**Quick introduction to**

**Convolutional Neural Network (CNN)**

Please go over the list below (in order). Extra labeled numbers are optional but we highly recommend to go over them.

1. [Applications of CNNs](https://www.youtube.com/watch?time_continue=156&v=HrYNL_1SV2Y)
2. [How computers interpret images](https://www.youtube.com/watch?v=V4f6p6uRhu8)
   1. <https://github.com/udacity/aind2-cnn.git>
3. [MLPs For Image Classification](https://www.youtube.com/watch?time_continue=3&v=TIFStebu530)
   1. Extra:
      1. <https://www.cs.toronto.edu/~hinton/absps/JMLRdropout.pdf>
      2. <https://keras.io/layers/core/#flatten>
      3. <http://cs231n.github.io/neural-networks-1/#actfun>
4. [Categorical Cross-entropy](https://www.youtube.com/watch?time_continue=2&v=3sDYifgjFck)
5. [Model Validation in Keras](https://www.youtube.com/watch?time_continue=3&v=002jNXSM6CU)
6. [When do MLPs (not) work well?](https://www.youtube.com/watch?v=002jNXSM6CU)
7. [Mini project](https://github.com/udacity/aind2-cnn/blob/master/mnist-mlp/mnist_mlp.ipynb)
8. [Local connectivity](https://www.youtube.com/watch?v=z9wiDg0w-Dc)
9. [Convolutional Layers (Part 1)](https://www.youtube.com/watch?time_continue=11&v=h5R_JvdUrUI)
10. [Convolutional layers Part (2)](https://www.youtube.com/watch?time_continue=9&v=RnM1D-XI--8)
    1. <https://github.com/udacity/aind2-cnn>
11. [Stride and padding](https://www.youtube.com/watch?time_continue=2&v=0r9o8hprDXQ)
12. [CNN in Keras](https://keras.io/layers/convolutional/)
13. [Pooling layers](https://www.youtube.com/watch?v=OkkIZNs7Cyc)
14. [Max pooling in Keras](https://keras.io/layers/pooling/#maxpooling2d)
15. [CNNs For Image Classification](https://www.youtube.com/watch?time_continue=2&v=l9vg_1YUlzg)
16. [CNN in Keras:](https://www.youtube.com/watch?v=faFvmGDwXX0)
    1. <https://github.com/udacity/aind2-cnn>
       1. Navigate to the **cifar10-classification/** folder and open **cifar10\_mlp.ipynb** and **cifar10\_cnn.ipynb**.
    2. <https://github.com/udacity/aind2-cnn/blob/master/mnist-mlp/mnist_mlp.ipynb>
    3. Extra:
       1. [Link1](http://blog.kaggle.com/2015/01/02/cifar-10-competition-winners-interviews-with-dr-ben-graham-phil-culliton-zygmunt-zajac/)
17. [Mini project](https://github.com/udacity/aind2-cnn/blob/master/cifar10-classification/cifar10_cnn.ipynb)
    1. Extra:
       1. <https://github.com/keras-team/keras/blob/master/examples/cifar10_cnn.py>
       2. <https://keras.io/optimizers/>
18. Extra:
    1. [Image Augmentation in Keras](https://www.youtube.com/watch?v=odStujZq3GY)
    2. [Github](https://github.com/udacity/aind2-cnn/blob/master/cifar10-augmentation/cifar10_augmentation.ipynb)
19. [Ground breaking CNNs](https://www.youtube.com/watch?v=ddrB-mhMfkY)
20. Extra:
    1. [Visulazing the CNNs](https://www.youtube.com/watch?v=mnqS_EhEZVg)
21. Extra:
    1. [Transfer learning](https://www.youtube.com/watch?v=LHG5FltaR6I)
    2. [Transfer learning in Keras](https://github.com/udacity/aind2-cnn/tree/master/transfer-learning)