

Autoencoders - Testes e Aplicações

CPE 727 - Aprendizado de Profundo

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Santos e Jefferson Osowsky**

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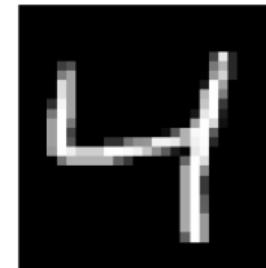
1 Denoising Autoencoder

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Dataset

1 Denoising Autoencoder

MNIST Dataset



Noisy MNIST Dataset

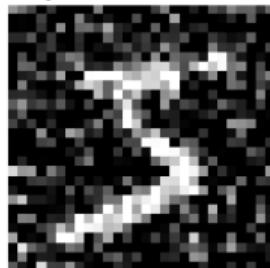


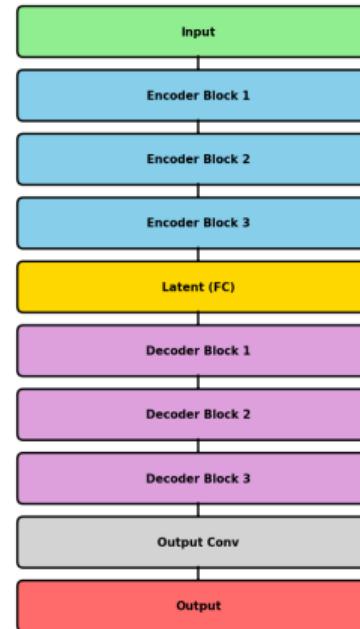
Figura: Imagens do MNIST e Noisy MNIST. Ruído Gaussiano com 0.3 de desvio padrão.

Modelo

1 Denoising Autoencoder

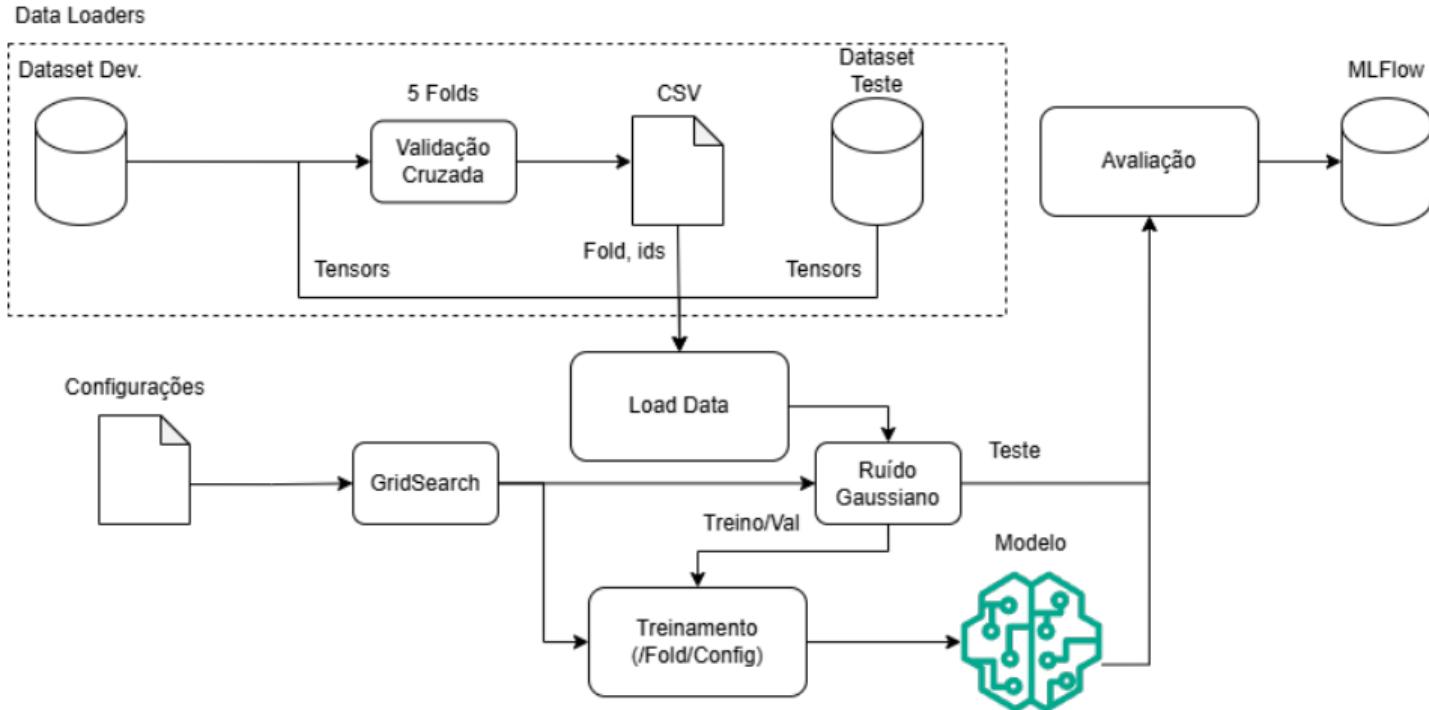
- Input: imagens 28x28x1 (Noisy MNIST)
- Encoder:
 - 3 Camadas Convolucionais (Kernel 3x3 e Stride 1)
 - BatchNorm
 - ReLU
 - MaxPooling(Kernel 2x2, Stride 2)
- Decoder:
 - 2 Camadas Convolucionais T. (Kernel 3x3 e Stride 2)
 - BatchNorm
 - ReLU
 - Camada Convolucional T. Final (Kernel 3x3, Stride 1)
 - Sigmoid

Denoising Autoencoder Architecture



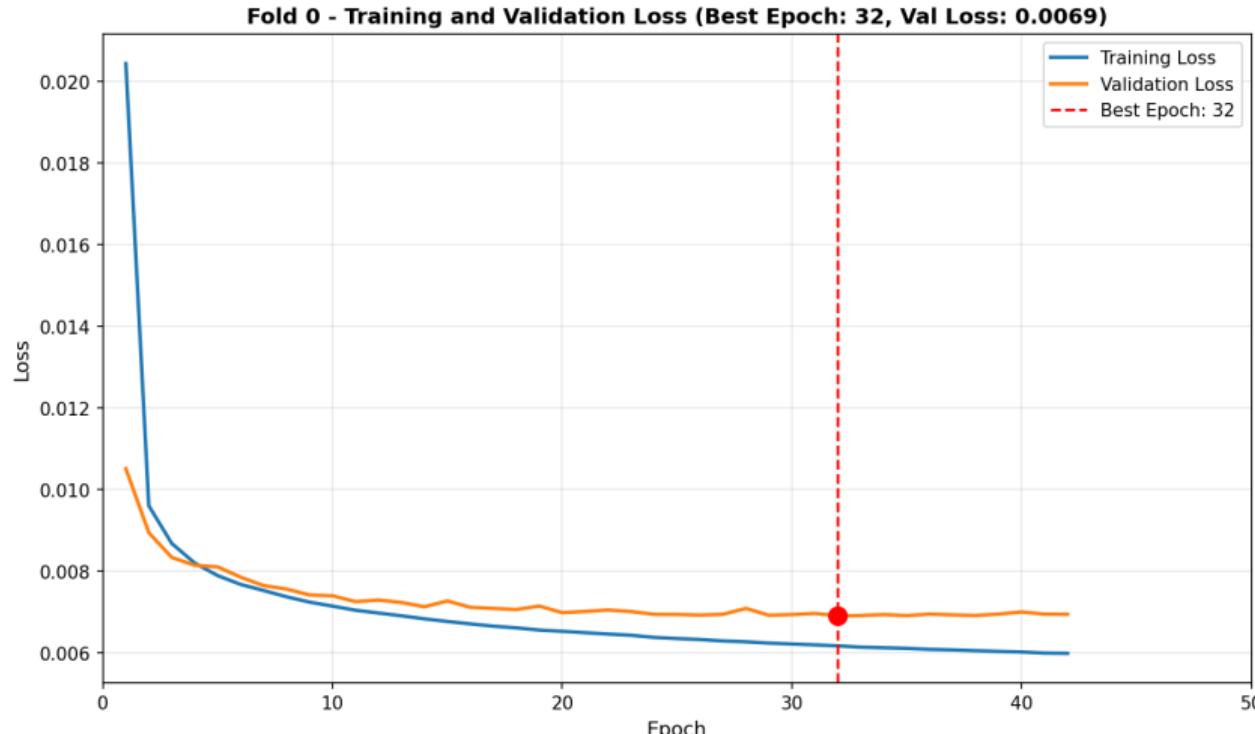
Metodologia

1 Denoising Autoencoder



Treinamento

1 Denoising Autoencoder



Resultado - Denoising

1 Denoising Autoencoder

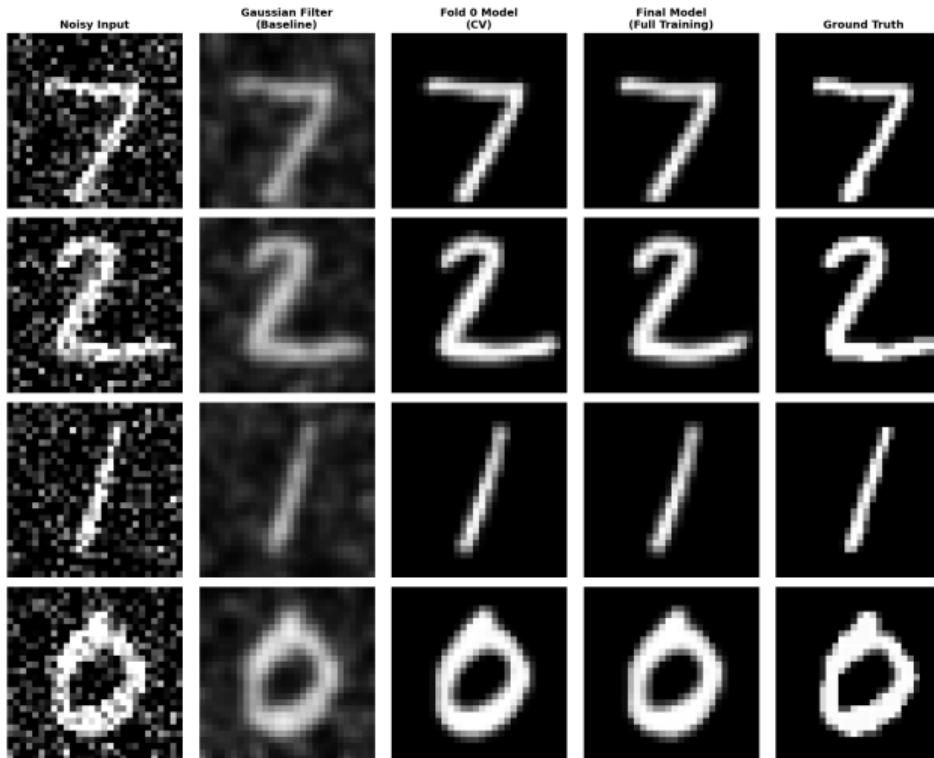


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Reuter Corpus V1

2 Reuter Corpus com Autoencoder

- Coleção de 804.414 artigos de notícias da Reuters (1996-1997)
- 103 categorias de tópicos organizadas hierarquicamente
- Classificação multi-label: cada documento pode pertencer a múltiplas categorias
- Categorias abrangem temas como economia, política, esportes, tecnologia, etc.

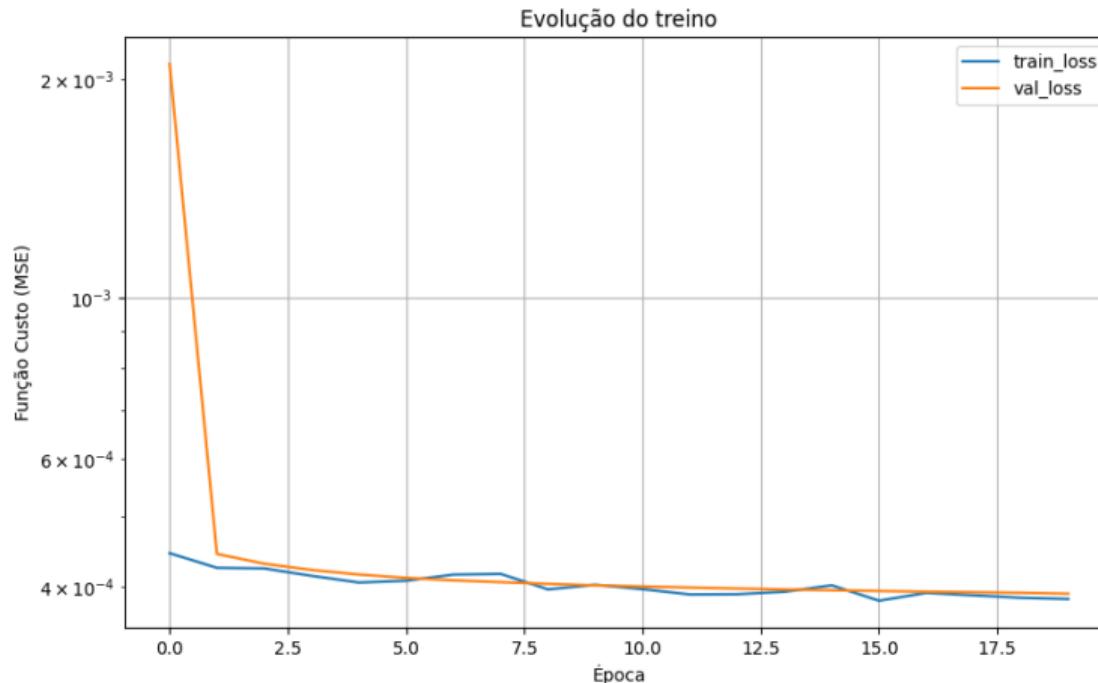
Método

2 Reuter Corpus com Autoencoder

- Objetivo: Replicar o plot do Hinton (2006)
- Autoencoder com mesma arquitetura (2000, 500, 250, 125, 2)
- Ativação linear na camada do espaço latente, e Leaky ReLU nas demais
- Otimização com AdamW, sem pré-treino

Evolução do treino

2 Reuter Corpus com Autoencoder



Resultado

2 Reuter Corpus com Autoencoder

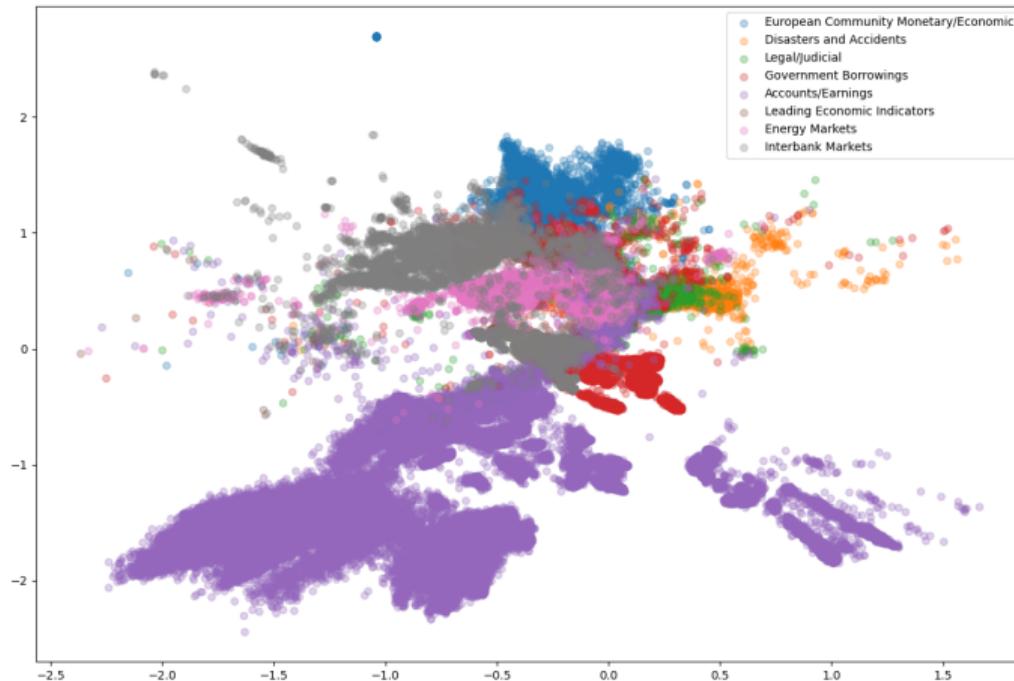


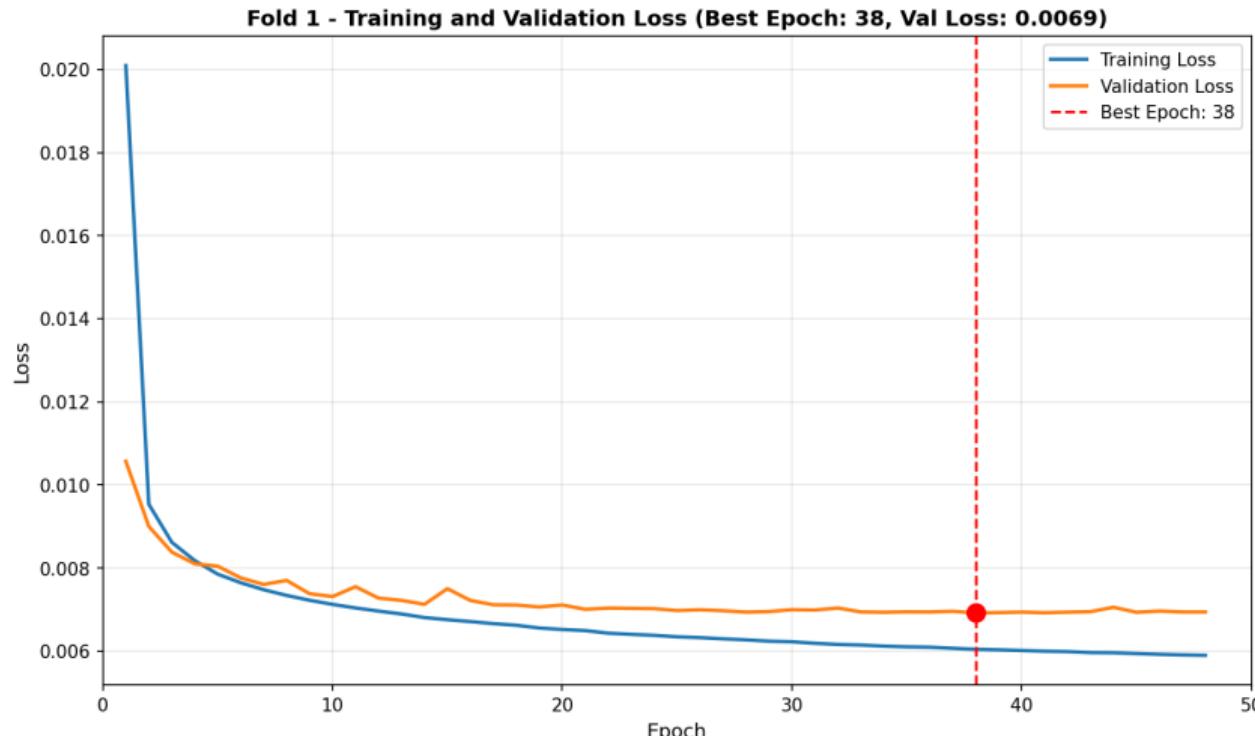
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Treinamento

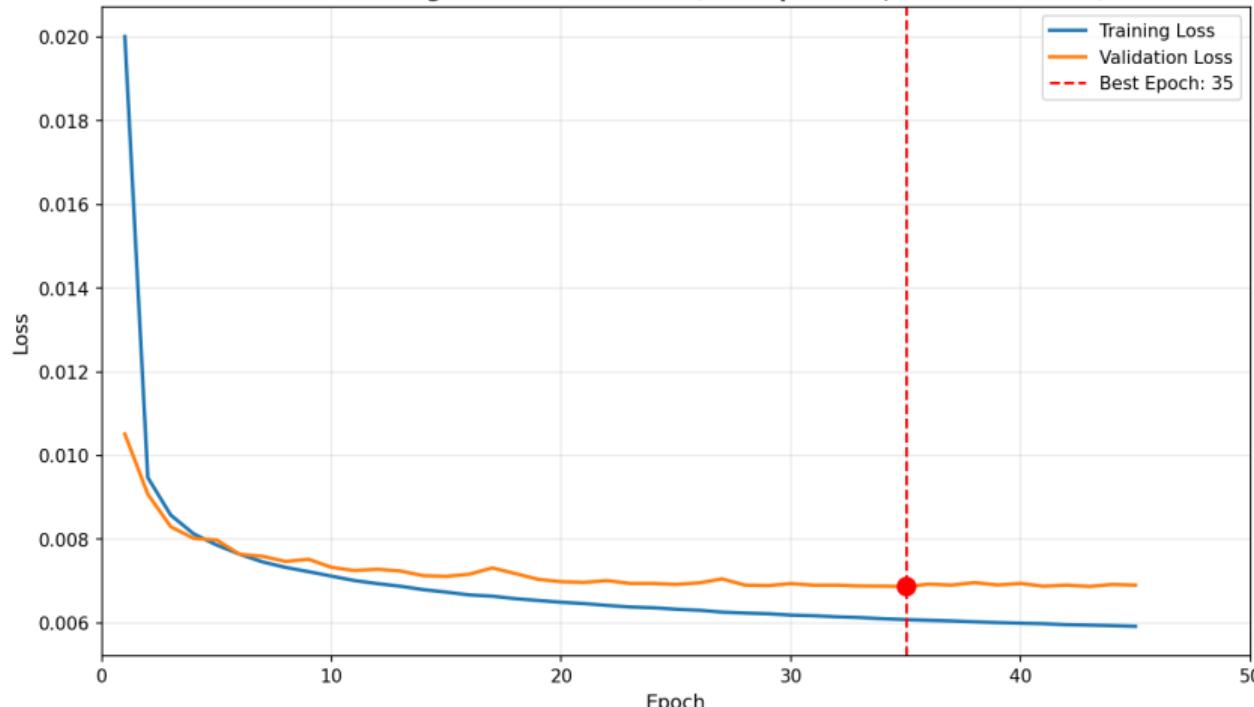
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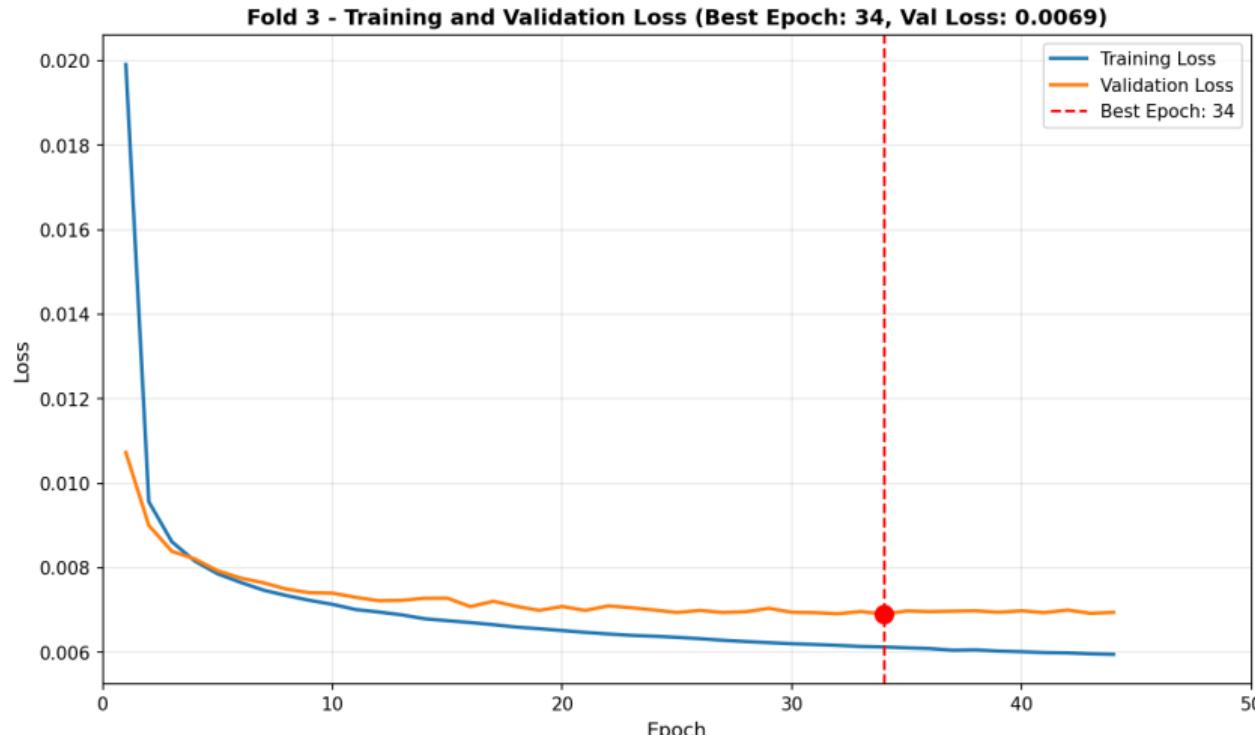
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Fold 2 - Training and Validation Loss (Best Epoch: 35, Val Loss: 0.0069)



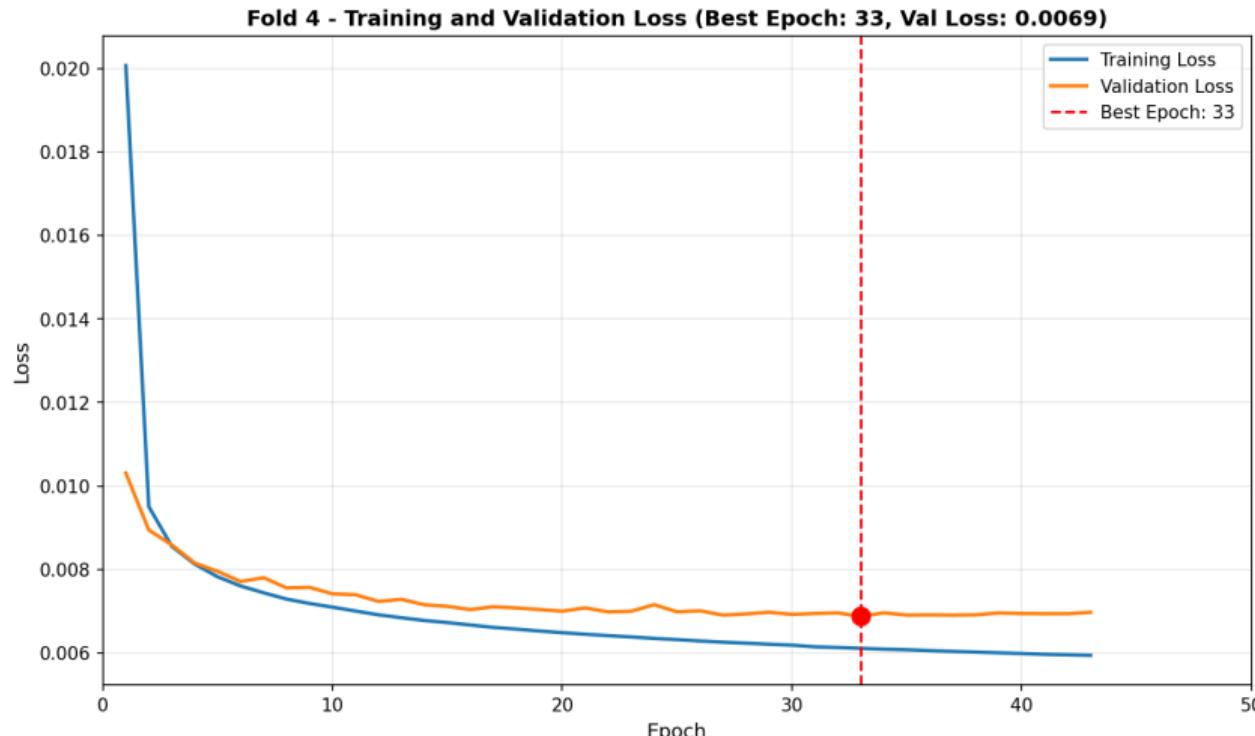
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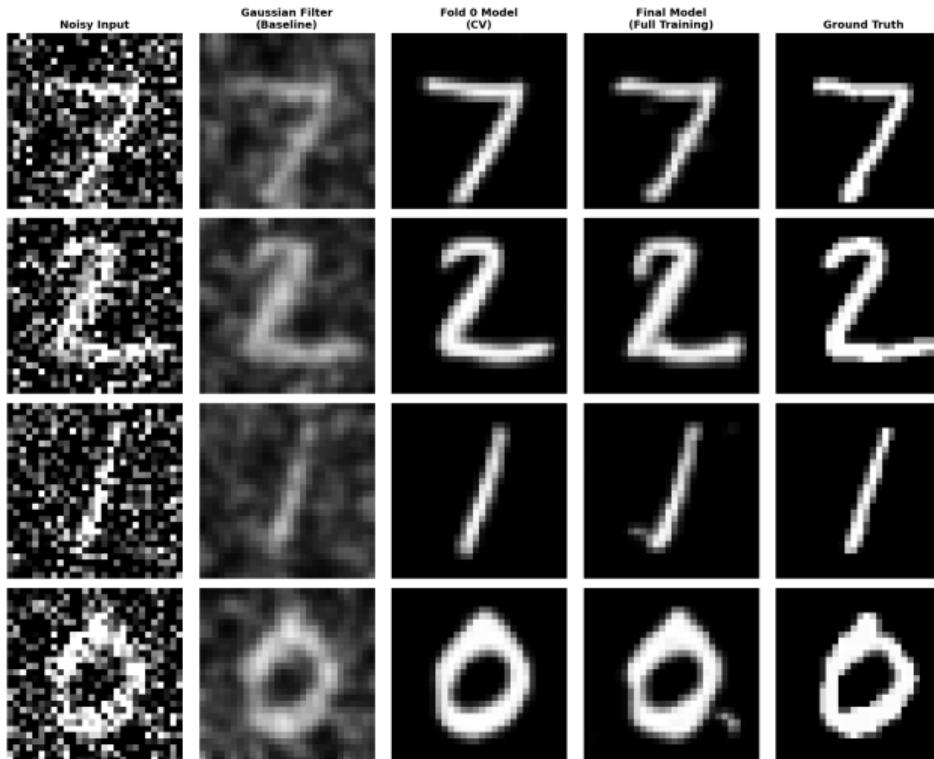
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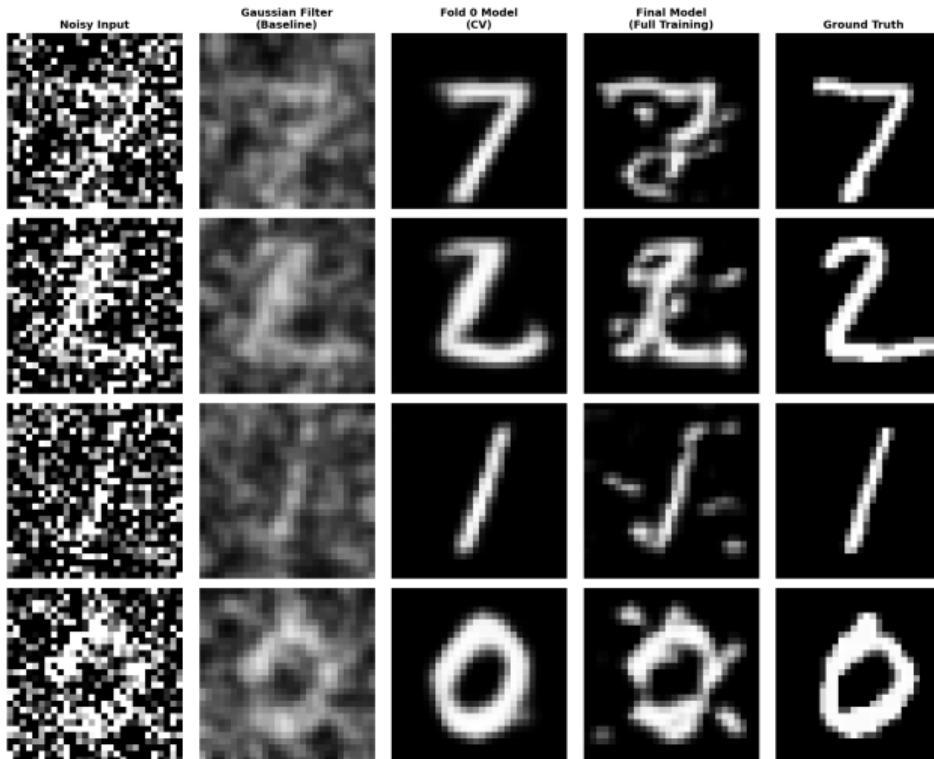
Resultado - Denoising

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Resultado - Denoising

3 Anexos



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*Obrigado pela Atenção!
Alguma Pergunta?*

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