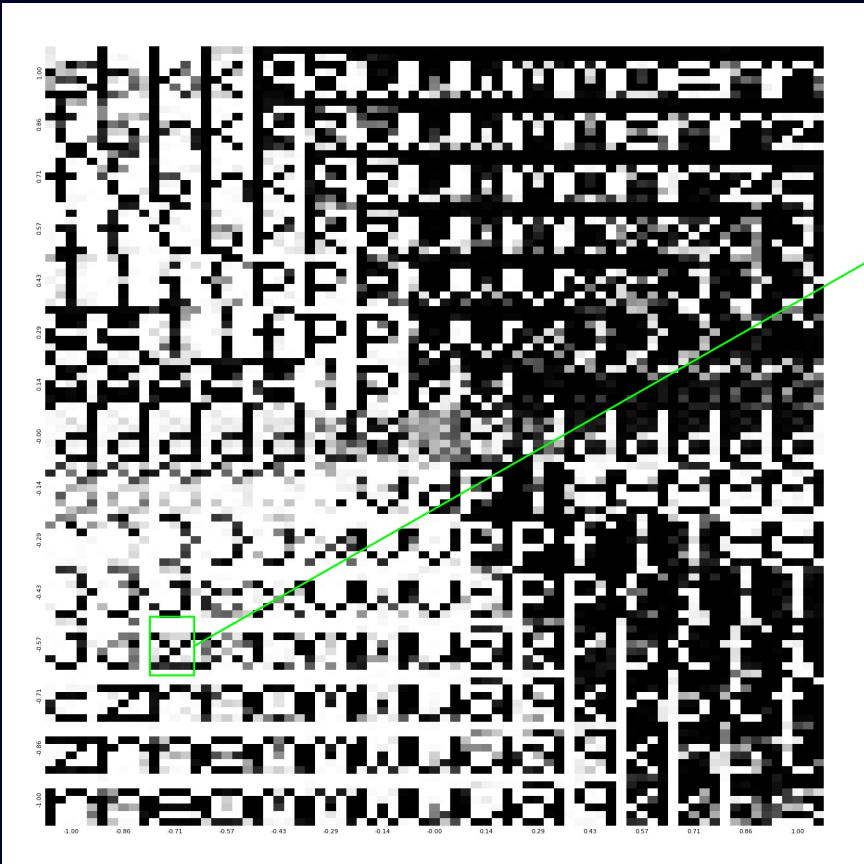
Espacio Latente

Layers: 30, 25, 25, 15
Epsilon: 3 (Discrete)
Optimizer: adam
Batch size: 12
LR: 0.001
LR Decay: 0.9999
Min LR: 0.000001
Beta: 2

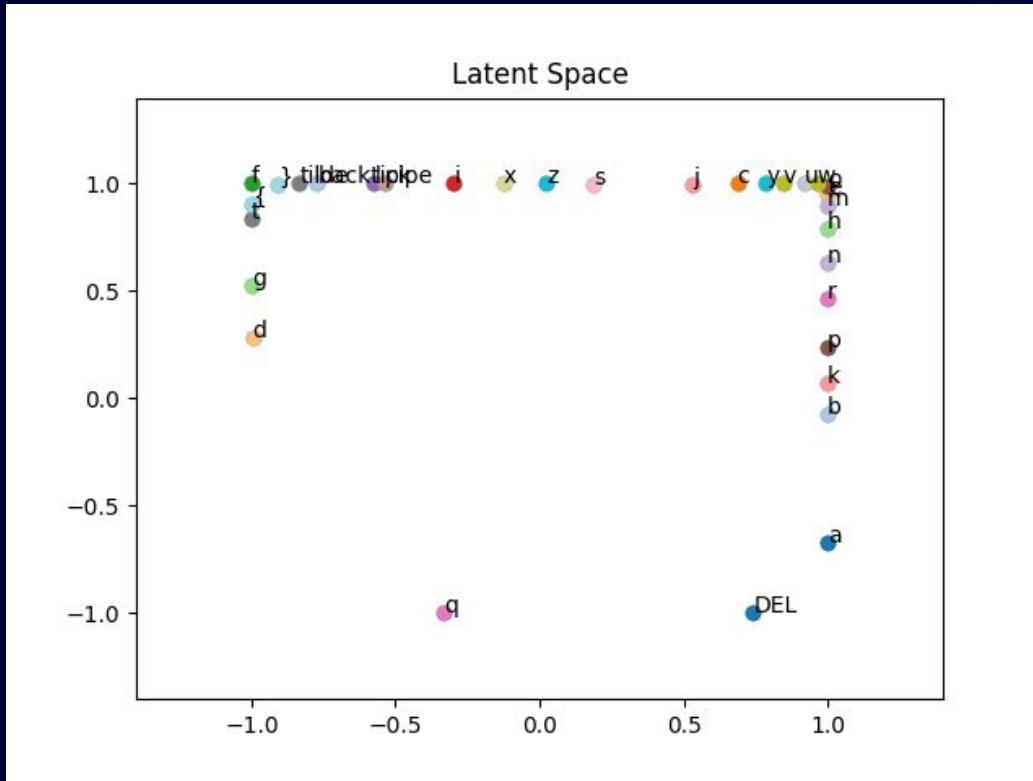


Letras nuevas

Layers: 30, 25, 25, 15
Epsilon: 3 (Discrete)
Optimizer: adam
Batch size: 12
LR: 0.001
LR Decay: 0.9999
Min LR: 0.000001
Beta: 2



Espacio Latente



Layers: 30, 25, 25, 25, 15

Epsilon: 3 (Discrete)

Optimizer: adam

Batch size: 12

LR: 0.001

LR Decay: 0.9999

Min LR: 0.000001

Beta: 2

Letras nuevas

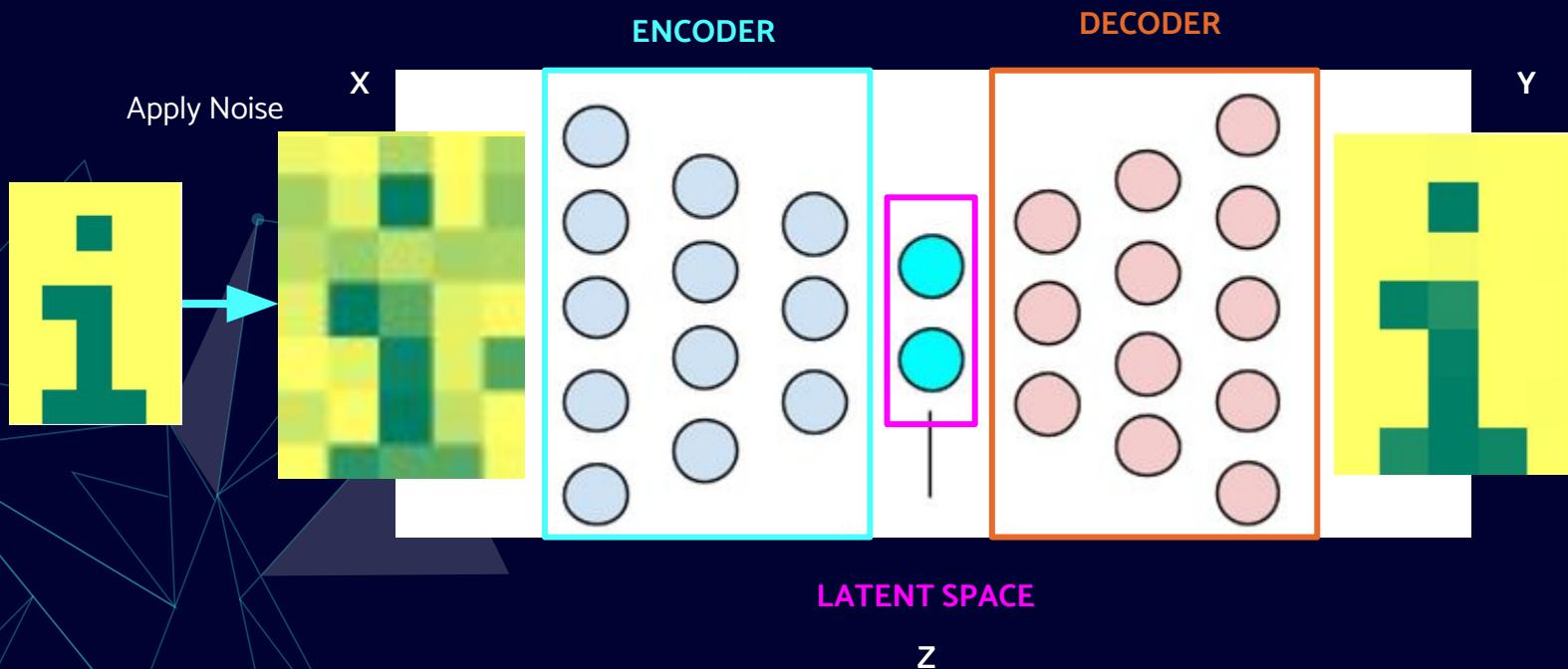
Layers: 30, 25, 25, 25, 15
Epsilon: 3 (Discrete)
Optimizer: adam
Batch size: 12
LR: 0.001
LR Decay: 0.9999
Min LR: 0.000001
Beta: 2



1.2

Denoising Autoencoder

Arquitectura Denoiser



Exceso de ruido en entrenamiento

Set entrenamiento = Letras normales + [0.15, 0.3, 0.5] * Letras Normales

Layers: 32, 16, 8

Epsilon: 10

Optimizer: adam

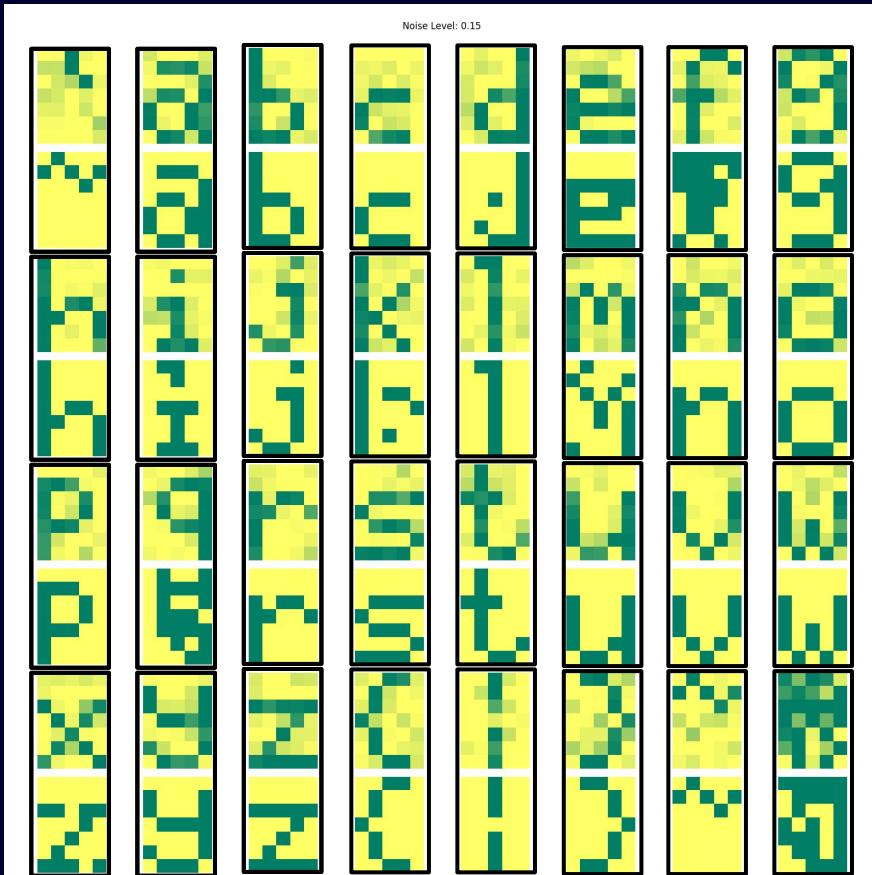
Batch size: 32

LR: 0.001

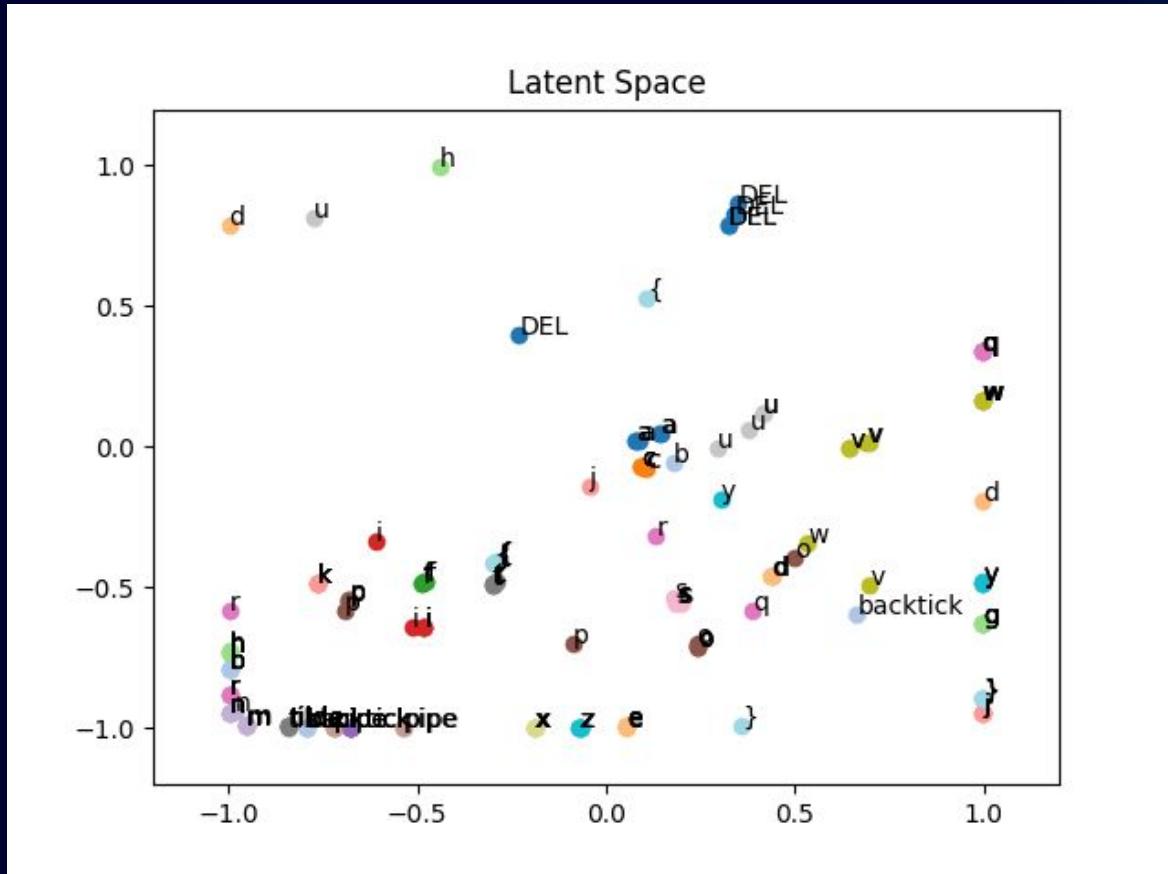
LR Decay: 0.9999

Min LR: 0.000001

Noise Level 0.15



Espacio Latente



Error de entrenamiento elevado

Set entrenamiento = Letras normales + [0.15, 0.3, 0.5]*Letras Normales

Layers: 32, 16, 8

Epsilon: 500

Optimizer: adam

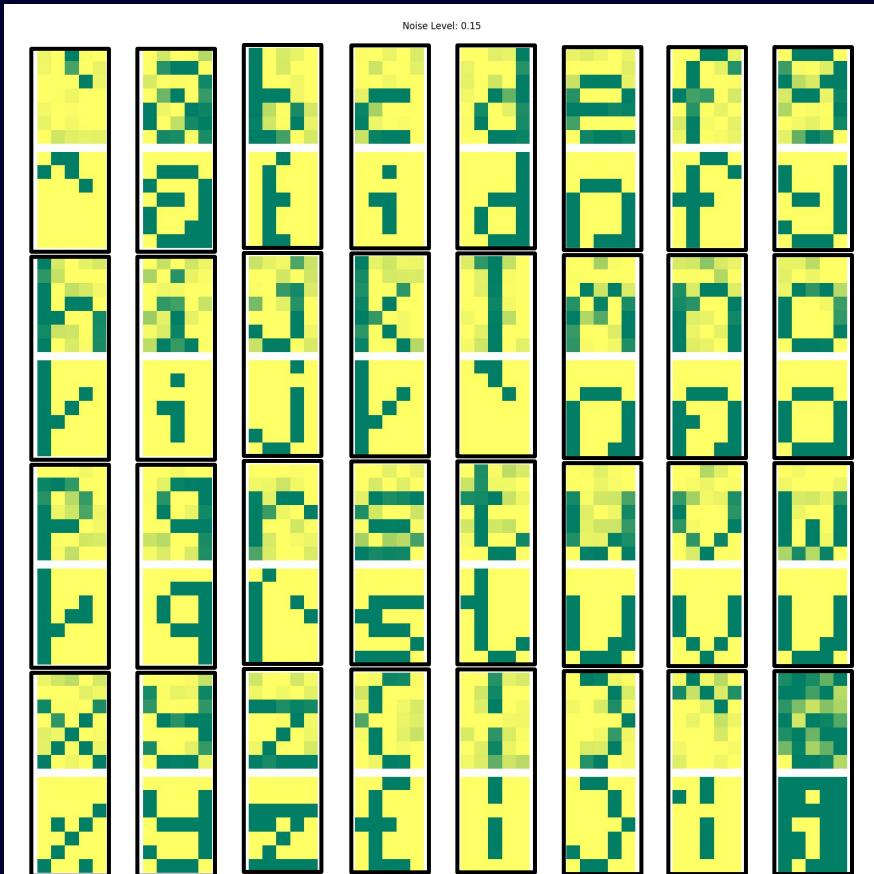
Batch size: 32

LR: 0.001

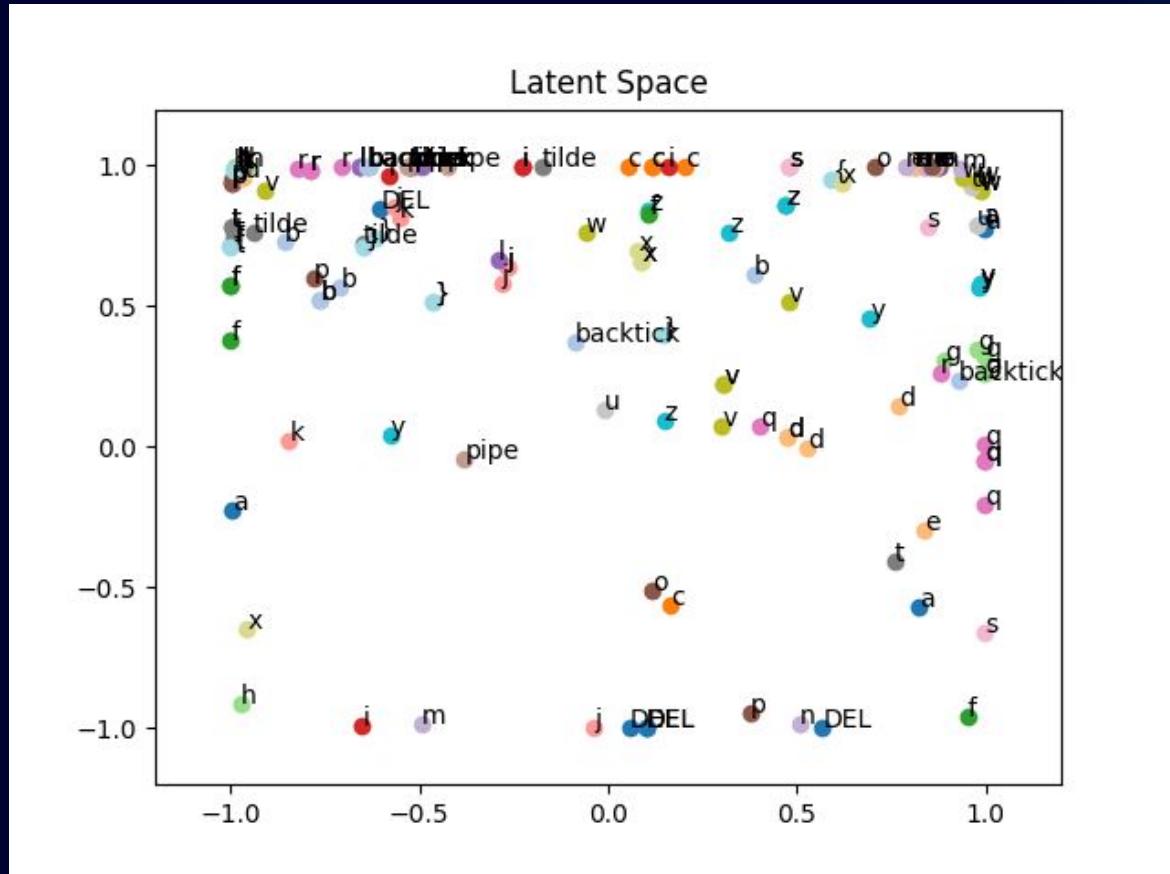
LR Decay: 0.9999

Min LR: 0.000001

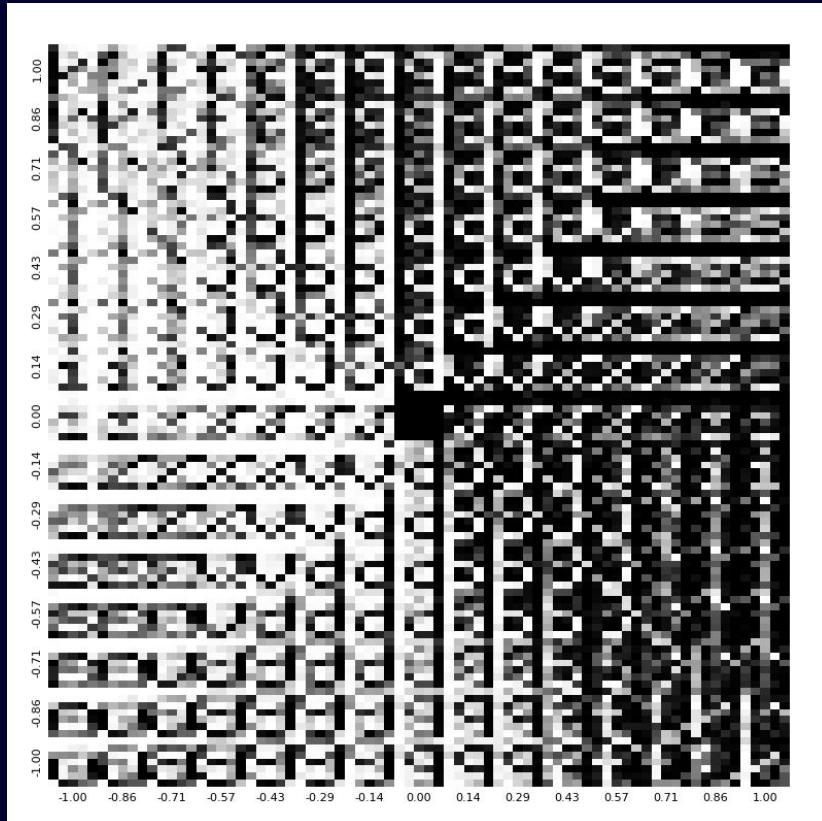
Noise Level 0.15



Espacio Latente



Espacio Latente



Entrenamiento con ruido progresivo

Set entrenamiento = Letras normales + [0.05, 0.10, ..., 0.45, 0.50]*Letras Normales

Layers: 30, 30, 30, 15

Epsilon: 10

Optimizer: adam

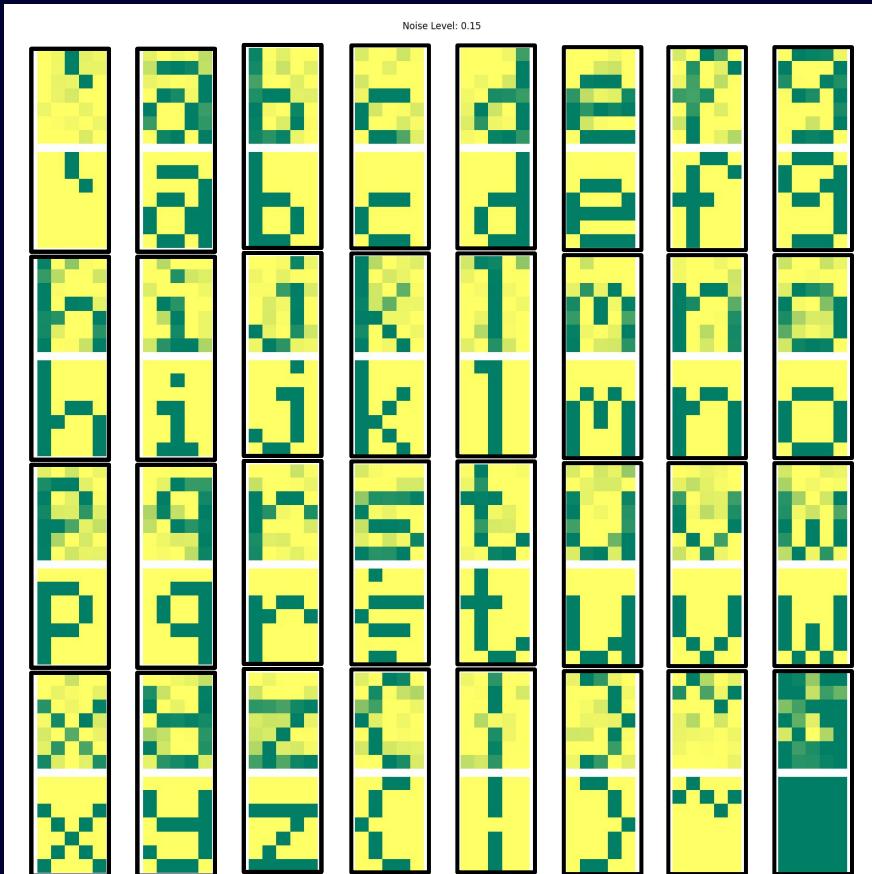
Batch size: 32

LR: 0.001

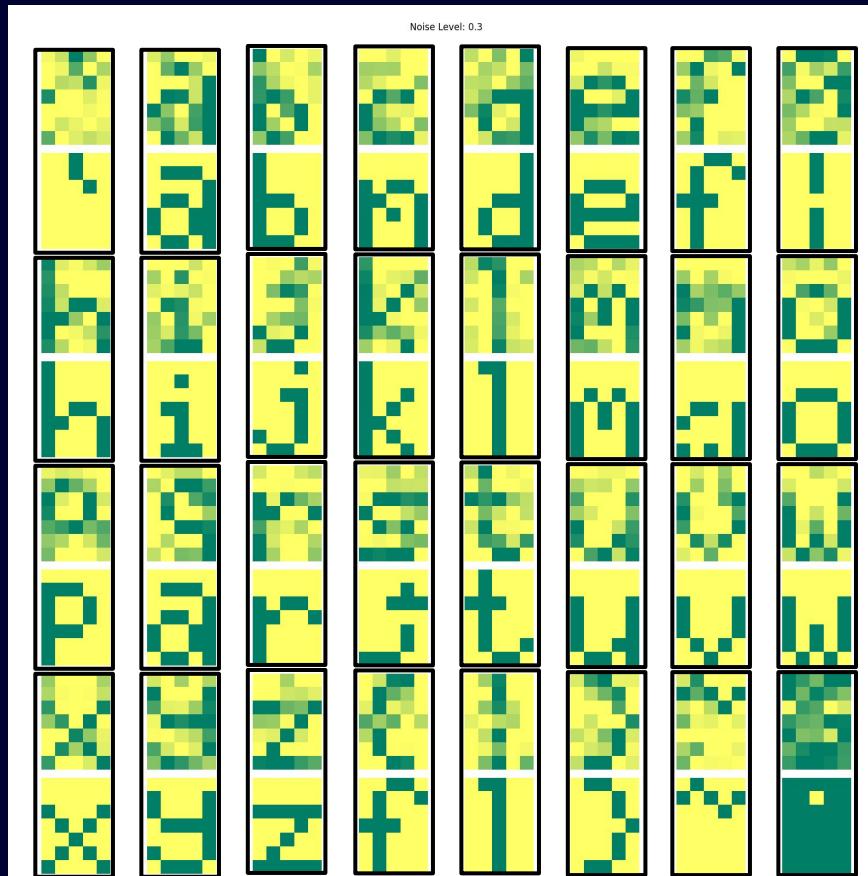
LR Decay: 0.9999

Min LR: 0.000001

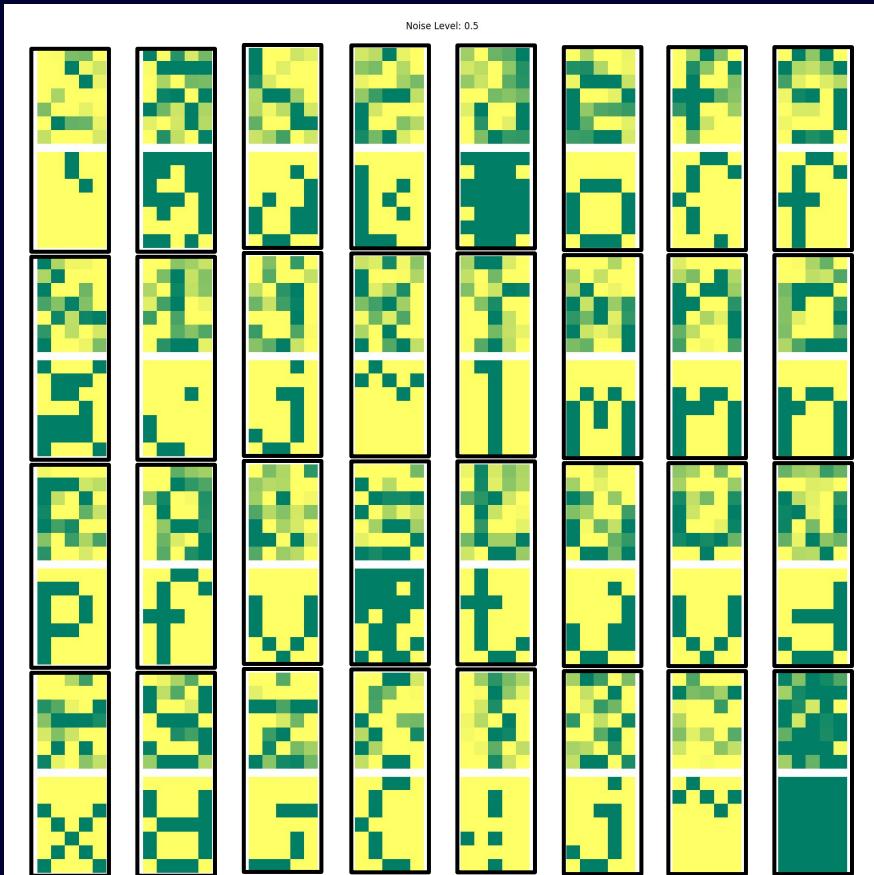
Noise Level 0.15



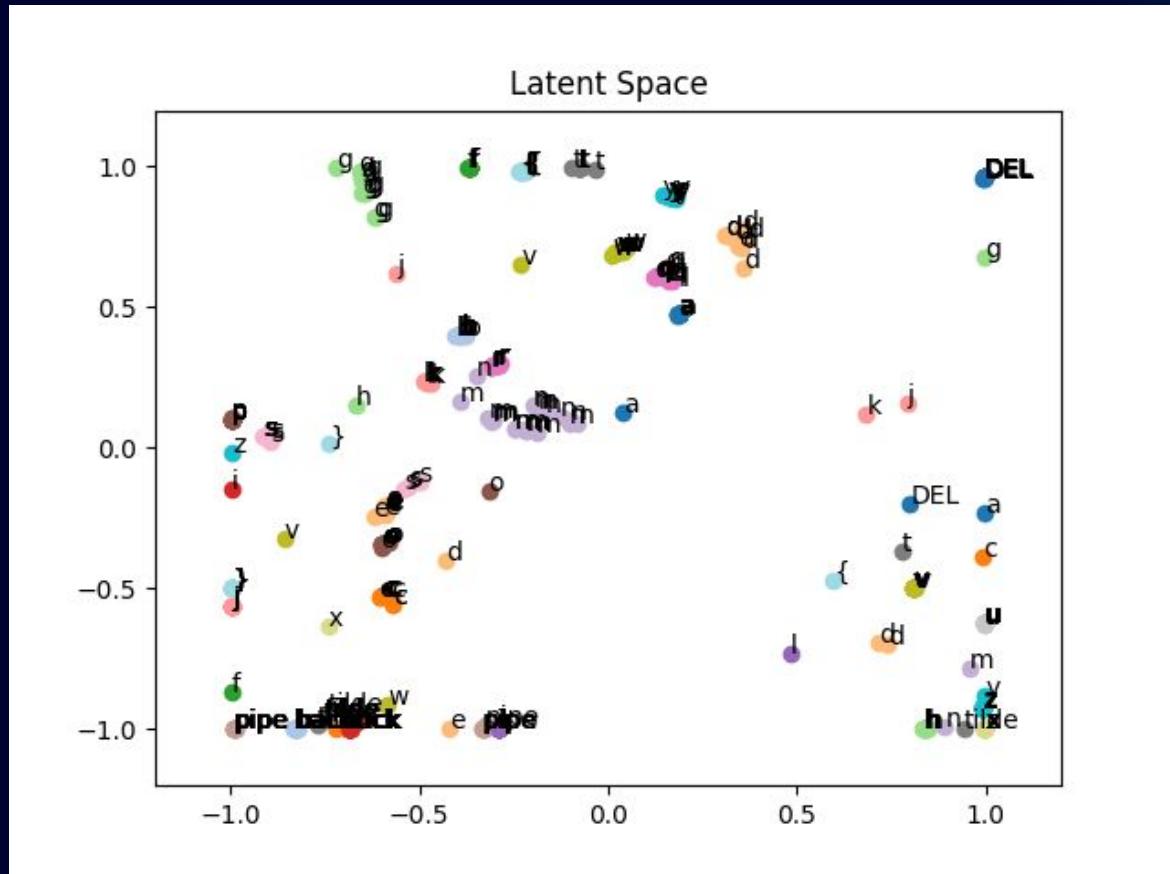
Noise Level 0.3



Noise Level 0.5



Espacio Latente



Output Grid



2

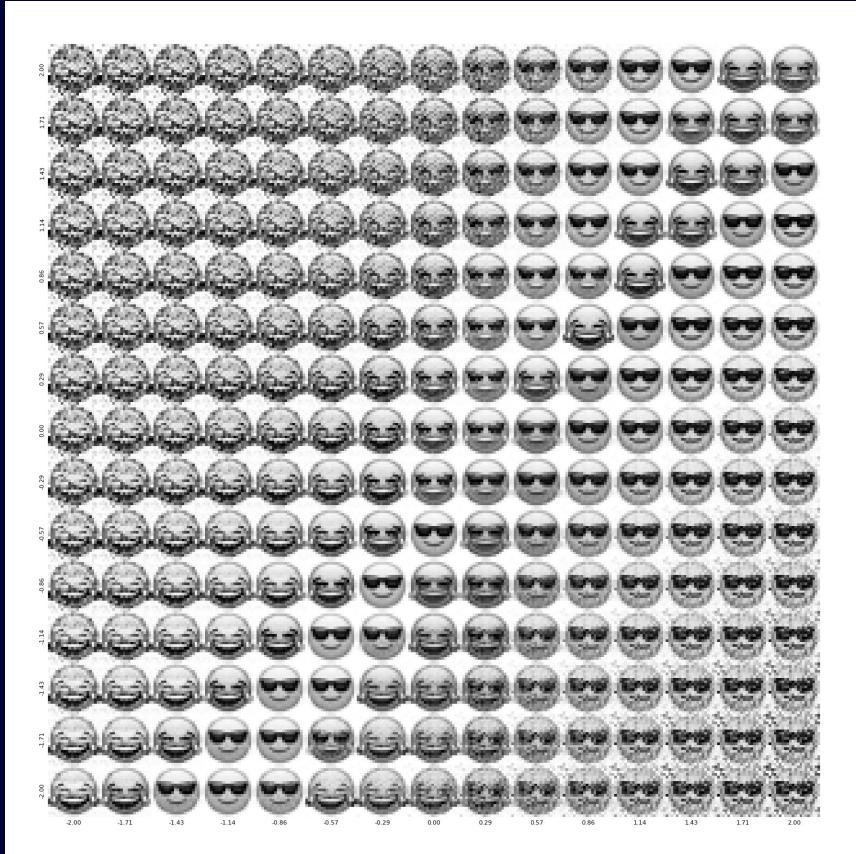
VAE



Emojis seleccionados

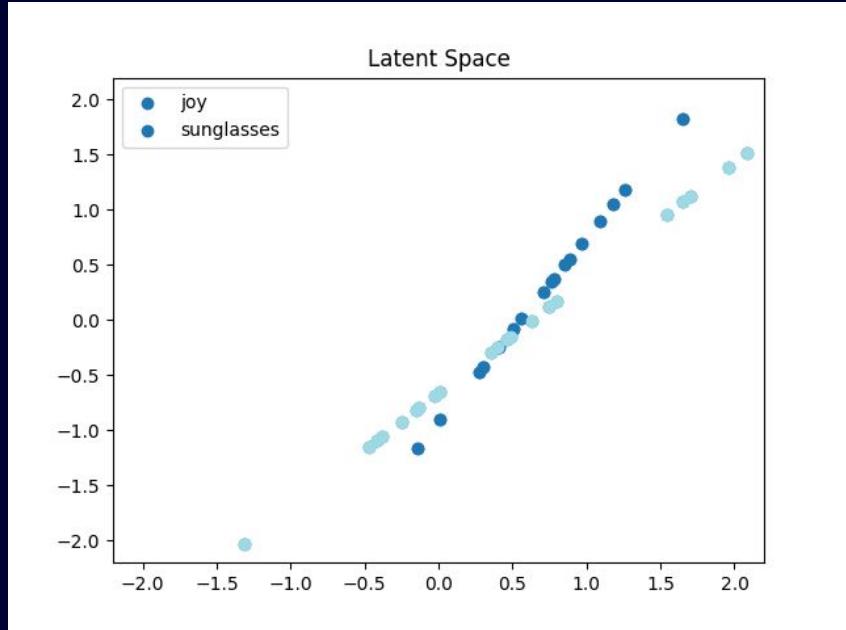


Joy - Sunglasses

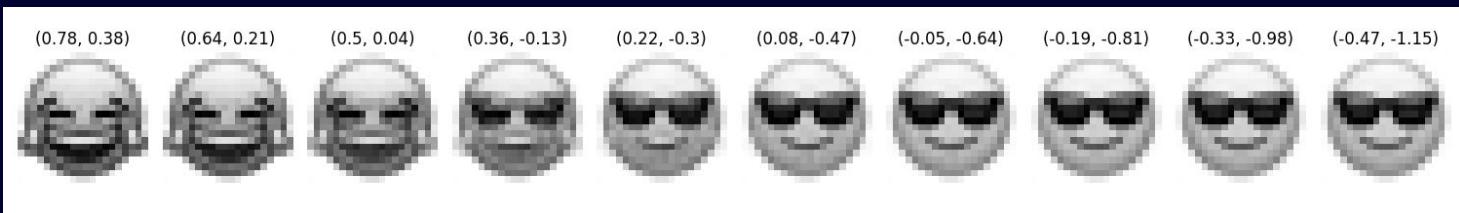
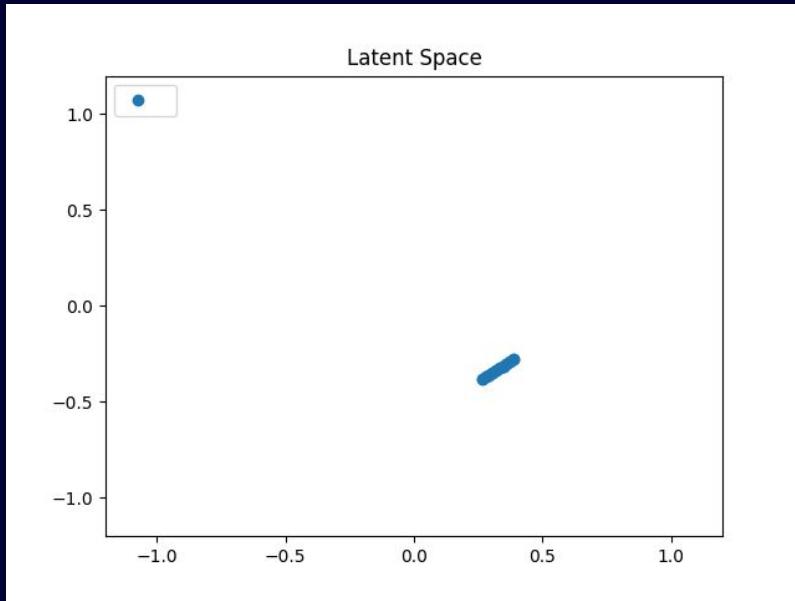


Layers: [250, 225]
Optimizer: adam
Batch size: 2
LR: 0.001
LR Decay: 0.9999
Min LR: 0.000001
Error: 2.33

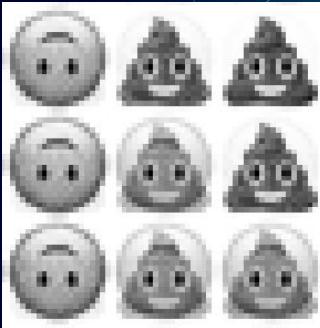
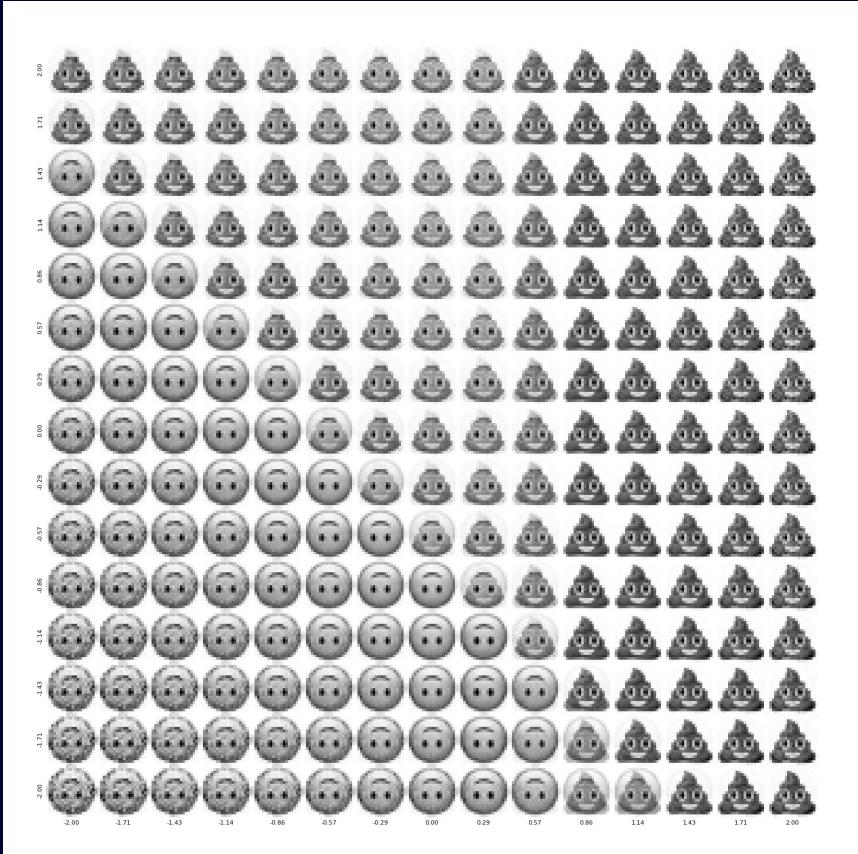
Joy - Sunglasses



Joy - Sunglasses

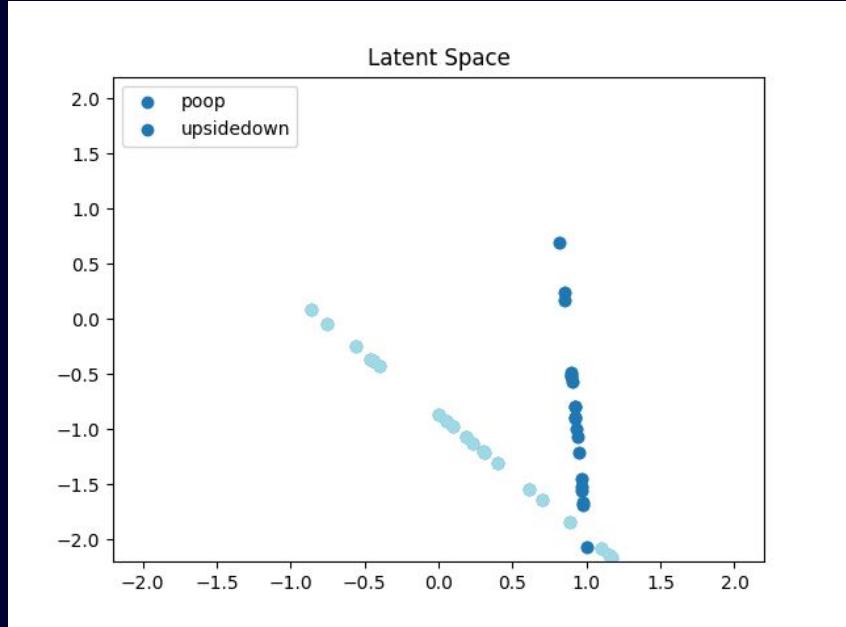


Poop - Upside down

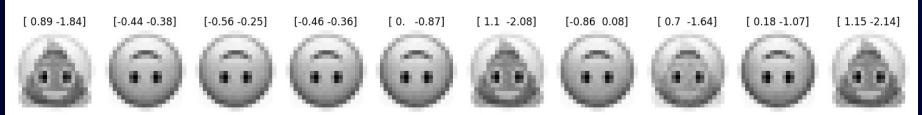
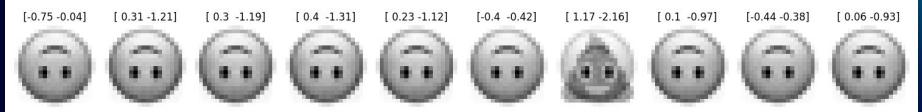


Layers: [300, 200, 100]
Optimizer: adam
Batch size: 2
LR: 0.001
LR Decay: 0.9999
Min LR: 0.000001
Error: 1.78

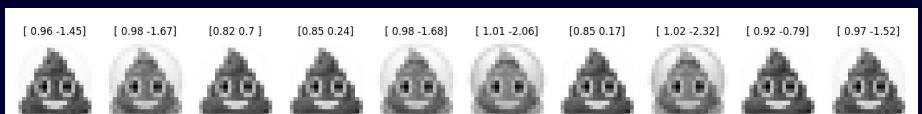
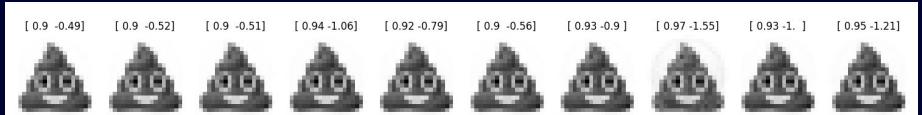
Poop - Upside down



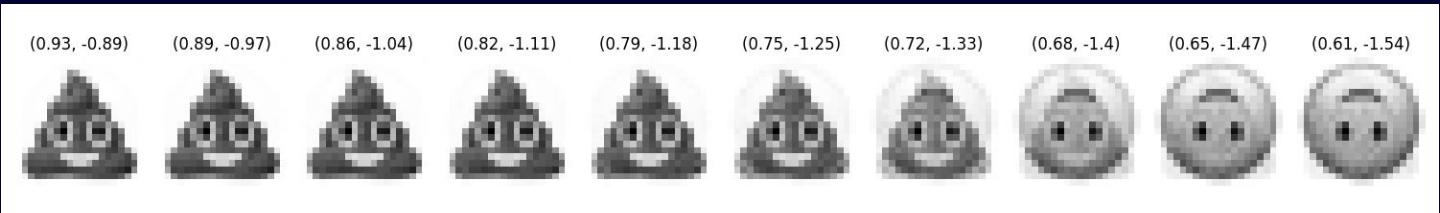
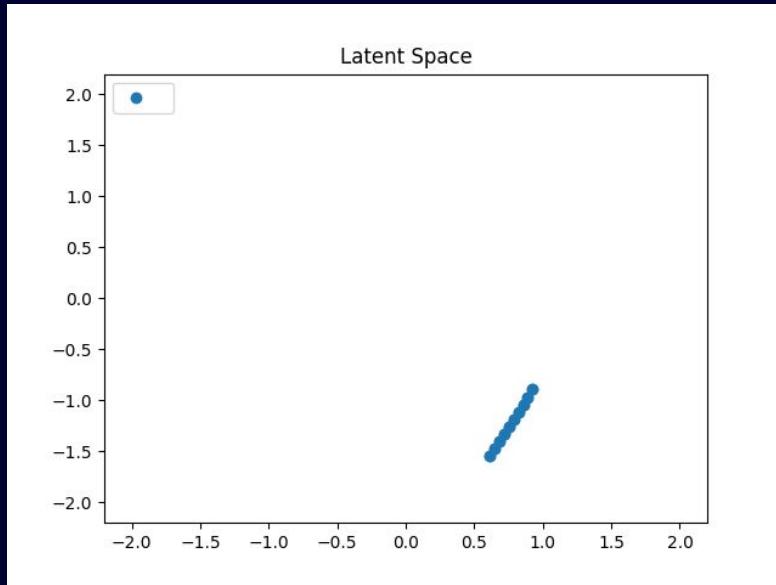
Upside down



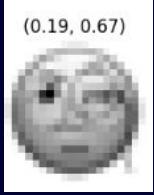
Poop



Poop - Upside down



Todos los emojis



Layers: 200, 150, 100

Error: 18.97

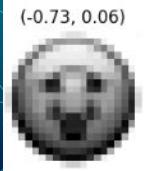
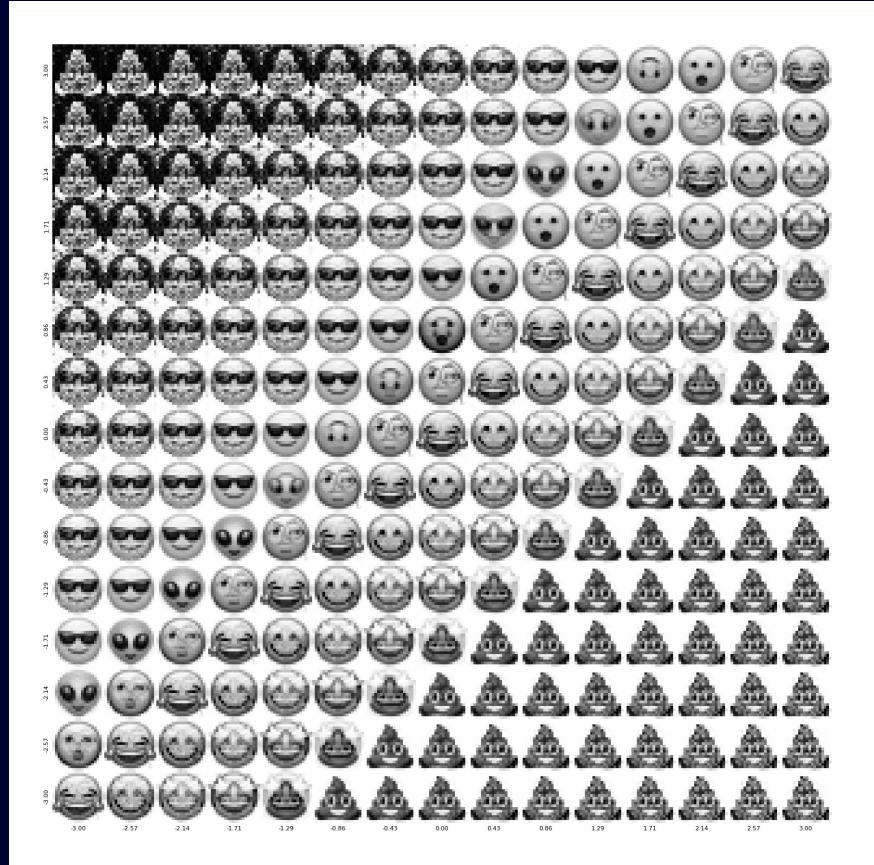
Optimizer: adam

Batch size: 8

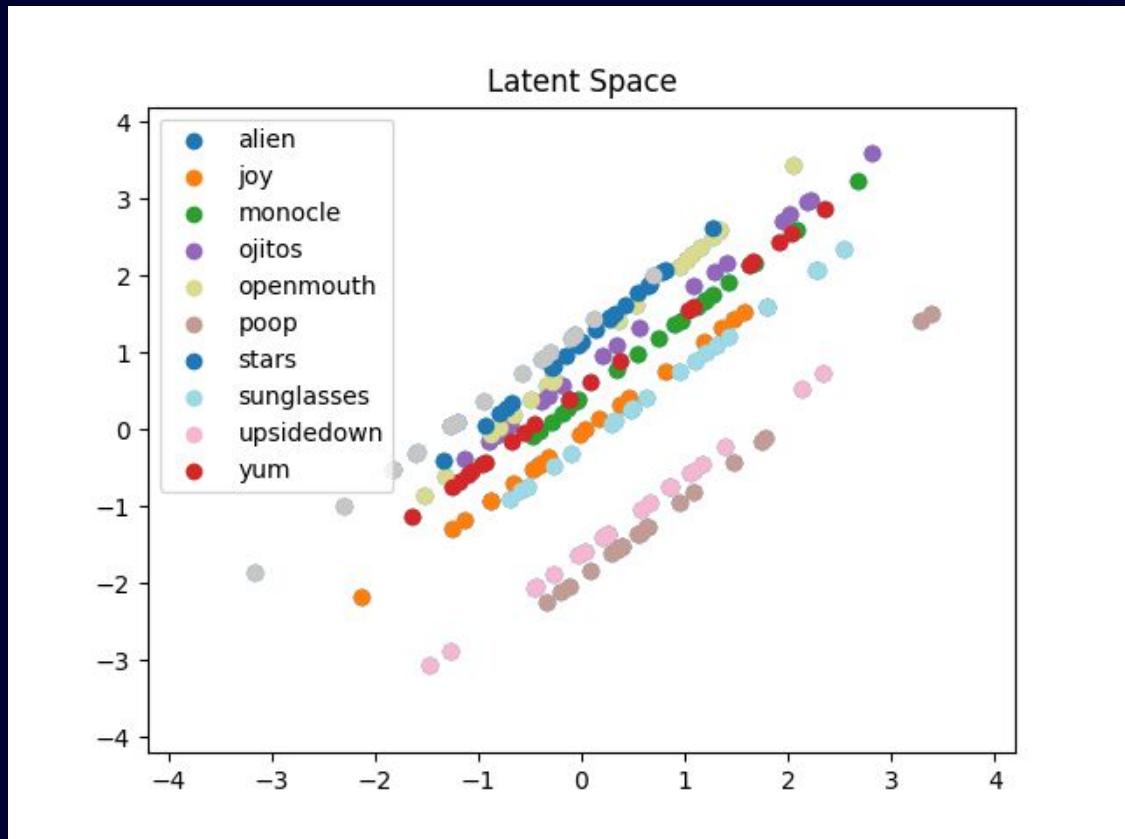
LR: 0.001

LR Decay: 0.999

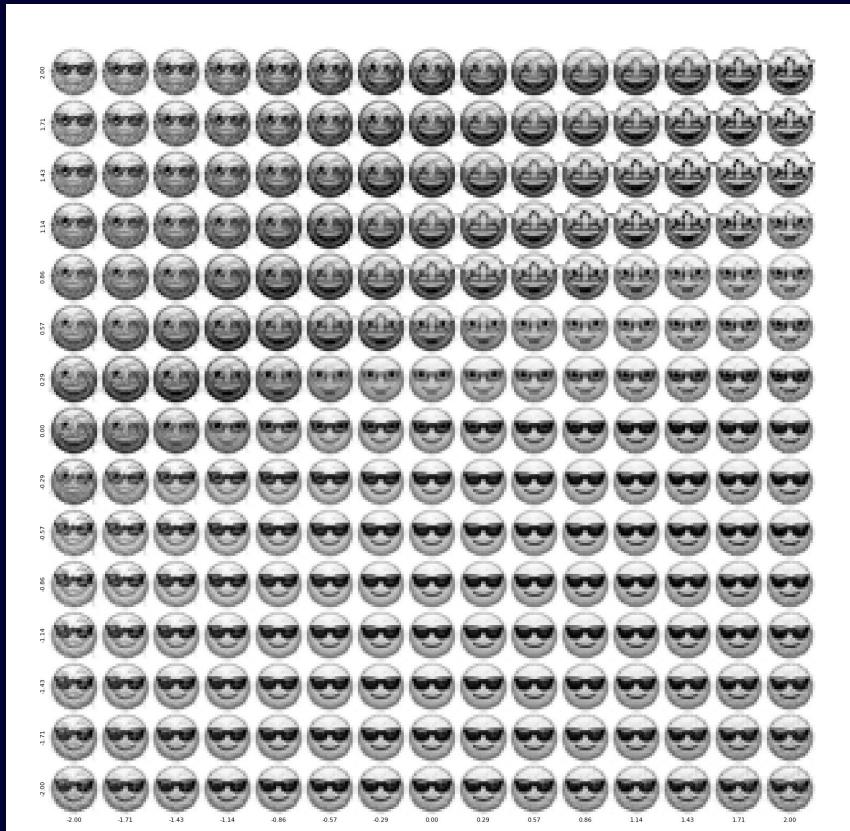
Min LR: 0.00001



Todos los emojis



Solo Caras



Layers: 250, 225, 100

Error: 28.38

Optimizer: adam

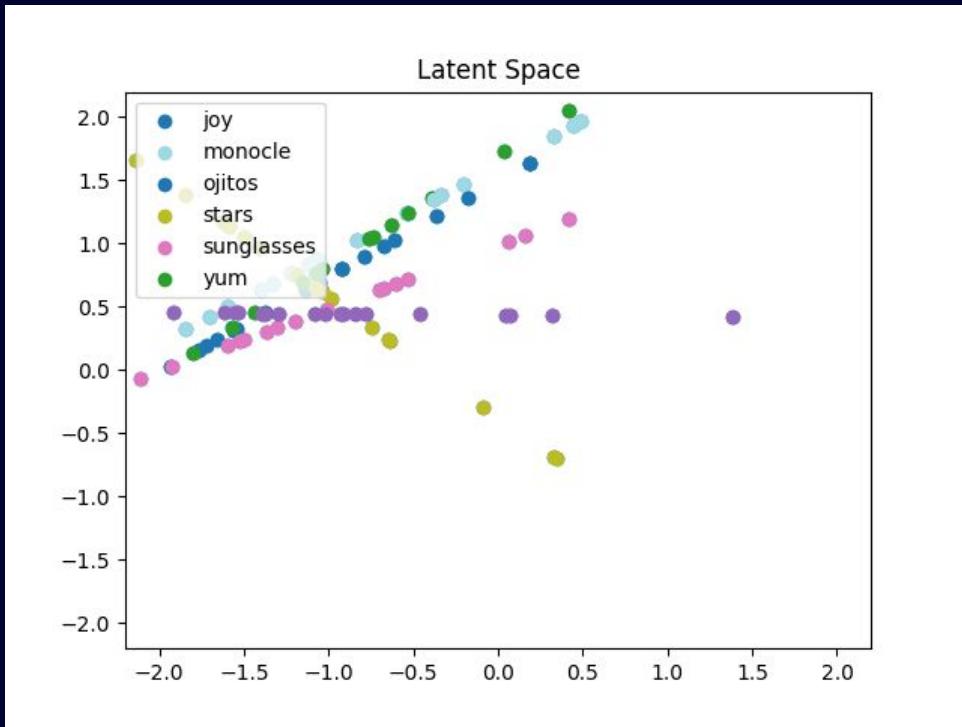
Batch size: 8

LR: 0.001

LR Decay: 0.999

Min LR: 0.00001

Solo Caras



Layers: 250, 225, 100

Error: 28.38

Optimizer: adam

Batch size: 8

LR: 0.001

LR Decay: 0.999

Min LR: 0.00001

Conclusiones

- La arquitectura es fundamental para que cualquiera de los algoritmos permita obtener algún resultado que no sea ruido.
- Qué ejemplares con ruido se toman para el entrenamiento, puede cambiar totalmente el desempeño del DAE
- El VAE es útil para resolver la conquista del espacio latente y puede generar emojis que son fácilmente interpretables como tales. Sin embargo, algunas de las cosas que genera no lo son tanto.
- Si bien el VAE es bueno para generar nuevas combinaciones, puede ser peor que el auto-encoder normal como función de identidad (debido al azar)

Gracias!

Preguntas?

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