Stacked AutoEncoder

Remoção de Ruído em Imagens em Escala de Cinza

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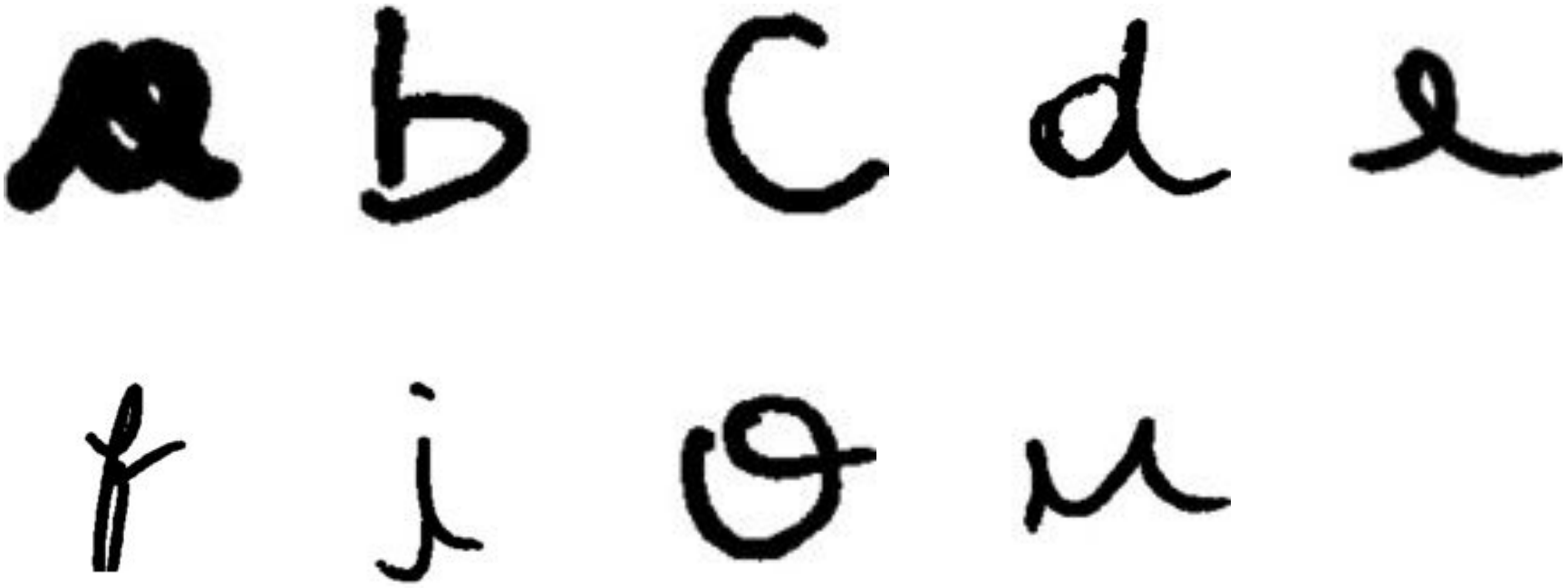
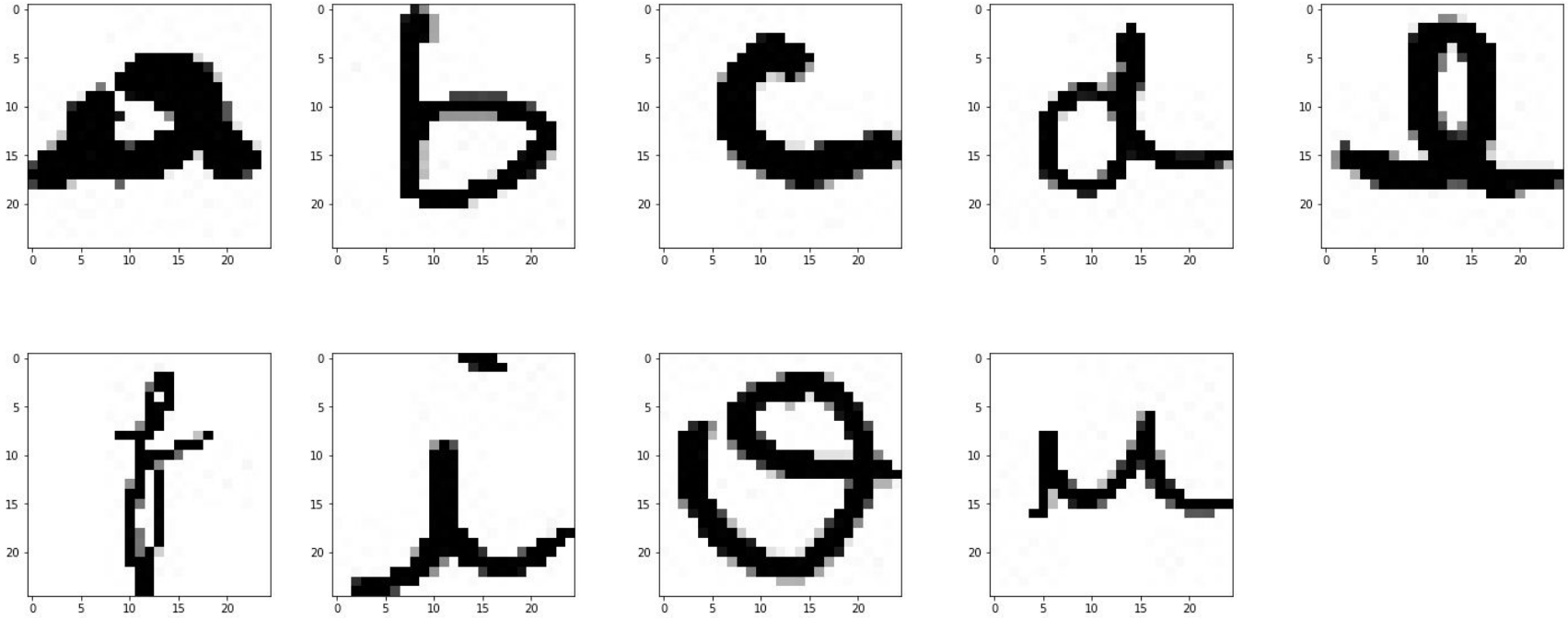
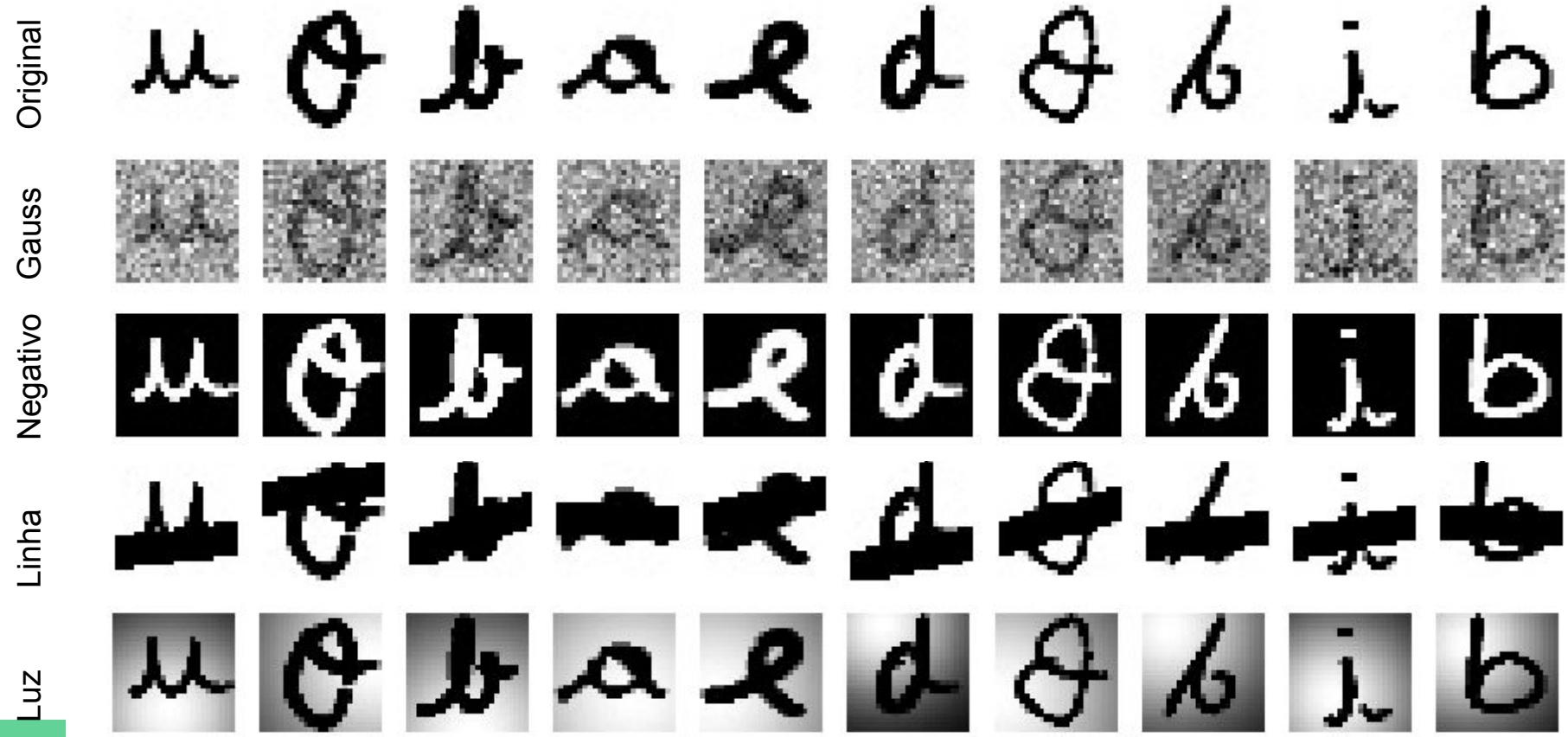
Dataset usado



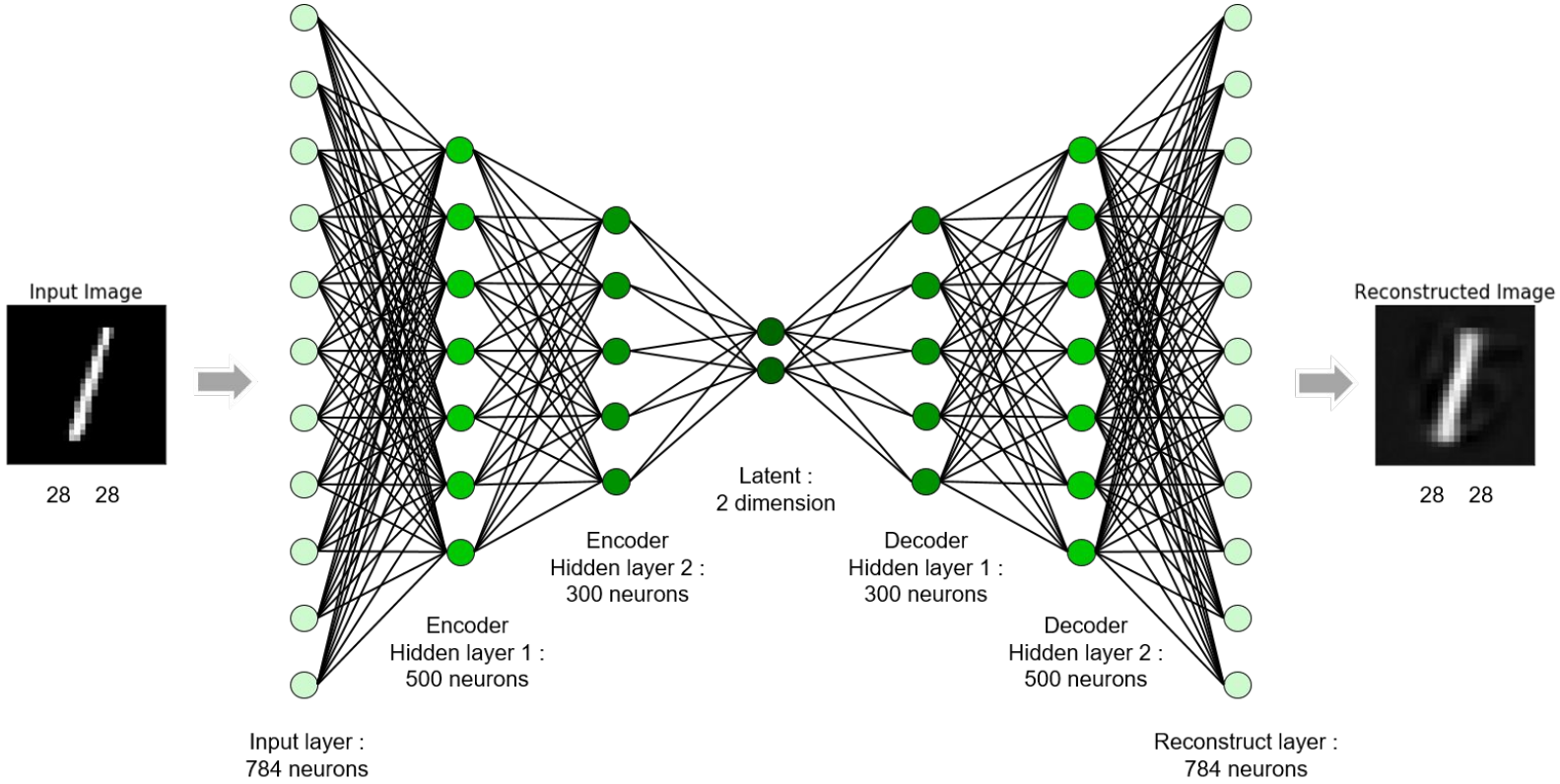
Dataset usado



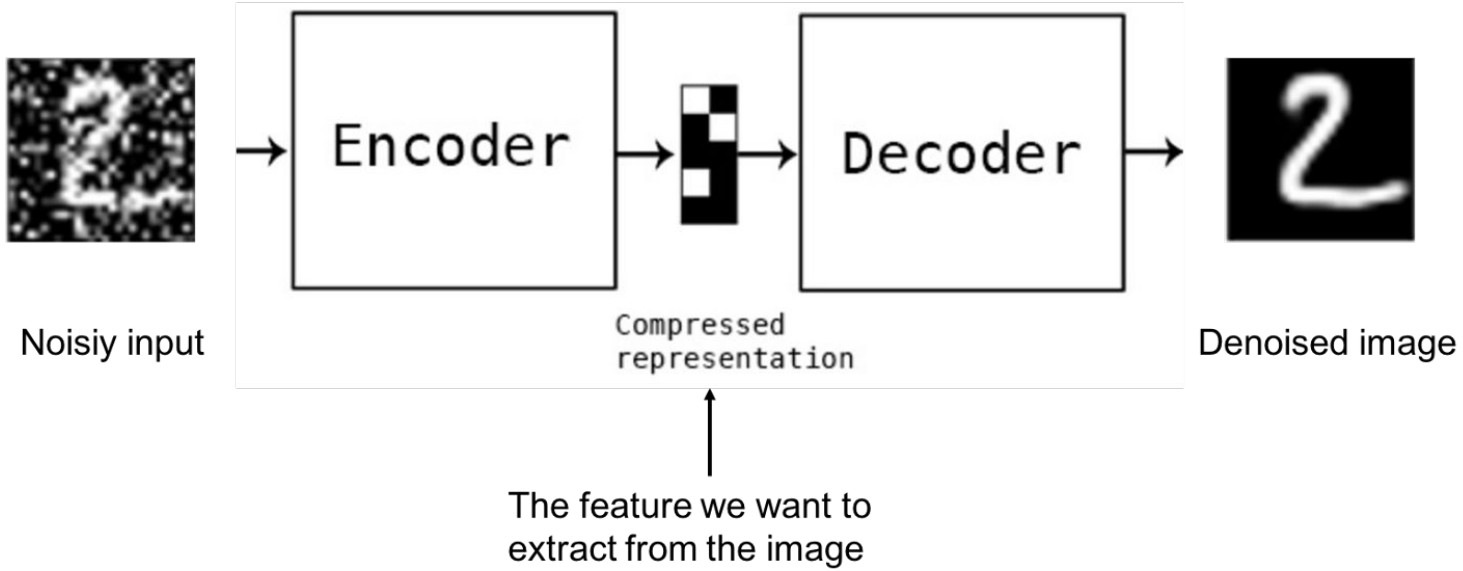
Ruídos criados



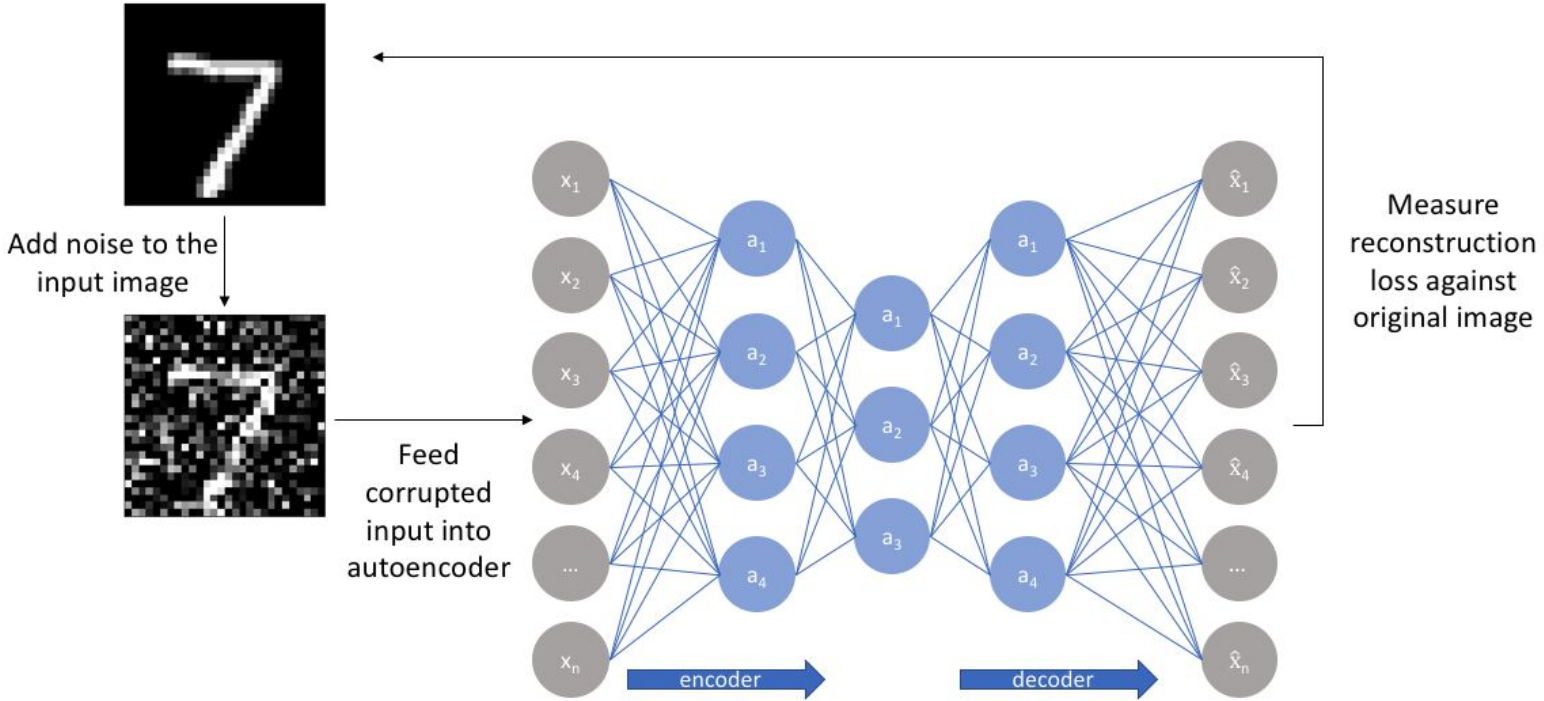
Stacked AutoEncoder



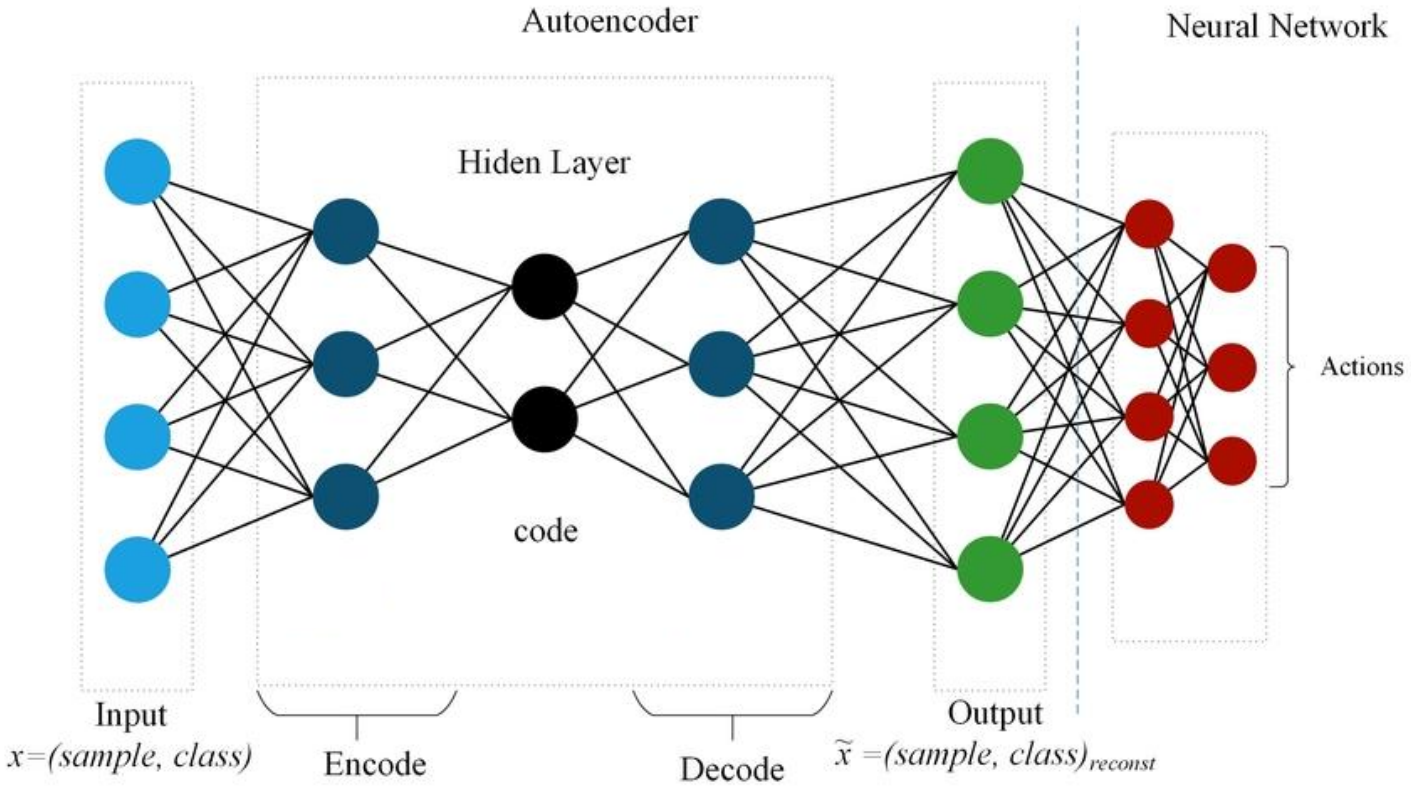
Aplicação da SAE: remoção de ruídos



Treino


Add noise to the input image
Feed corrupted input into autoencoder
Measure reconstruction loss against original image
encoder
decoder

Visão geral

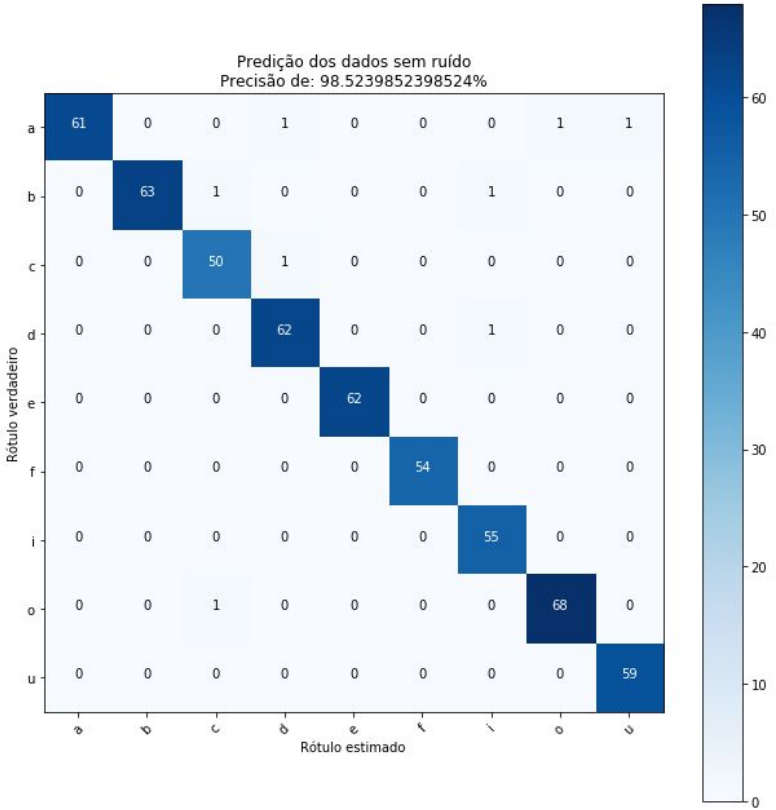

Autoencoder
Neural Network
Hiden Layer
code
Actions
Input
x=(sample, class)
Encode
Decode
Output
$\tilde{x}$ =(sample, class)$_{reconst}$

Parâmetros do SAE

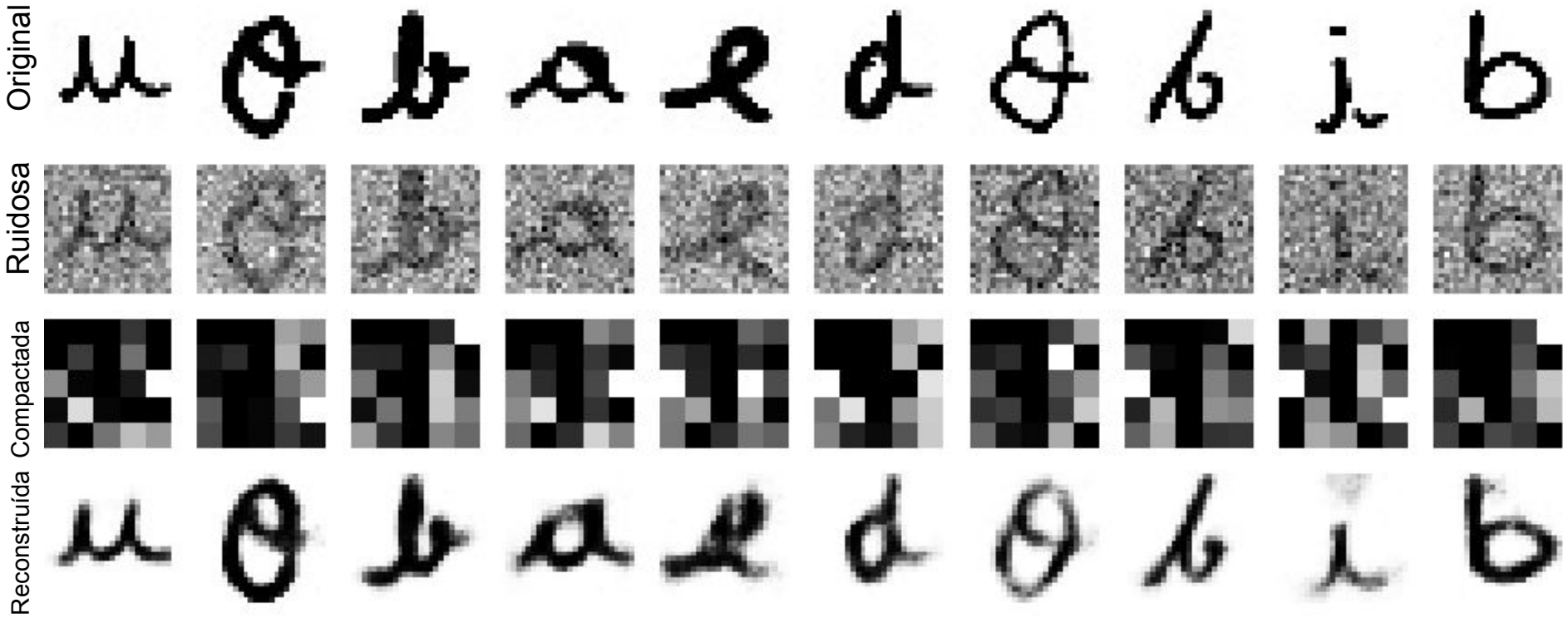
- Camadas: 625, 100, 50, 25, 50, 100, 625
- Função custo: Binary Crossentropy
- Épocas: 50
- Tamanho do *Batch*: 10
- Otimizador: adadelta
- Proporção de amostras: 80% p/ treino, 20% p/ teste

Parâmetros da MLP classificadora de letras

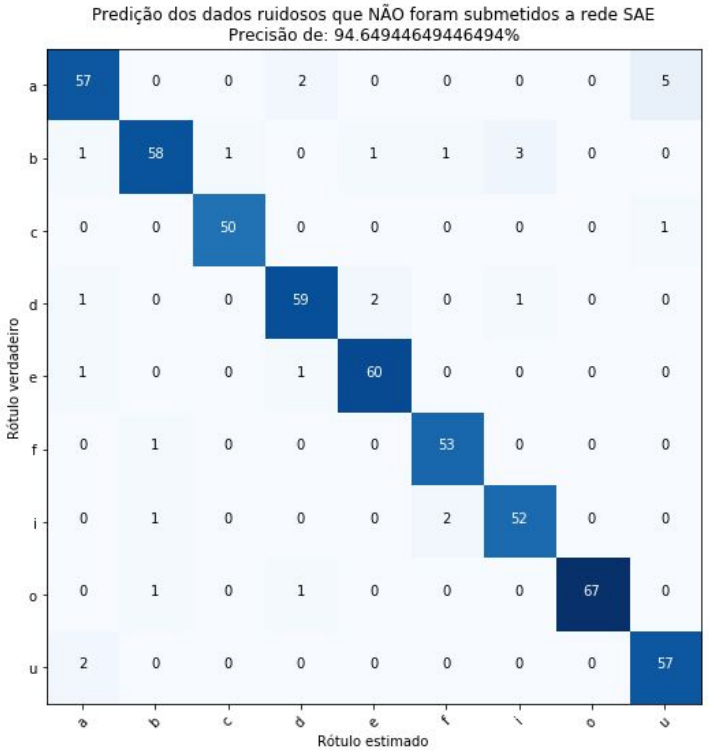
- Camadas: 625, 10, 9
- Função custo: Sparse Categorical Crossentropy
- Épocas: 40
- Tamanho do *Batch*: 20
- Otimizador: adadelta
- Proporção de amostras: 80% p/ treino, 20% p/ teste

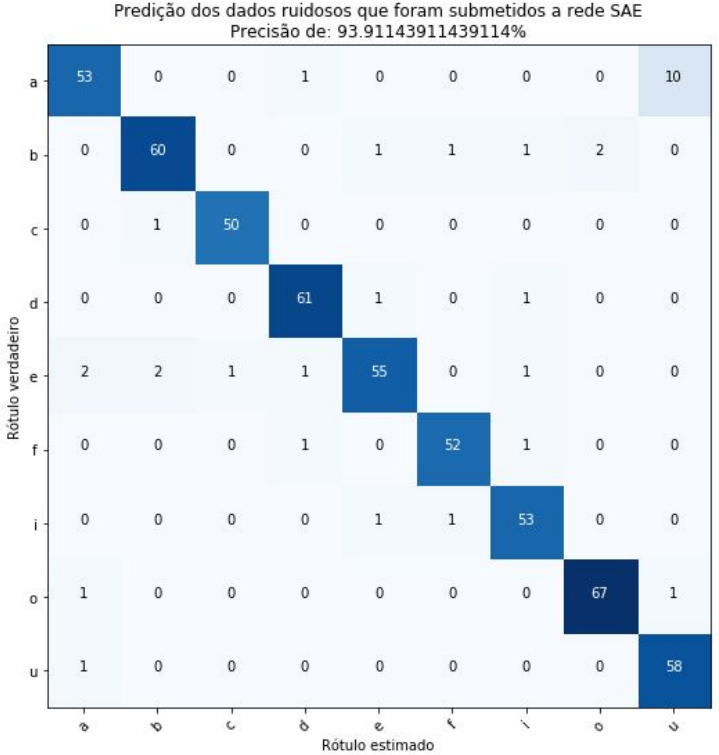


Resultados: ruído gaussiano

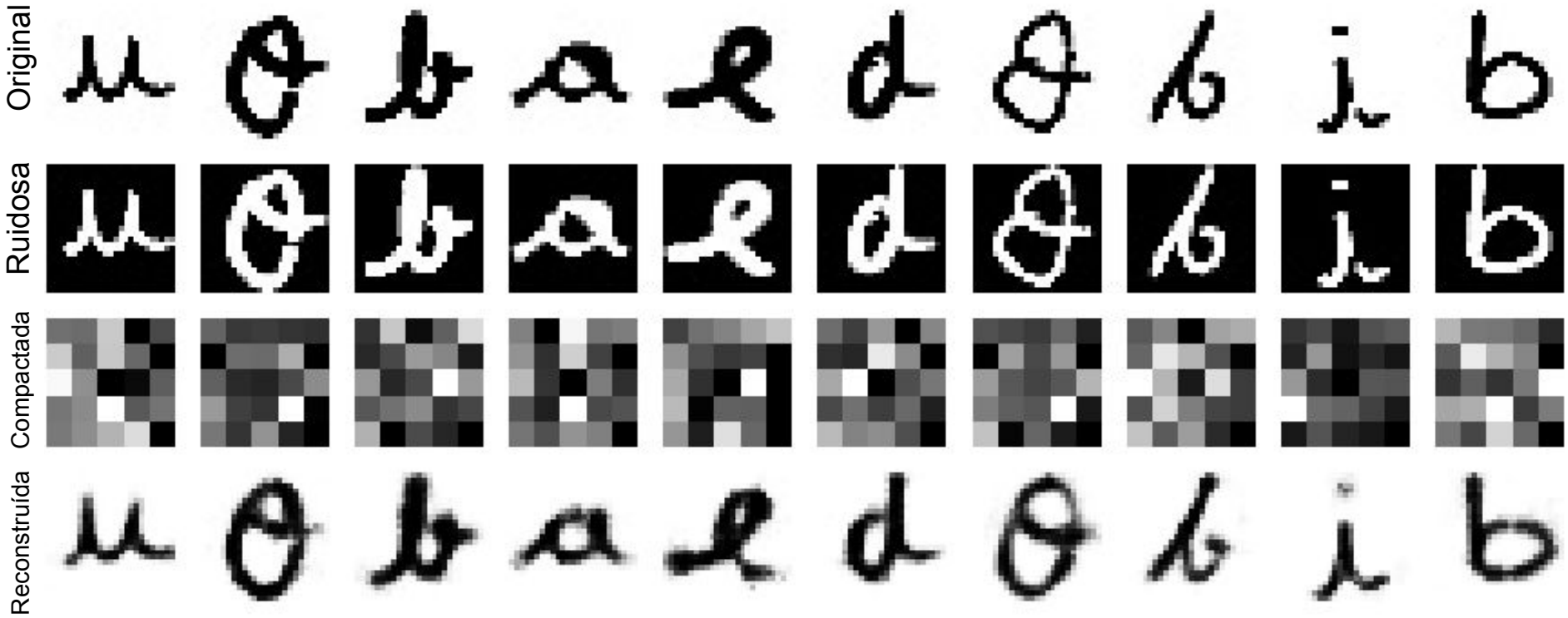


Resultados: ruído gaussiano

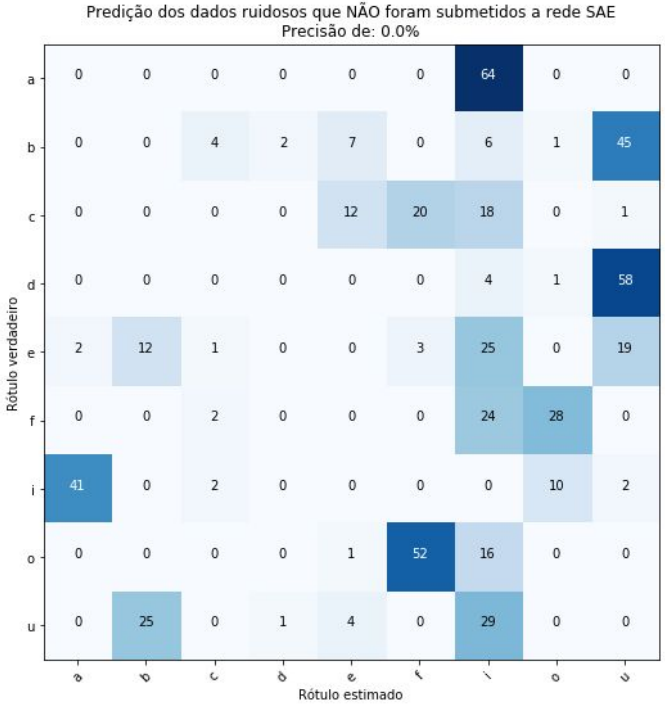


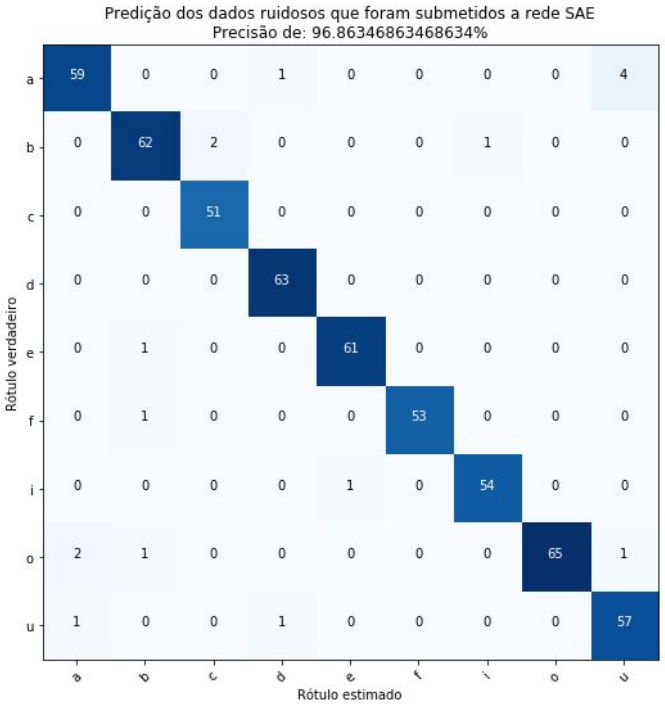


Resultados: negativo da imagem



Resultados: negativo da imagem





Resultados: Linha preta

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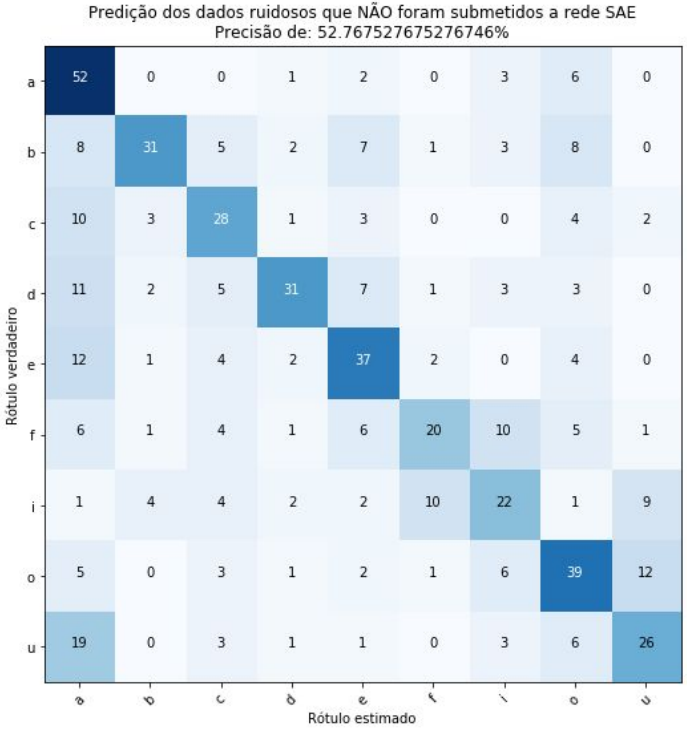
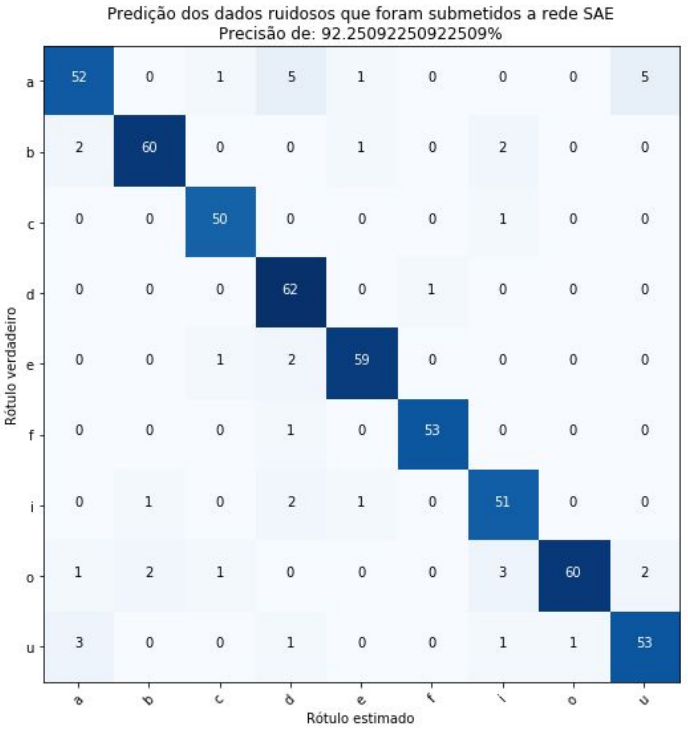
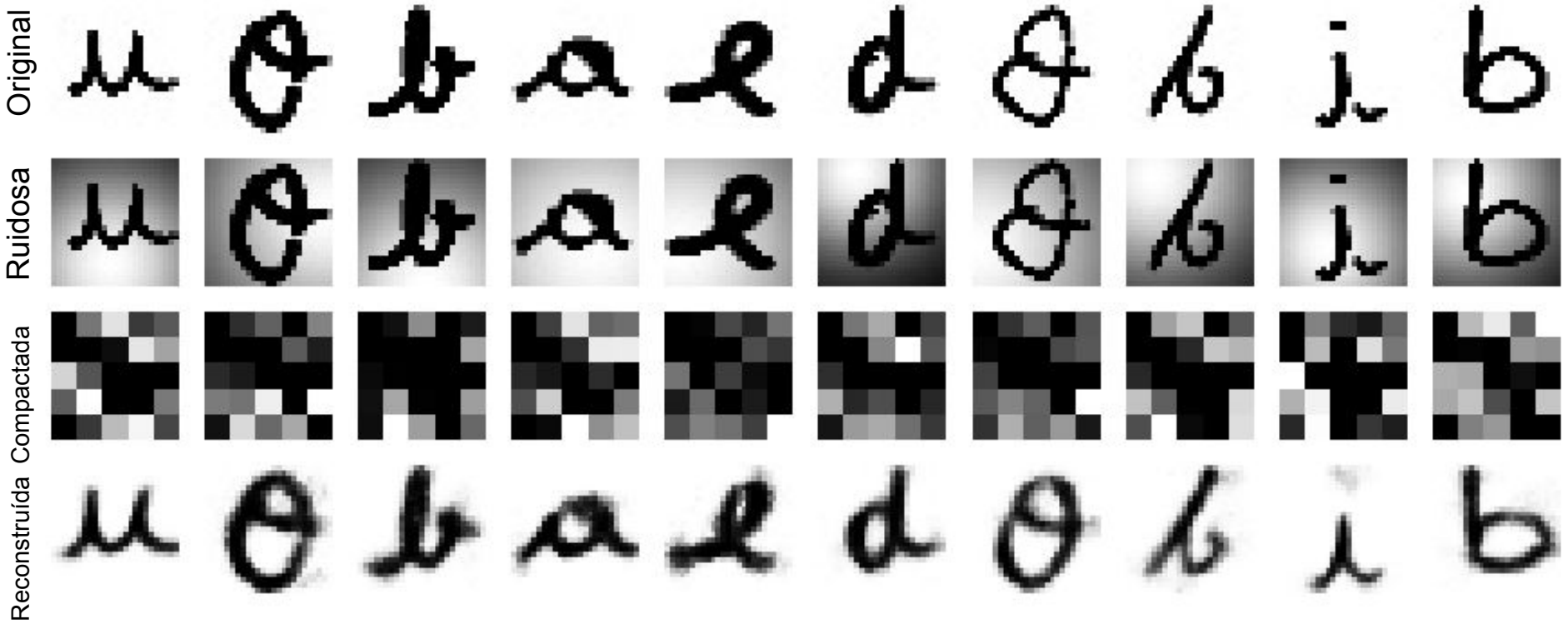
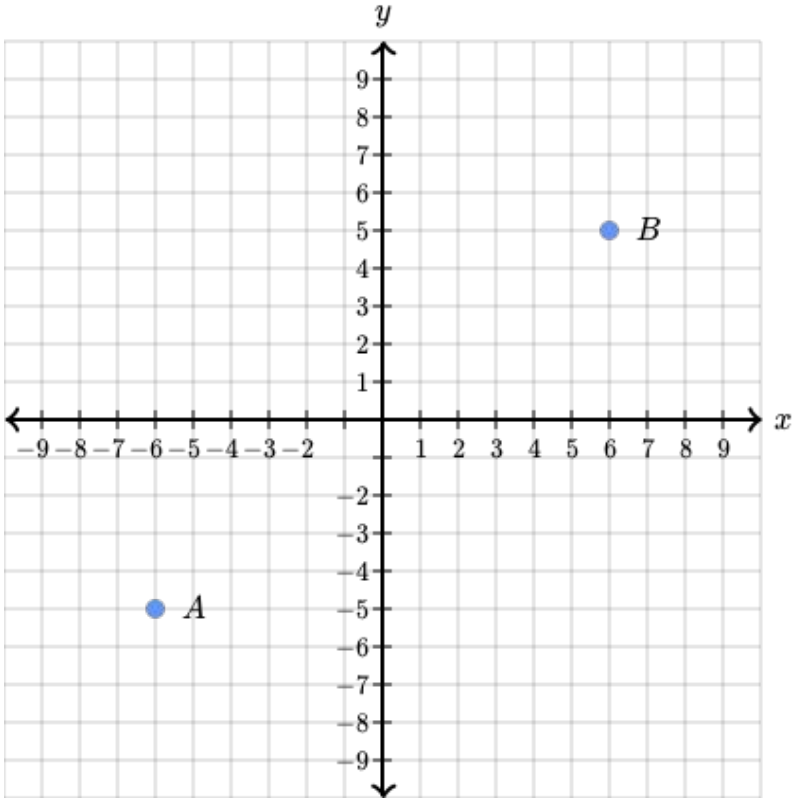




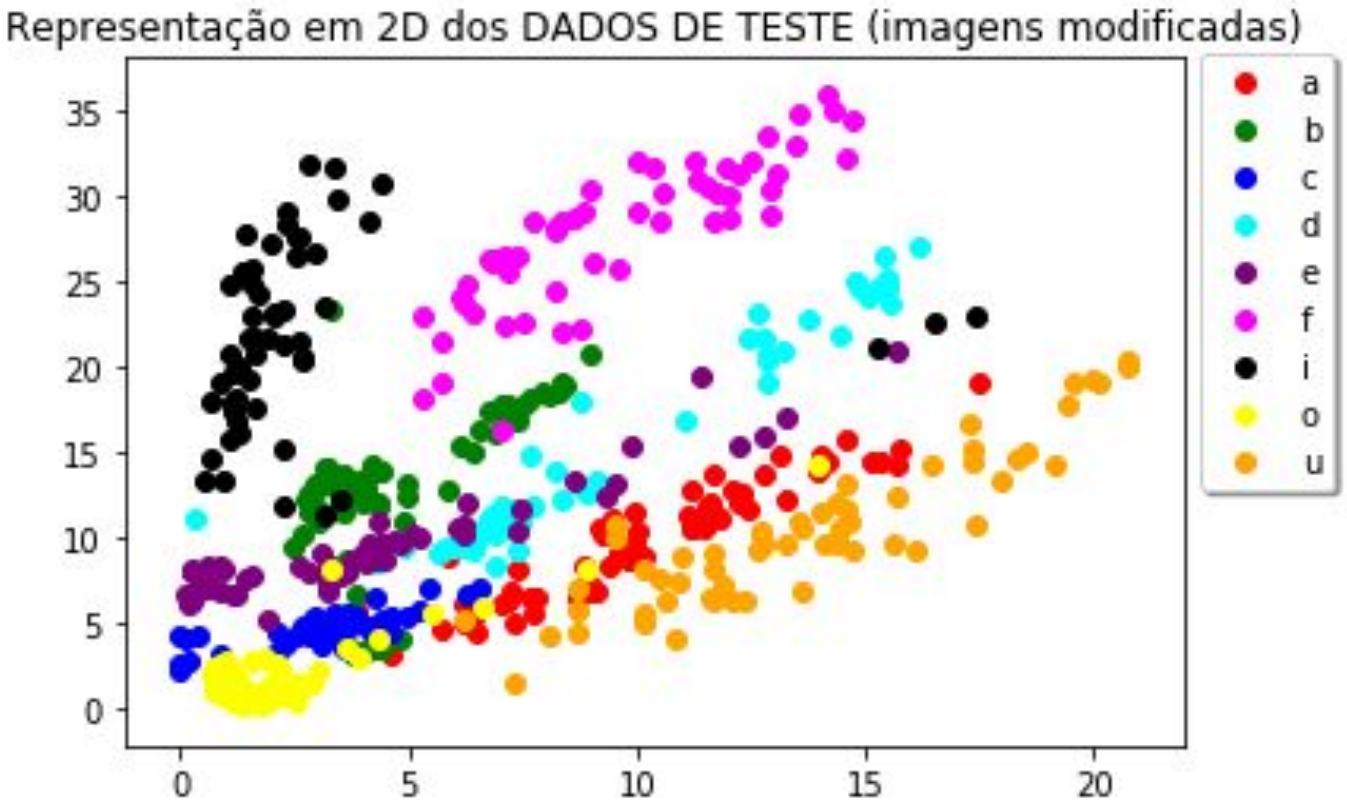
Resultados: Iluminação



Visualização de Dados: Representação em 2D

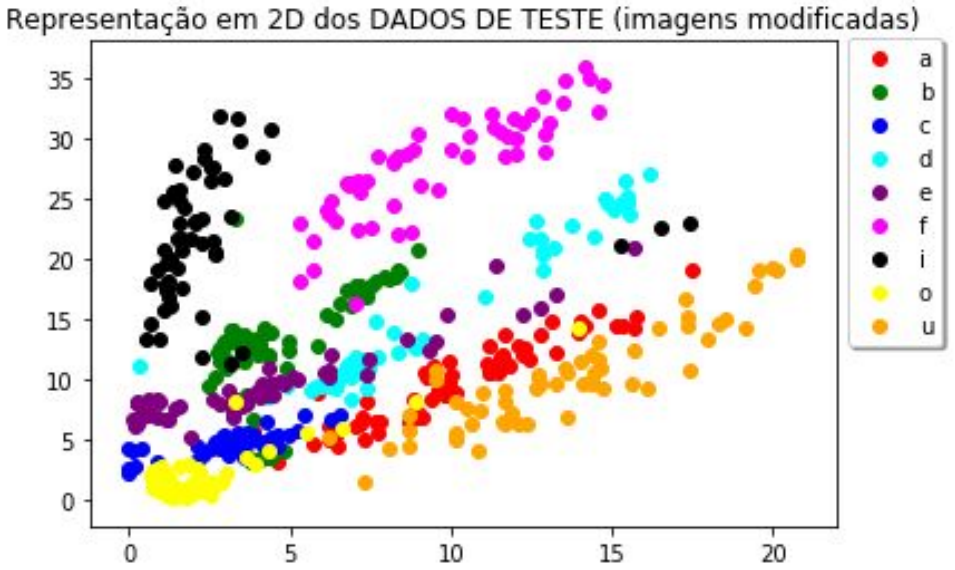


Resultados: Dados em 2D

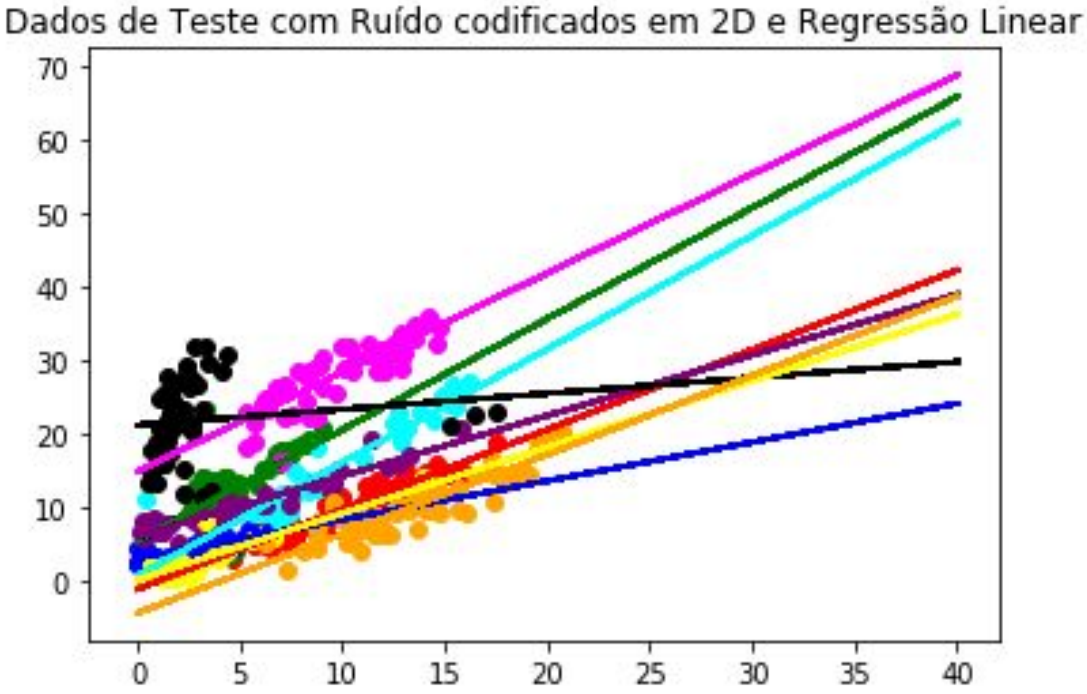


Estatística dos Dados

Index	intercept	p_value	r_value	slope	std_err
a	-1.18907	1.09047e-31	0.94457	1.08592	0.0479349
b	5.40044	6.81772e-07	0.570973	1.51113	0.273743
c	3.00305	9.3619e-13	0.806266	0.527039	0.0552408
d	0.624695	9.6768e-34	0.954455	1.54421	0.0618042
e	5.94576	7.62111e-30	0.94063	0.824614	0.0384159
f	14.8477	7.57897e-16	0.846432	1.3497	0.11775
i	21.1413	0.304892	0.14089	0.215148	0.207665
o	0.0972581	2.53025e-19	0.838395	0.903297	0.071745
u	-4.47209	1.62819e-22	0.902506	1.07916	0.0682106



Utilizando a Estatística dos Dados



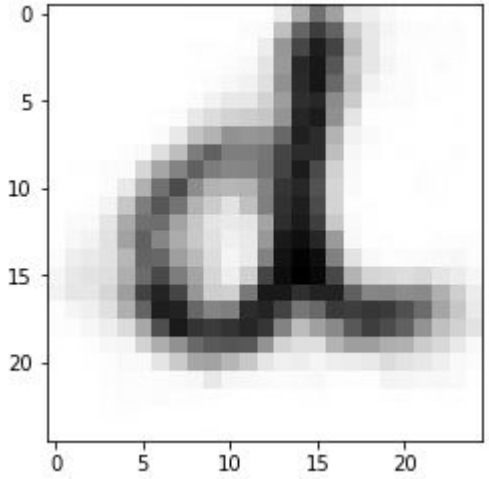
- Correlação pequena gera retas anormais.
- Necessidade de pré-processamento dos dados em 2D.
- Geração de novas imagens

Decodificação dos Dados

```
def unzip(x, frame, letra):
    y = x*frame['slope'][letra] + frame['intercept'][letra]
    _2Dimg = np.array([[x, y],])
    decoded_img = decoder2D.predict(_2Dimg)
    decoded_img = decoded_img.reshape(25,25)
    plt.imshow(decoded_img)
```

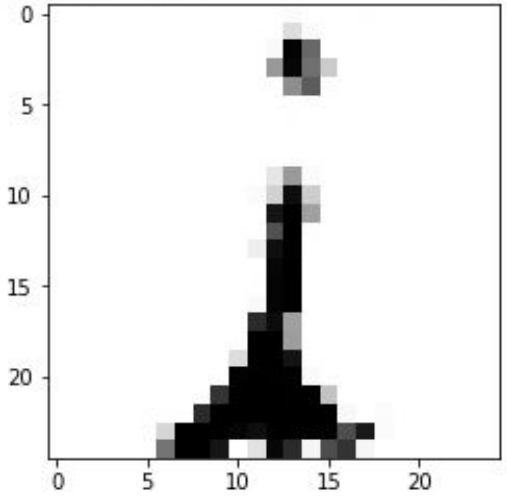
x = 5

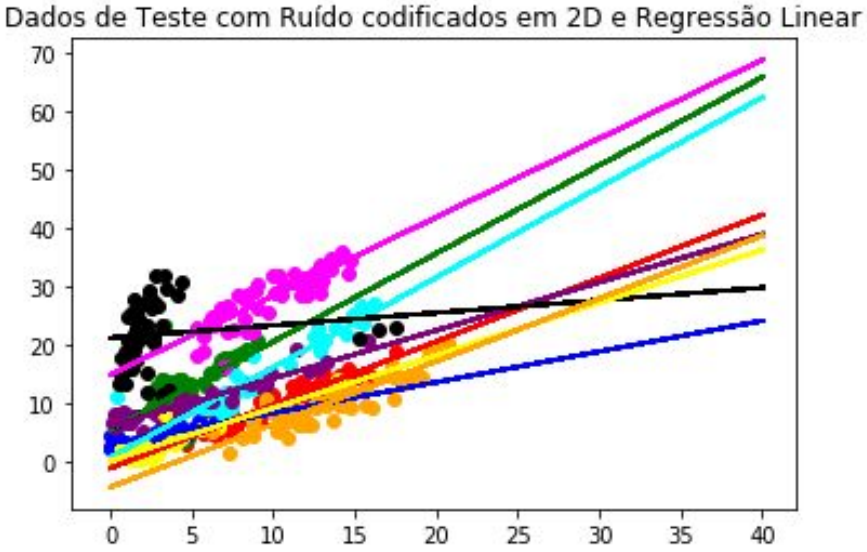
letra = ‘d’



Decodificação dos Dados

```
In [35]: _2Dimg = np.array([[10, 80],])
    ...: decoded_img = decoder2D.predict(_2Dimg)
    ...: decoded_img = decoded_img.reshape(25,25)
    ...: plt.imshow(decoded_img)
Out[35]: <matplotlib.image.AxesImage at 0x2366a8f5978>
```





Decodificação dos Dados

```
In [48]: letra = 'o'
    ...: x = 1
    ...: unzip(x, frame, letra)
```