Aprendizado Profundo

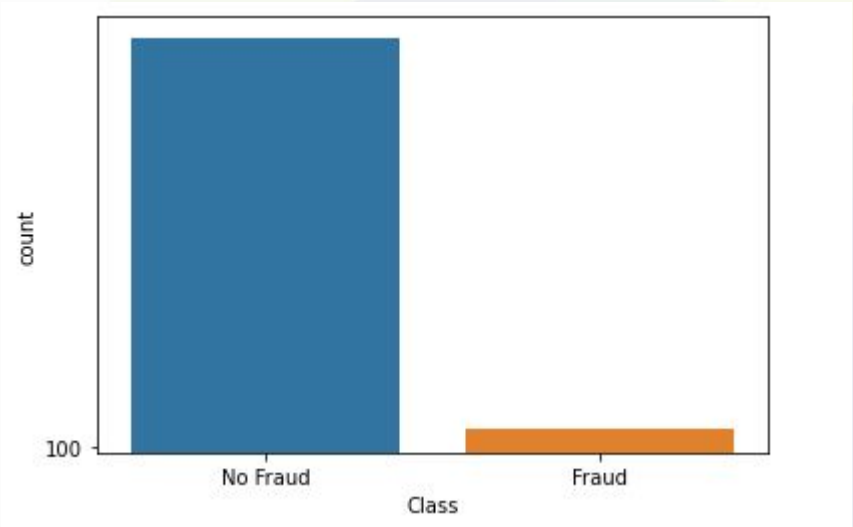
Problemas Comuns

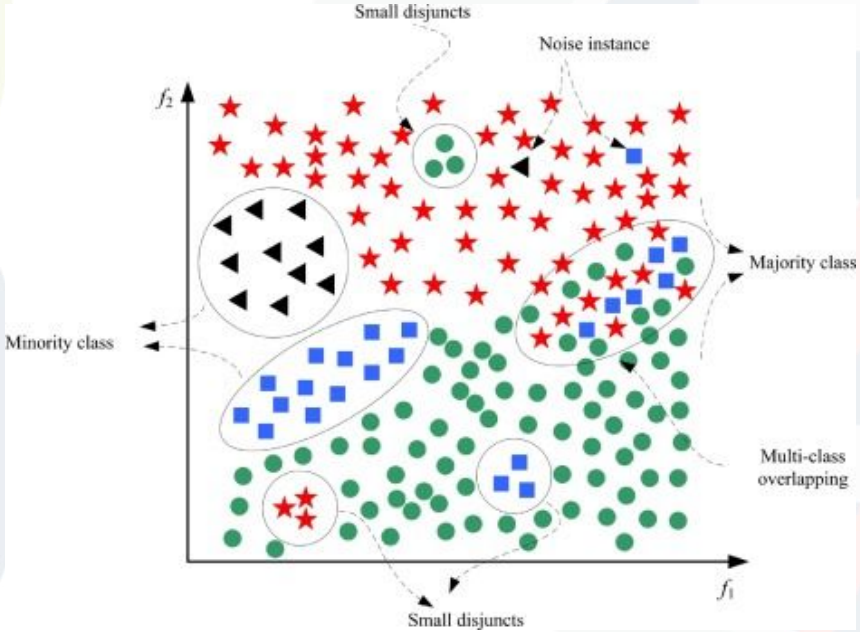
Prof. Carlos Moraes (Carlão)

Projeto Residência 8 (TPA N° 068/SOFTEX/UNIFEI)

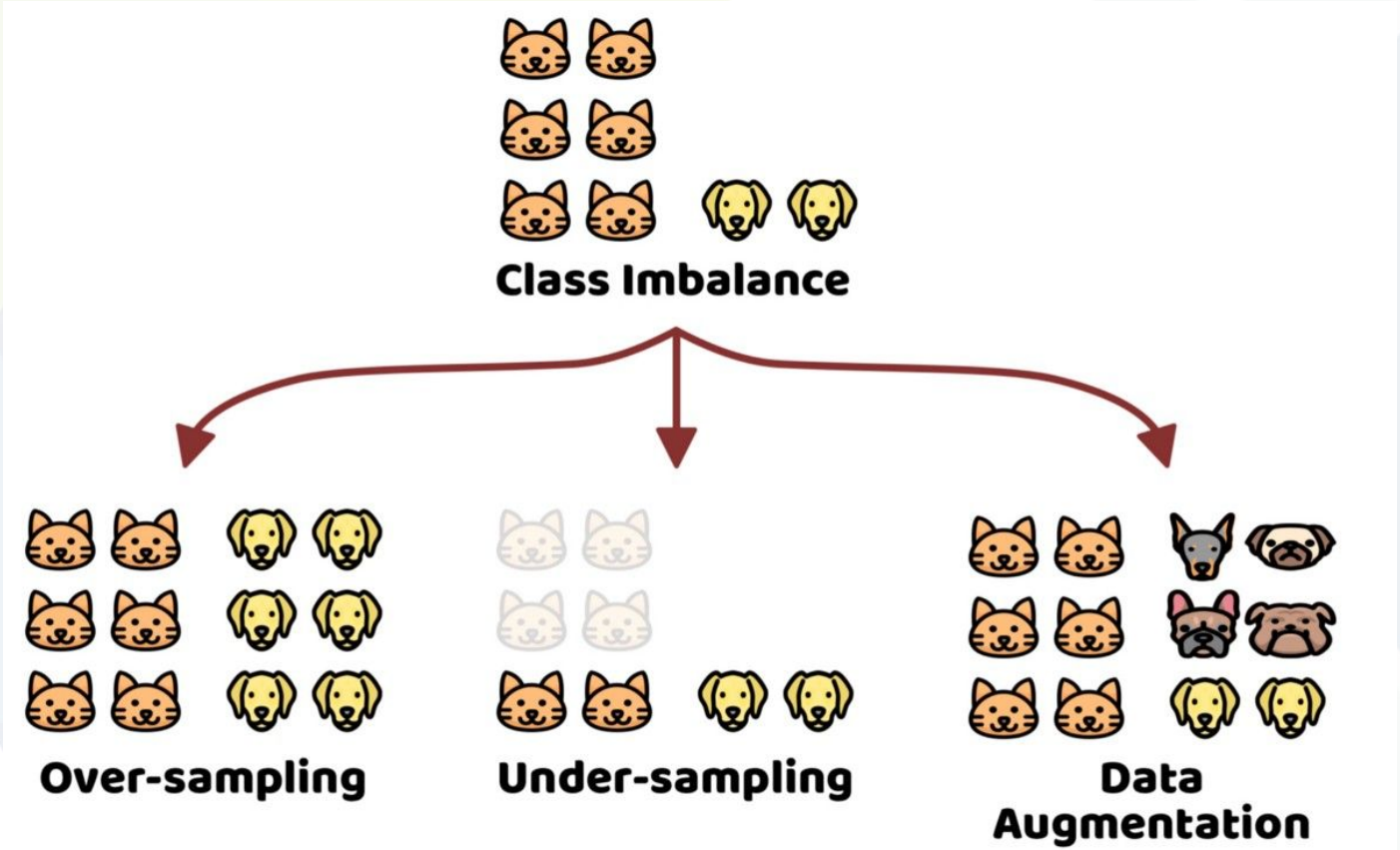
Base de Dados

Dados Desbalanceados



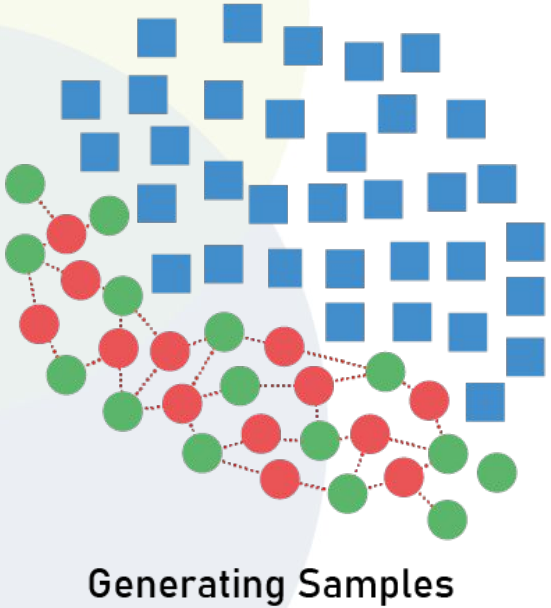


Soluções para Desbalanceamento

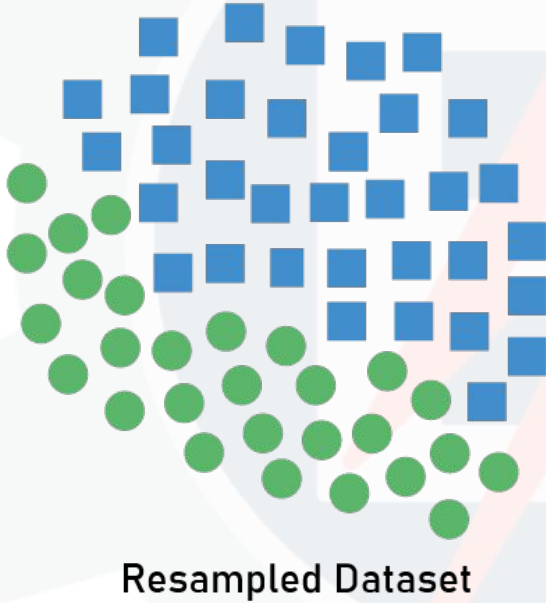


SMOTE - Synthetic Minority Oversampling TEchnique

Original Dataset



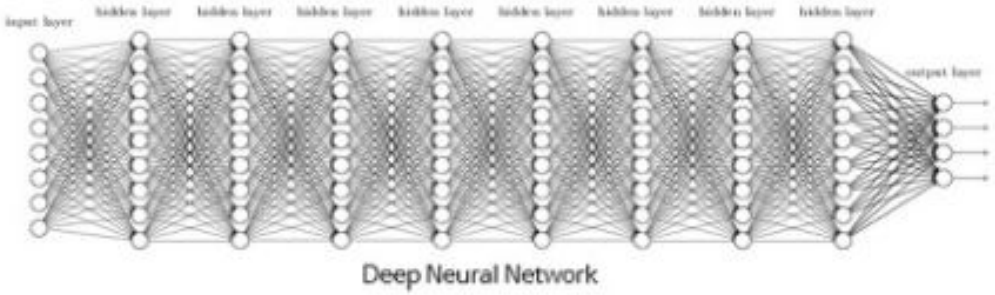
Generating Samples

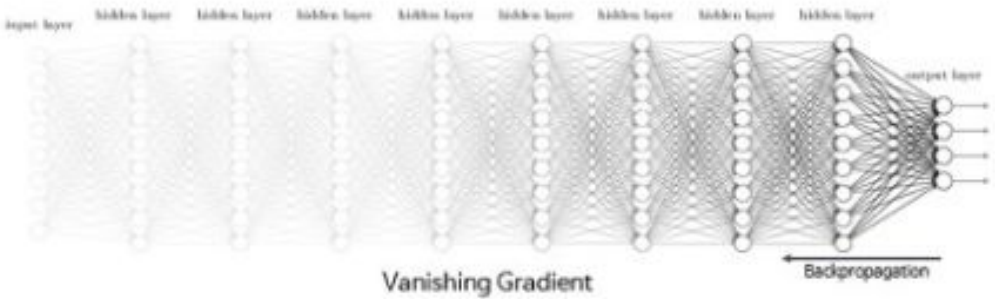


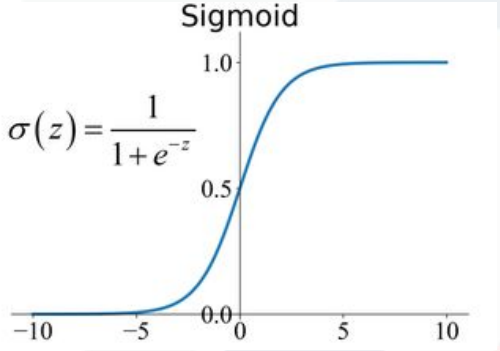
Resampled Dataset

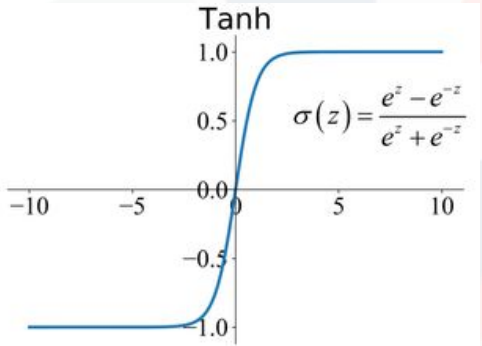
Intensidade do Ajuste

Gradiente de Desaparecimento (Vanishing)

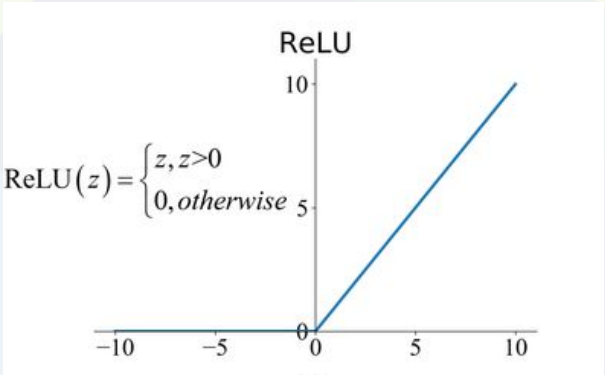


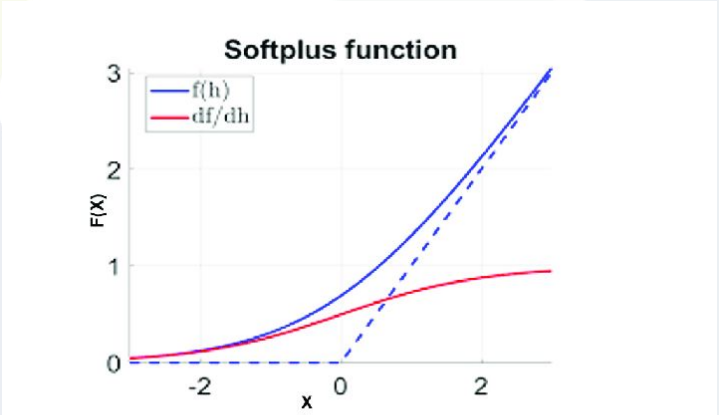




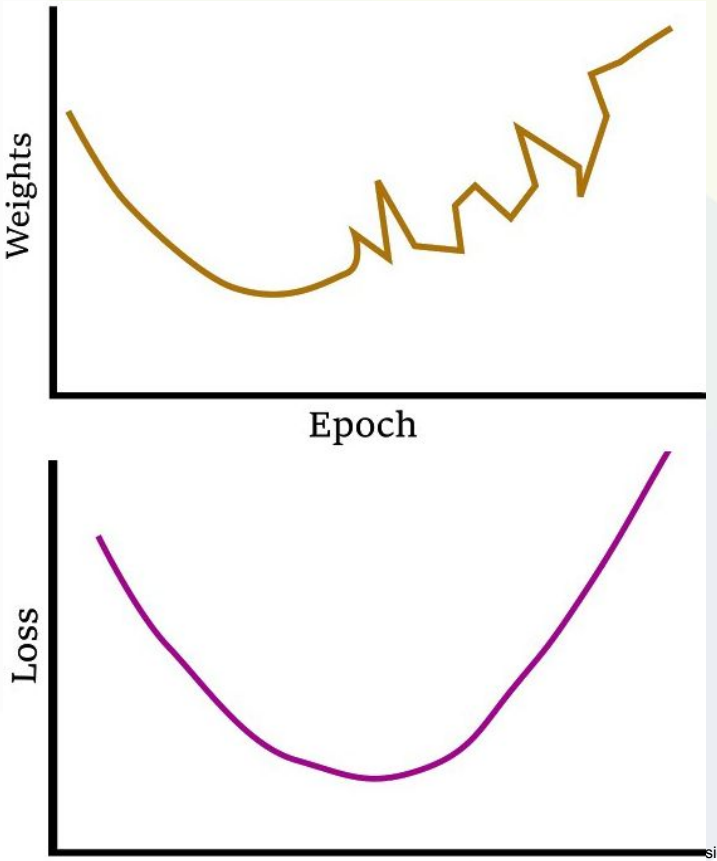


Solução do Gradiente de Desaparecimento

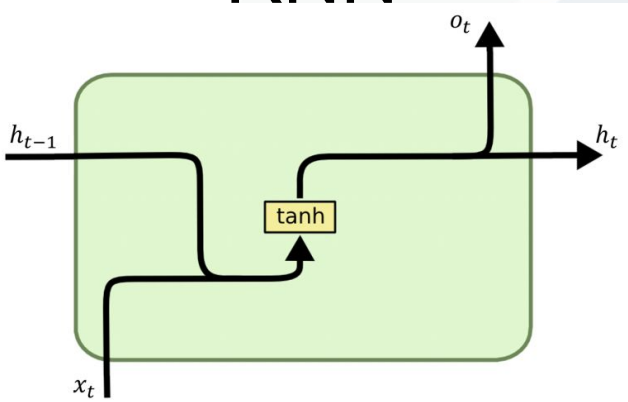


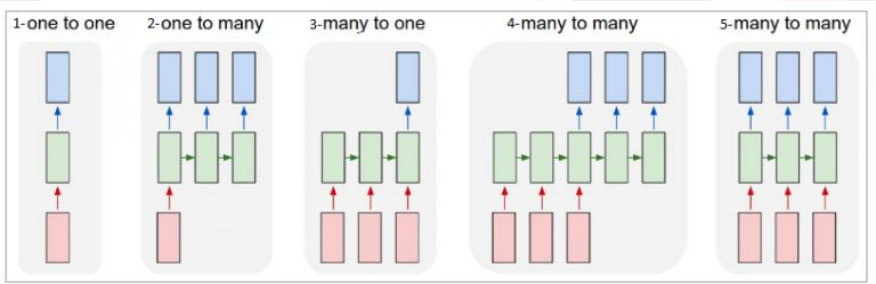


Gradiente de Explosão (Exploding)

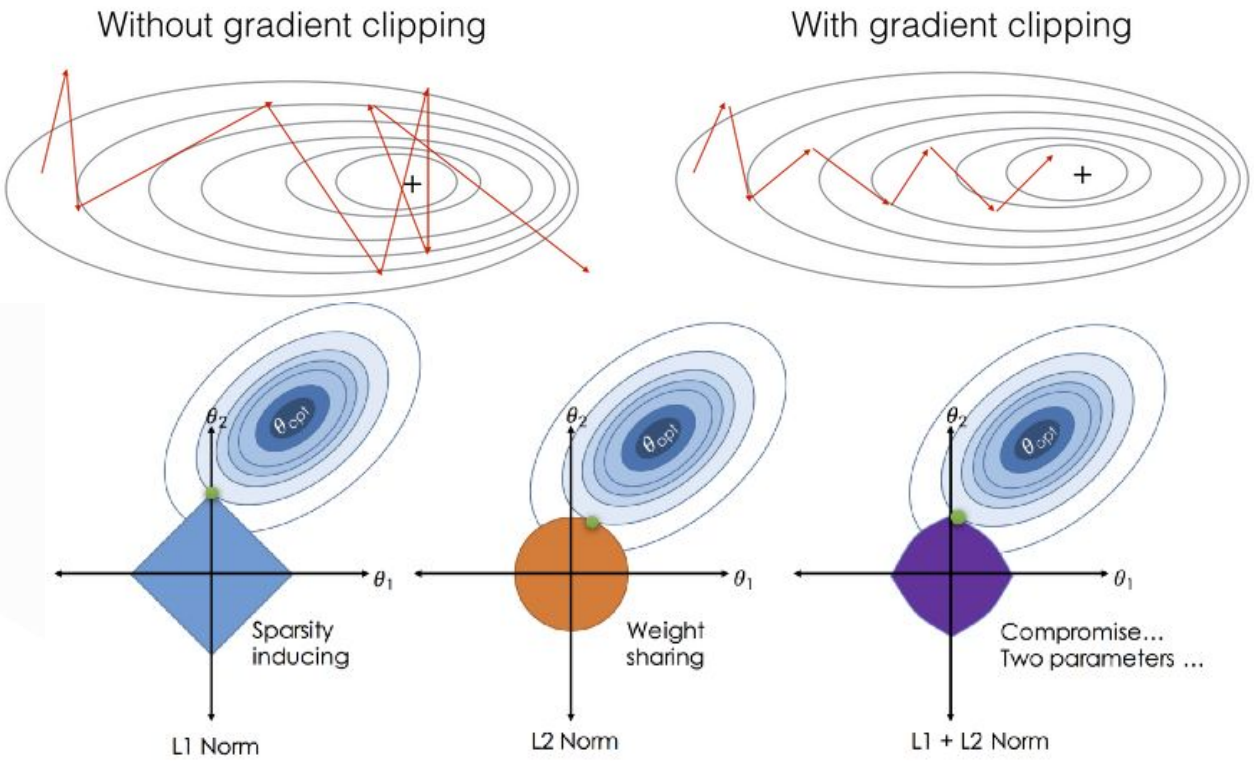


RNN

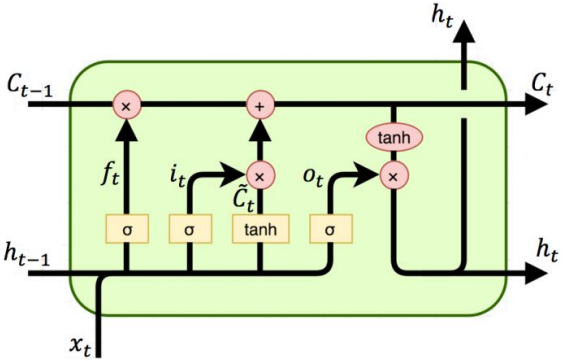




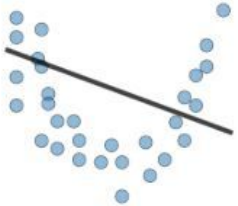
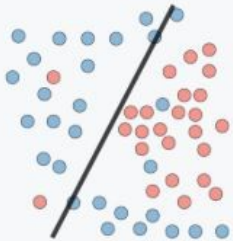
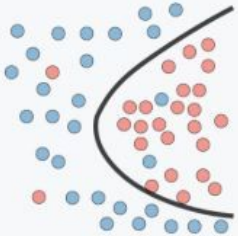
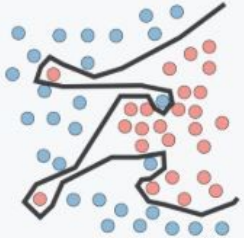
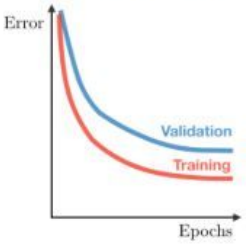
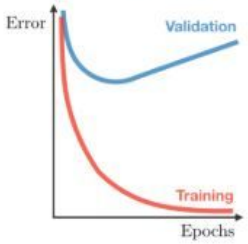
Solução do Gradiente de Explosão



LSTM



Excesso de Treinamento

	Underfitting	Just right	Overfitting
Symptoms	• High training error • Training error close to test error • High bias	• Training error slightly lower than test error	• Very low training error • Training error much lower than test error • High variance
Regression illustration			
Classification illustration			
Deep learning illustration			
Possible remedies	• Complexify model • Add more features • Train longer		• Perform regularization • Get more data

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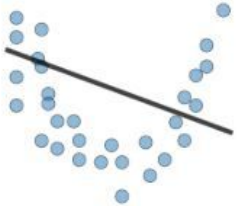
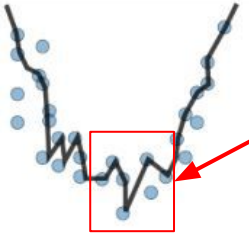
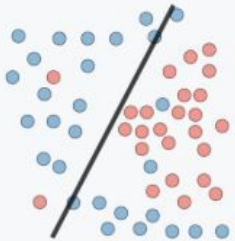
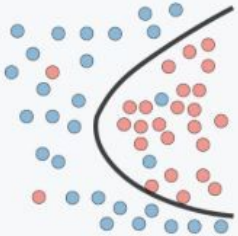
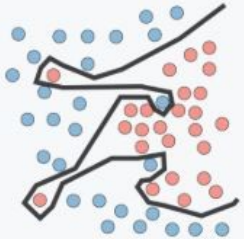
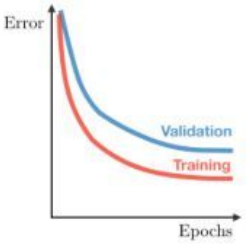
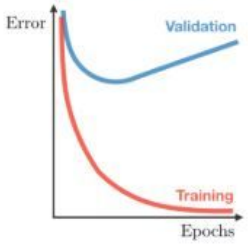
Regression illustration			
Classification illustration			
Deep learning illustration			
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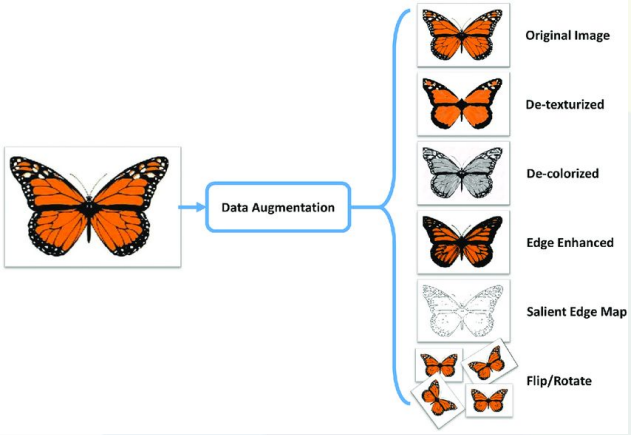
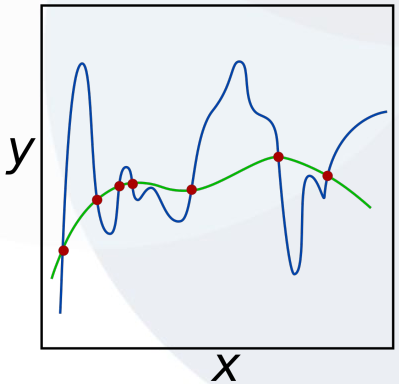
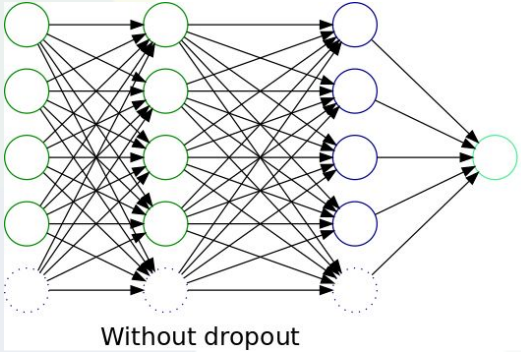
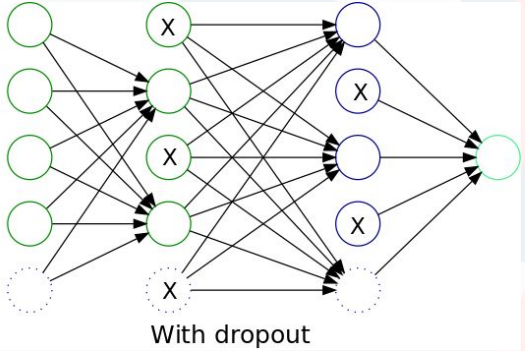
Ruído

Soluções do Sobreajuste (Overfitting)









Perguntas

- In deep learning tasks, when encountering data imbalance problems, which of the following methods can we use to solve the problem?
  - Random oversampling
  - Synthetic sampling
  - Batch deletion
  - Random undersampling

Perguntas

- Which of the following activation functions are prone to vanishing gradient problems?
  - Tanh
  - Sigmoid
  - ReLU
  - Softplus

Perguntas

- Which of the following statements are true about common activation functions in deep learning?
  - The sigmoid function is monotonic, continuous, and easy to derive. Its output is bounded, making the network converge better.
  - During training of a deep neural network, the sigmoid, tanh, and softsign functions cannot prevent the vanishing gradient problem.
  - The tanh function is symmetric with respect to the origin, and the mean of its output is closer to 0.
  - The sigmoid function can easily cause the gradient to explode.

Perguntas

- What are the regularizations in deep learning?
  - Momentum optimizer
  - L1 Norm
  - L2 Norm
  - Dropout
  - Data set enhancement
  - Integration method

Apoio

Este projeto é apoiado pelo Ministério da Ciência, Tecnologia e Inovações, com recursos da Lei nº 8.248, de 23 de outubro de 1991, no âmbito do [PPI-Softex| PNM-Design], coordenado pela Softex.

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