Deep Learning

UFRN 2018.1

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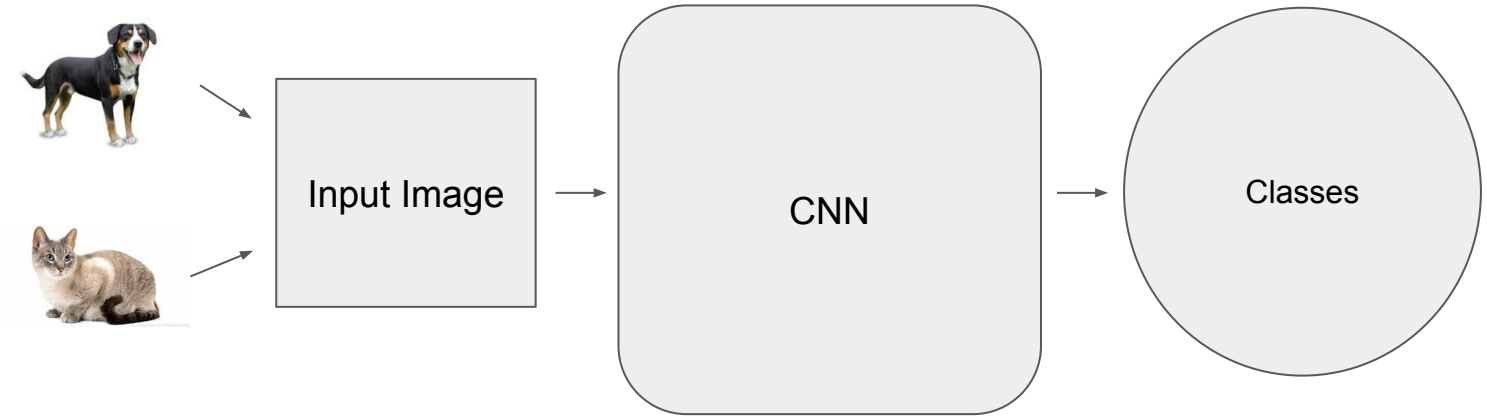
Plano de Estudos

- Semana 1: *What is Deep Learning ?*
- Semana 2: Fundamentos de Machine Learning
  - Introdução
  - Aprendizagem Supervisionada
  - CNN - *Layers : Convolutional, Activation, Pooling, Flattening, Fully-connected*
- **Semana 3**: Processamento de Imagens em Python
  - Instalação de pacotes e preparação do ambiente
  - Manipulando imagens com OpenCV
- **Semanas 4-5**: Construíndo o Primeiro Classificador
  - Conheçendo o Keras
  - Repetindo exemplos conhecidos
  - Projeto: Desenho e implementação de um novo experimento
- **Semanas 6-7**: Otimizando o Classificador
  - Analisando resultados e testando parâmetros
  - Apresentação de resultados

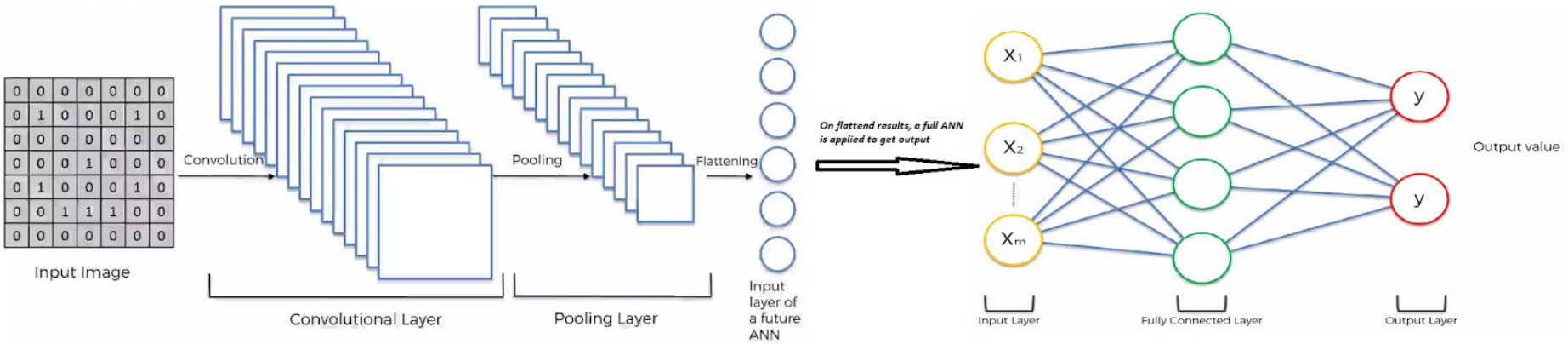
Semana 3

What is Deep Learning?

“A machine learning technique that learns **features and tasks** directly from data”.



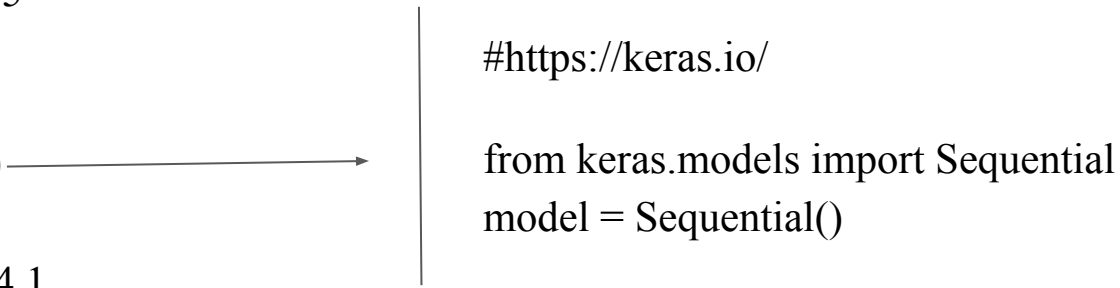
Full Connection



source: http://arun-aiml.blogspot.com.br/2017/07/convolutional-neural-networks.html

Instalação de pacotes e preparação do ambiente:

- Linux/VM
- Python 3.6
- Anaconda 1.6.5
- Conda
- Spyder 3.2.7
- OpenCV 3.3.0
- Keras 2.1.4
- Tensorflow 1.4.1
- GitHub



Example Dataset

https://www.superdatascience.com/deep-learning/

Most Visited Getting Started http://localhost:3000/

SUPER DATASCIENCE

Descent)

- Michael Nielsen, 2015, ***Neural Networks and Deep Learning***

PART 2. CONVOLUTIONAL NEURAL NETWORKS (CNN)

Datasets & Templates:

- **Convolutional_Neural_Networks**

3 Shares

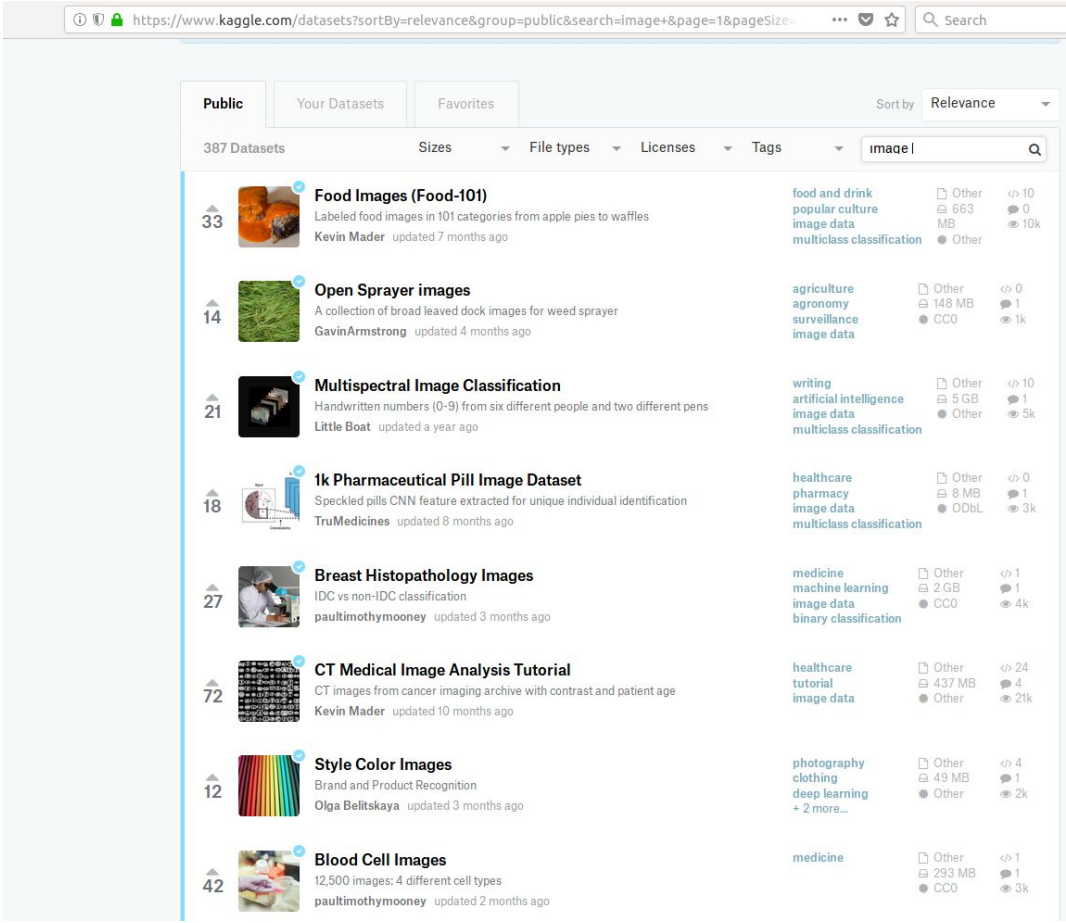
dditional Reading:

- Yann LeCun et al., 1998, ***Gradient-Based Learning Applied to Document Recognition***
- Jianxin Wu, 2017, ***Introduction to Convolutional Neural Networks***
- C.-C. Jay Kuo, 2016, ***Understanding Convolutional Neural Networks with A Mathematical Model***
- Kaiming He et al., 2015, ***Delving Deep into Rectifiers: Surpassing Human-Level Performance on ImageNet Classification***
- Dominik Scherer et al., 2010, ***Evaluation of Pooling Operations in Convolutional Architectures for Object Recognition***
- Adit Deshpande, 2016, ***The 9 Deep Learning Papers You Need To Know About (Understanding CNNs Part 3)***
- Rob DiPietro, 2016, ***A Friendly Introduction to Cross-Entropy Loss***
- Peter Roelants, 2016, ***How to implement a neural network Intermezzo 2***

Name	Size	Type	Date Modified
single_prediction	2 items	Folder	sáb 25 fev 2017
test_set	2 items	Folder	qua 07 dez 2016
training_set	2 items	Folder	qua 07 dez 2016

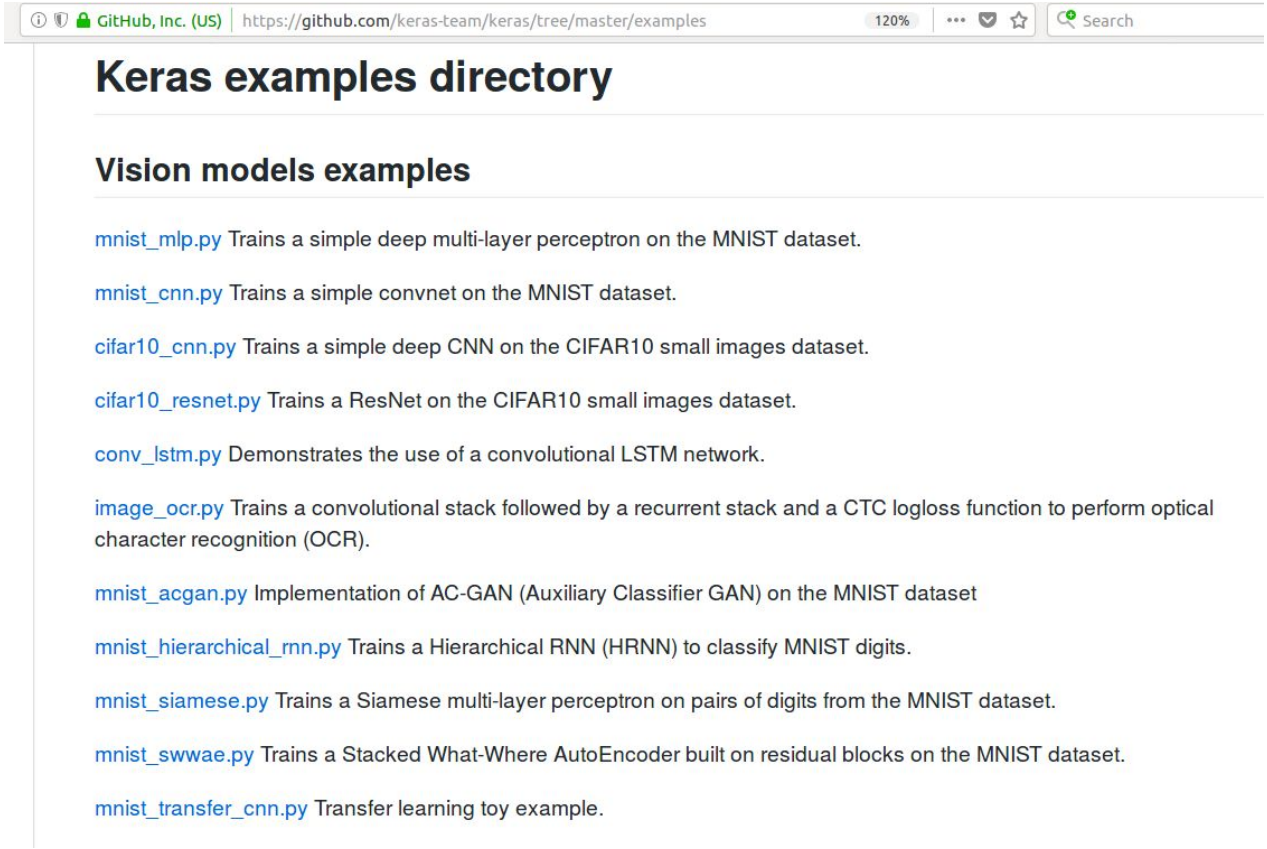
https://www.superdatascience.com/deep-learning/

Datasets



https://www.kaggle.com/

Datasets: https://github.com/keras-team/keras/tree/master/examples



Colab Google - https://colab.research.google.com

Test: *convolve 32x7x7x3 filter over random 100x100x100x3 images (batch x height x width x channel). Sum of ten runs.*

Helton-CPU (s): 6.736331526000868

Google-CPU (s): 8.688575368999864

Google-GPU (s): 0.17155587199977163

GPU speedup over CPU: 50x

Treinamento, validação e Testes

Visualize your data: histograms, scatter plots, debugging, find outliers/missing/duplicate values, rank metrics, etc.

Próximas semanas:

- Semanas 4-5: Construíndo o Primeiro Classificador
  - Conheçendo o Keras : API *Documentation*
  - Repetindo exemplos conhecidos:

    1) Testar e melhorar o desempenho do classificador exemplo (cat vs dog)

    2) Substituir as imagens/classes do item 1 e testar seu novo classificador

    3) Construa um classificador *multiclass* para um dataset conhecido a sua escolha

  - Projeto: Desenho e implementação de um novo experimento:
    - Discutir de ideias para o projeto