

Autoencoders - Testes e Aplicações

CPE 727 - Aprendizado de Profundo

**Felipe Fink Grael, Rafael Tadeu Cardoso dos Santos, Thalles Nonato Leal
Santos e Jefferson Osowsky**

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Table of Contents

1 Denoising Autoencoder

► Denoising Autoencoder

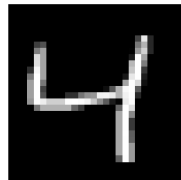
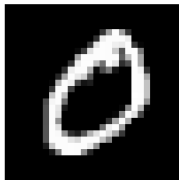
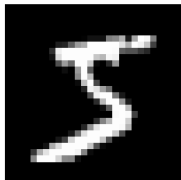
► Reuter Corpus com Autoencoder

► Anexos

Dataset

1 Denoising Autoencoder

MNIST Dataset



Noisy MNIST Dataset

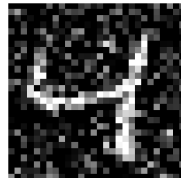
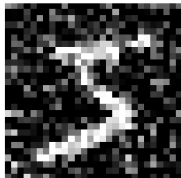


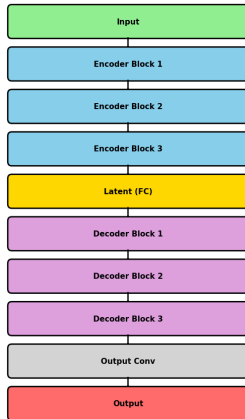
Figura: Imagens do MNIST e Noisy MNIST. Ruído Gaussiano com 0.3 de desvio padrão.

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 Convolutacional T. Final (Kernel 3x3, Stride 1)
 - Sigmoid

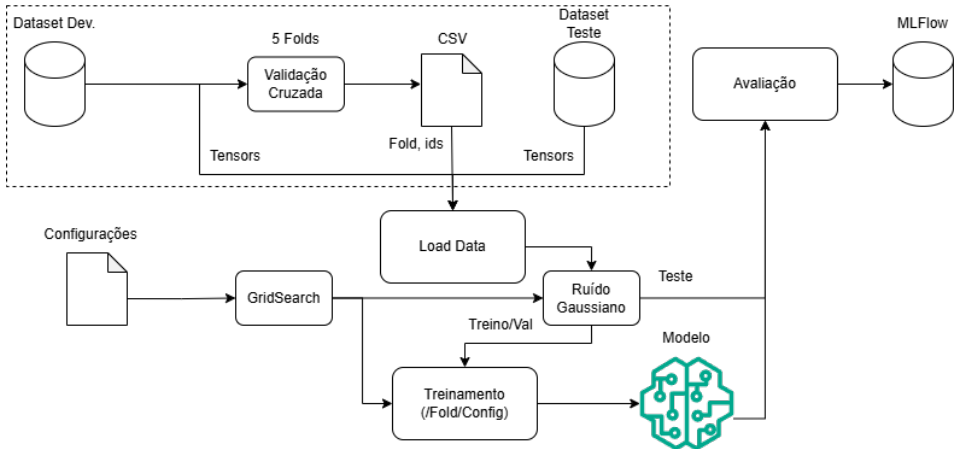
Denoising Autoencoder Architecture



Metodologia

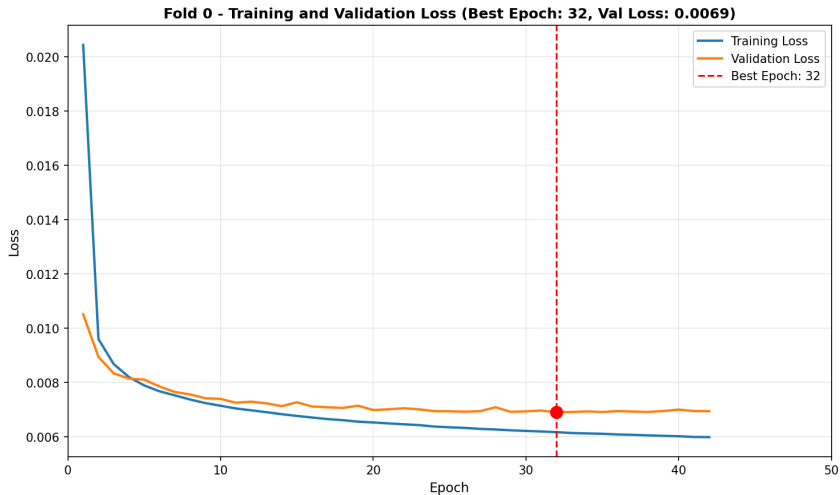
1 Denoising Autoencoder

Data Loaders



Treinamento

1 Denoising Autoencoder



Resultado - Denoising

1 Denoising Autoencoder

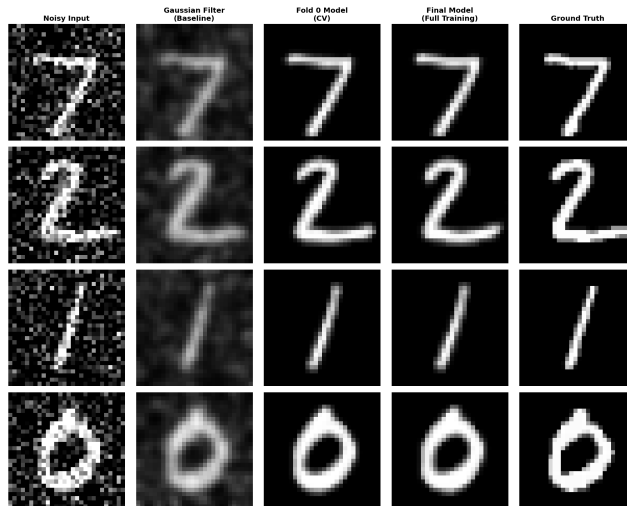


Table of Contents

2 Reuter Corpus com Autoencoder

► Denoising Autoencoder

► Reuter Corpus com Autoencoder

► Anexos

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.

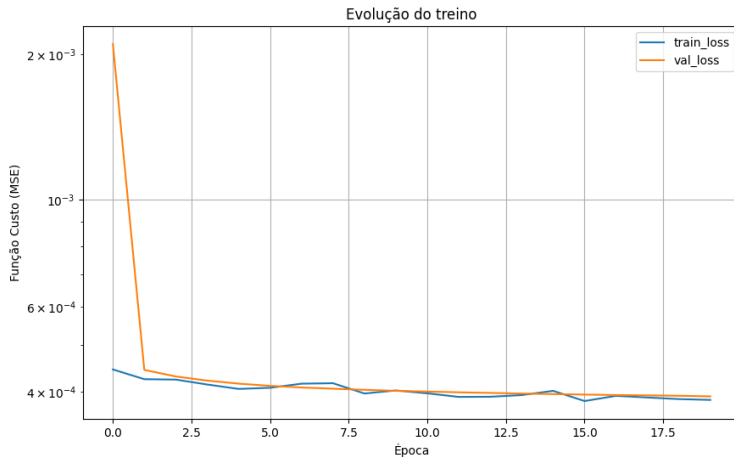
Método

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

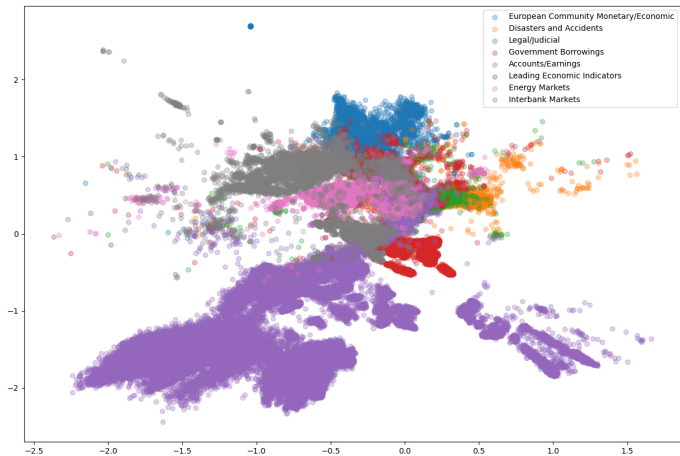


Table of Contents

3 Anexos

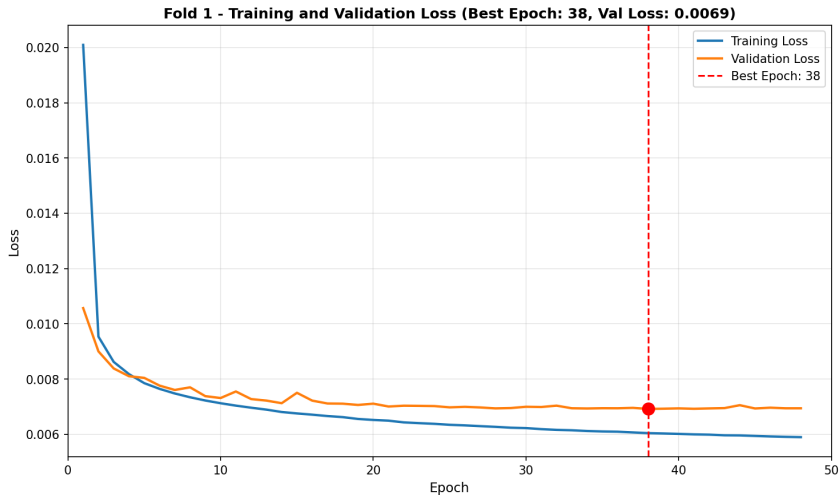
▶ Denoising Autoencoder

▶ Reuter Corpus com Autoencoder

▶ Anexos

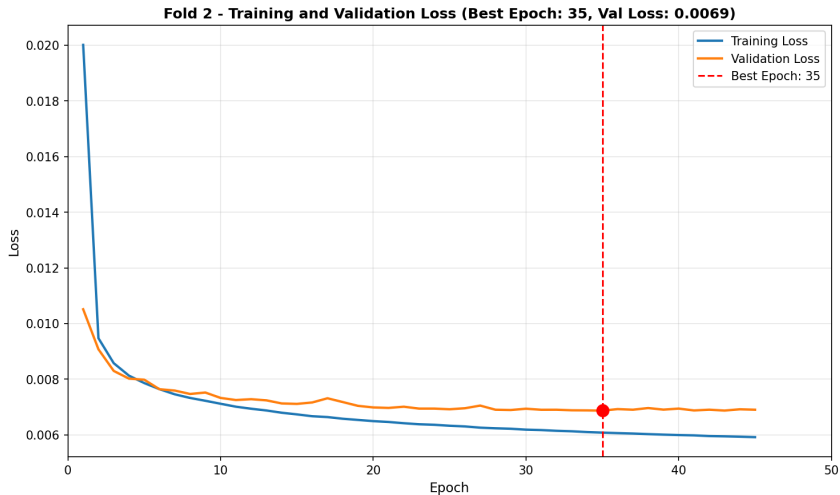
Treinamento

3 Anexos



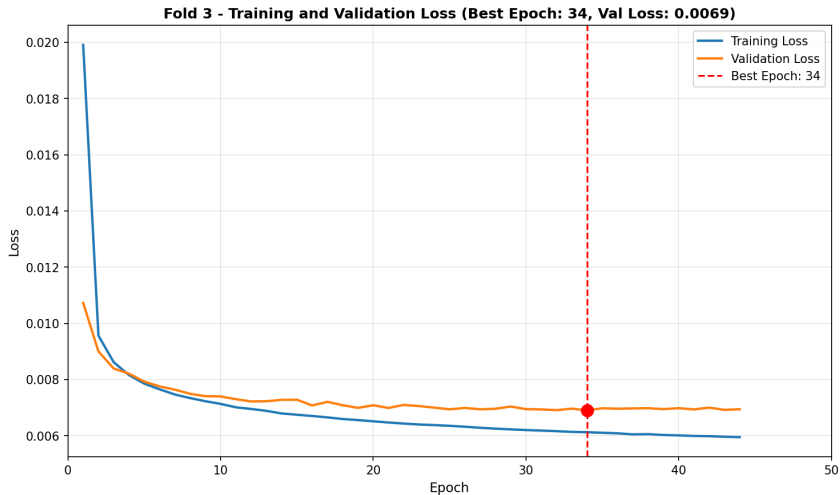
Treinamento

3 Anexos



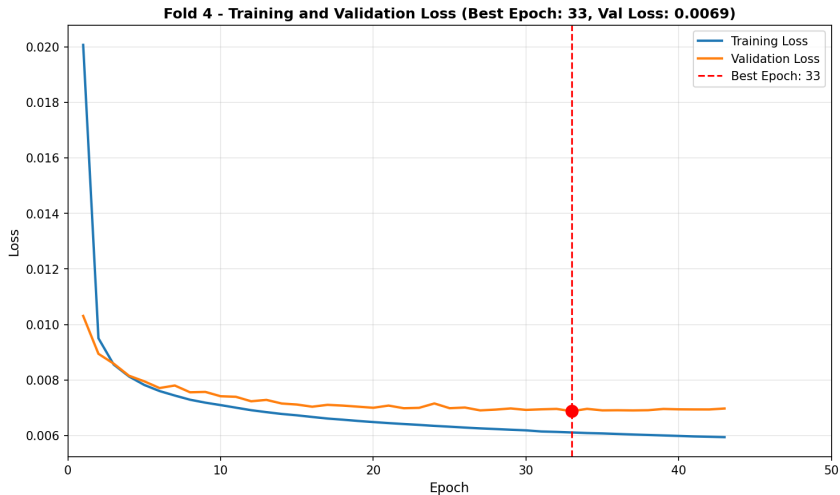
Treinamento

3 Anexos



Treinamento

3 Anexos



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Obrigado pela Atenção!

Alguma Pergunta?

*Felipe Fink Grael, Rafael Tadeu C. dos Santos,
Thalles Nonato Leal Santos e Jefferson Osowsky*