* Everything I know about the topic
* Questions I have
* Points I think I might like to cover
* Outside sources to research
* Quotes
* Other (can start compiling data)

**Subject : Convolutional neural networks (CNNs) for image recognition**

# Brain dump

## Points I want to cover (I think)

* General neural networks info
* Specificities of convolutional neural network
* Differences with other neural networks
* How CNNs work
  + Structure
  + Learning
  + Etc.
  + Revoir les vidéos de 3b1B pourrait être un bon point de départ. M’assurer que c’est pertinent pour le neural network que j’étudies cependant.
* How image recognition works
  + I saw there were different steps of decomposing and analyzing the image… What are those steps? What’s the purpose of each one? How do they work? How do they enable the neural network to recognize the subject of the picture?
* I’ve read that CNNs were especially well suited for image recognition… Why?
  + What characteristics of CNNS makes them well suited for image recognition, compared to other neural networks or artificial intelligence forms?
* …

## Everything I know about the topic

* Neural network structure
  + Neurons, layers
  + Connections, weights, biases
  + Activation of a neuron influences connected neurons according to weights and biases
  + Representation in a matrix 🡺 Especially well suited for GPU computation
* Learning
  + Training set (examples with solutions)
  + Measuring cost of errors
  + Backpropagation (start from output layers, reinforce, or weaken connections that give or don’t give the expected result)
  + Repeat process on all training set until results satisfactory
  + Gradient descent? Worth talking about? (Video #2)
  + Backpropagation calculus 🡺 The math should be covered
* Image recognition
  + I don’t know much about this
  + Decompose image to find outlines of objects
  + Compare to a database
  + Must research lol
* CNNs for image recognition
  + I also don’t know anything about this… Must research.

## Questions I have

* The image recognition part… Clearly, I don’t know much. Must research.
* Why CNNS are good for image recognition compared to others… Must also research. Specific characteristics and comparisons.

## Other stuff

# Recherche

* Develop a well-defined **focus** for your paper 🡺 The use of CNNs for image recognition.
* Come up with several **guiding questions** that you’d like to answer 🡺 already done above. 3 main questions. What CNNs are? How they work? How they achieve image recognition? Why are they well suited for image recognition?
* Lot of research done on paper. References in Zotero

Convolutional neural networks (CNNs) for image recognition

* Cover page
* Abstract
* Table of contents
* Background and introduction
  + SA
  + SP
  + SD
* What is a CNN?
  + Multilayer perceptron that uses image convolution
  + What is a multilayer perceptron?
    - What is a neuron?
    - Why are there multiple layers?
    - What is the purpose of the different layers?
    - What is a connection?
    - Why is there a bias?
    - How do we train neural networks?
    - What is the cost function?
    - What is backpropagation?
  + What is an image convolution?
    - What is an image convolution?
    - What is a kernel?
    - What are filters?
  + Multilayer perceptron + image convolution = CNN
    - Not fully connected
    - Make “3D” image from original 2D image + multiple different convolutions applied = Extract more data from initial image
* How can a CNN achieve image recognition?
  + Covered in the part above?
  + Apply multiple convolutions
  + Feed patches of image to neural network instead of individual pixels
* Why are CNNs good for image recognition?
  + Keeps spatial data unlike MLP
  + Not fully connected = lighter and more efficient than a regular multilayer perceptron
  + Use of different filters = enables extraction of many kinds of data
  + More possibilities (for ex not just classification. Identification also possible)
* Conclusion
* References