

# Autoencoders - Testes e Aplicações

CPE 727 - Aprendizado de Profundo

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Santos e Jefferson Osowsky**

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## 1 Denoising Autoencoder

► Denoising Autoencoder

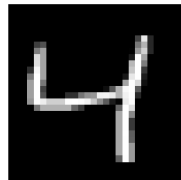
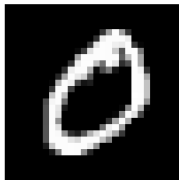
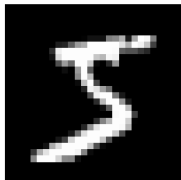
► Reuter Corpus com Autoencoder

► Anexos

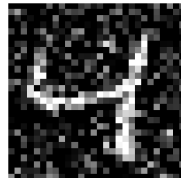
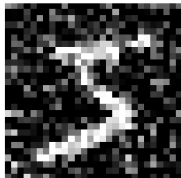
# Dataset

## 1 Denoising Autoencoder

MNIST Dataset



Noisy MNIST Dataset



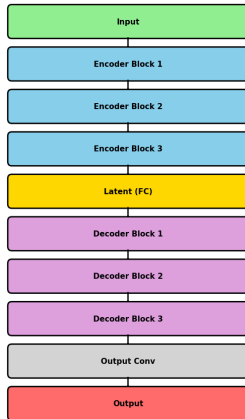
**Figura:** Imagens do MNIST e Noisy MNIST. Ruído Gaussiano com 0.3 de desvio padrão.

# 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

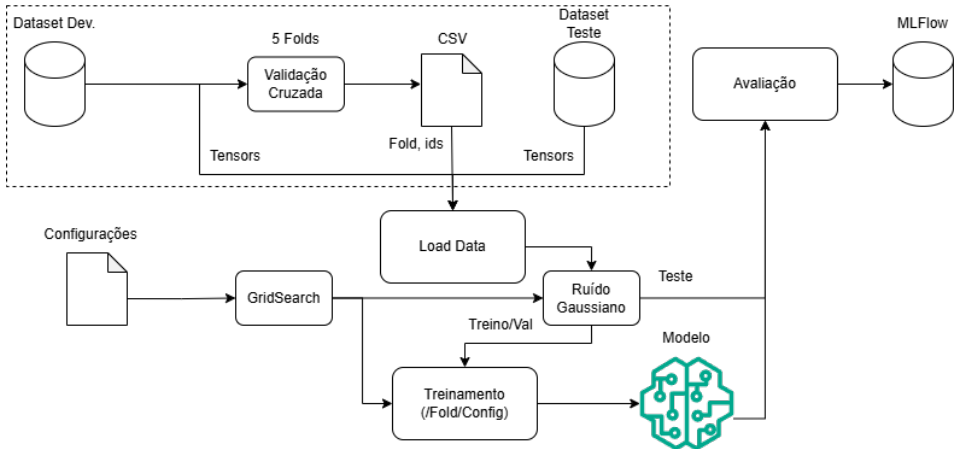
Denoising Autoencoder Architecture



# Metodologia

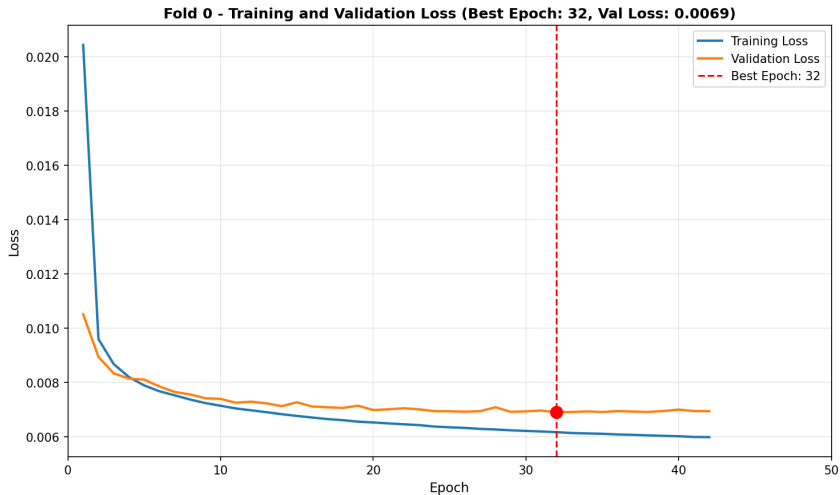
## 1 Denoising Autoencoder

Data Loaders



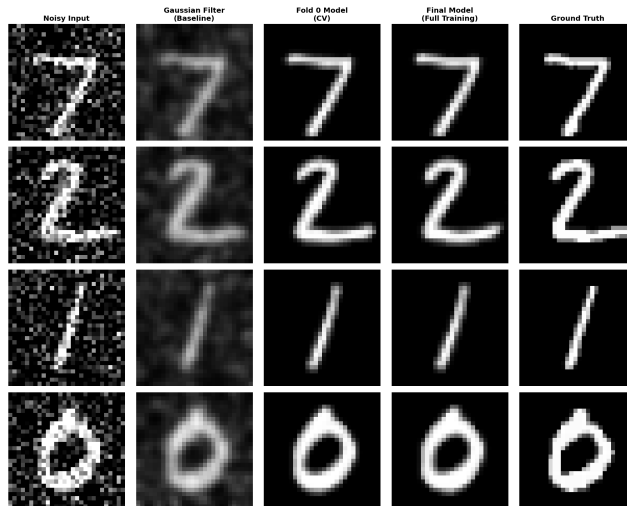
# Treinamento

## 1 Denoising Autoencoder



# Resultado - Denoising

## 1 Denoising Autoencoder



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## 2 Reuter Corpus com Autoencoder

► 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.

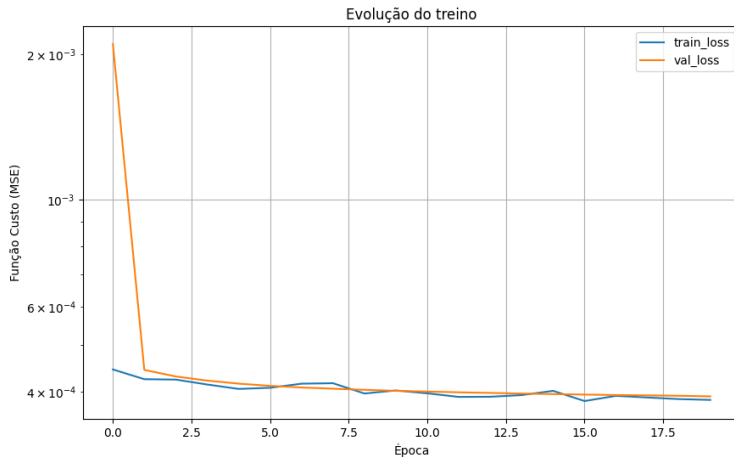
## Método

### 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

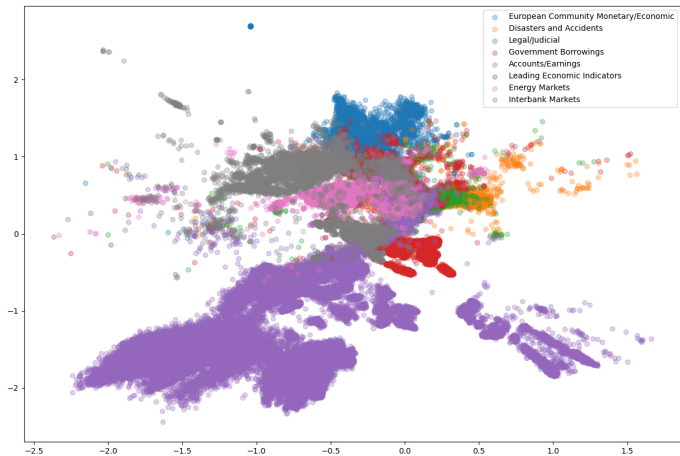
# Evolução do treino

## 2 Reuter Corpus com Autoencoder



# Resultado

## 2 Reuter Corpus com Autoencoder



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3 Anexos

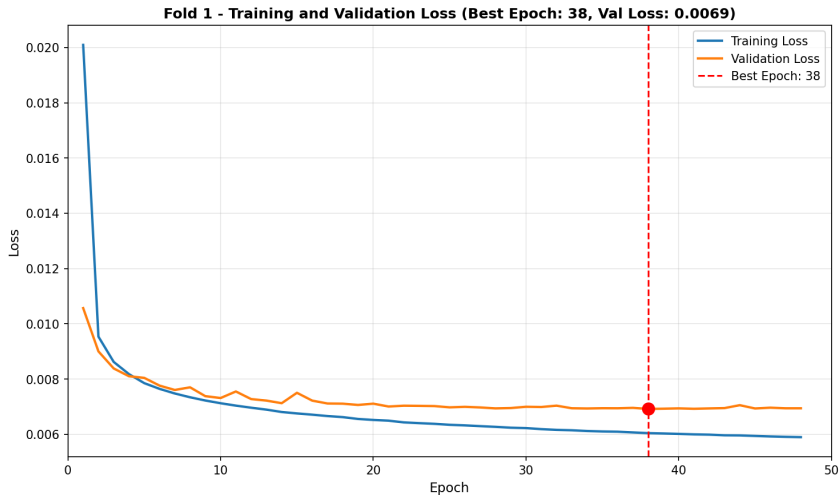
▶ Denoising Autoencoder

▶ Reuter Corpus com Autoencoder

▶ Anexos

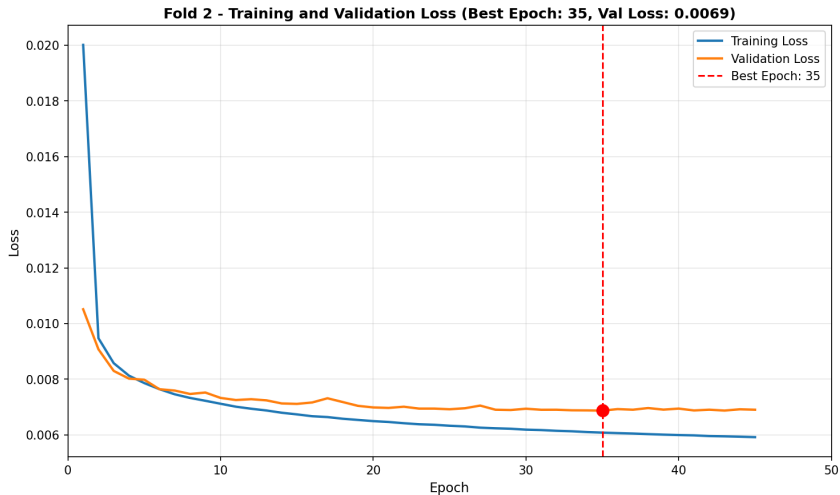
# Treinamento

## 3 Anexos



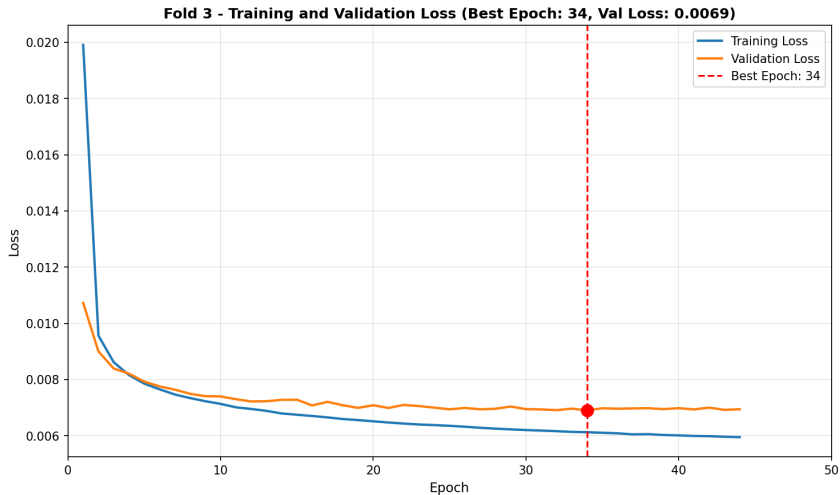
# Treinamento

## 3 Anexos



# Treinamento

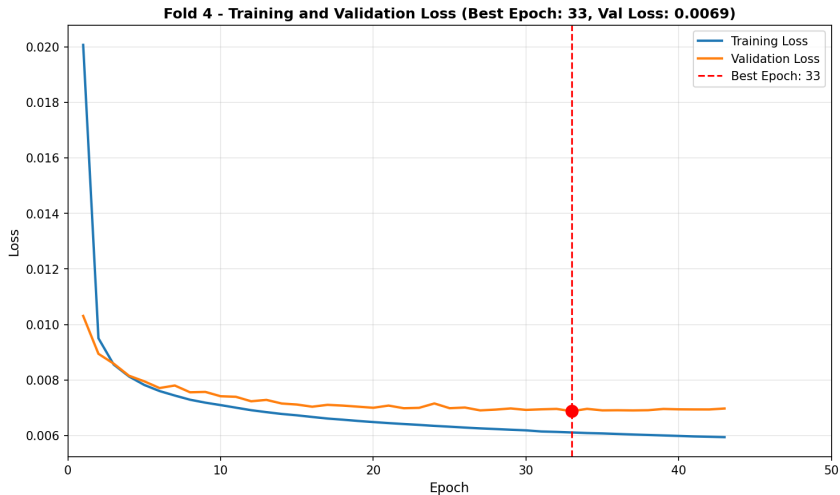
## 3 Anexos





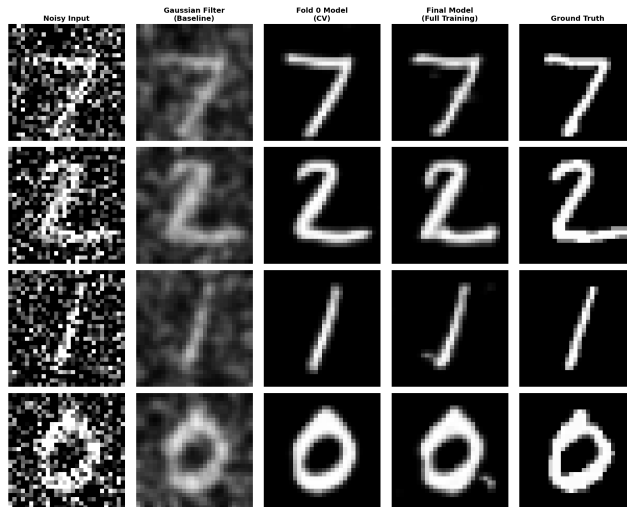
# Treinamento

## 3 Anexos



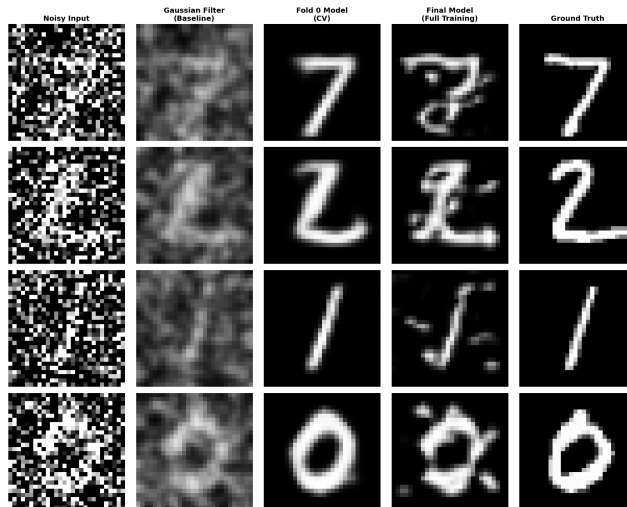
# Resultado - Denoising

3 Anexos



# Resultado - Denoising

## 3 Anexos



# Autoencoders - Testes e Aplicações

*Obrigado pela Atenção!*

*Alguma Pergunta?*

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