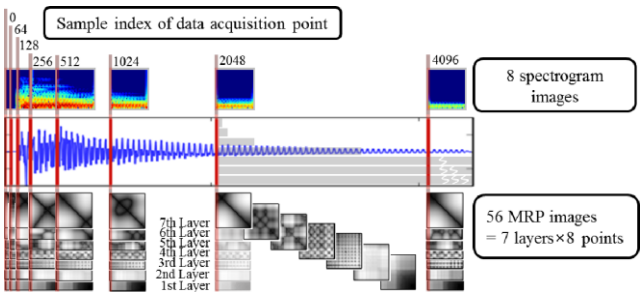
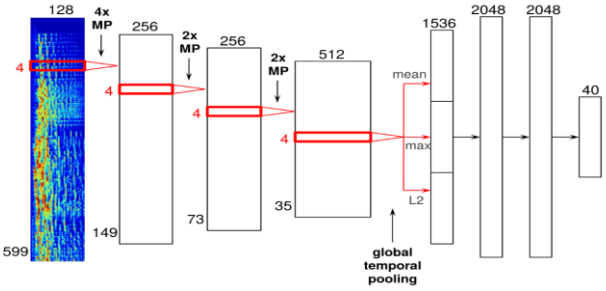
Vector Input for Neural Network

Daniel Lu, 2018 / 3 / 1

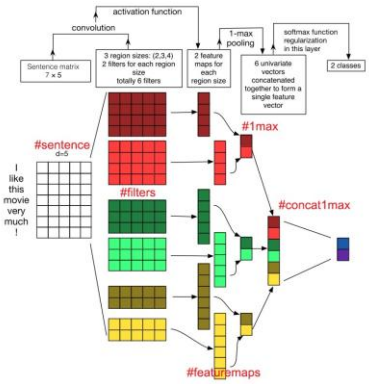
Since the most popular Neural Network use visual data (Pixels) as input, like image, sound, text…, then processing the pixel data with weights in different kind of model.

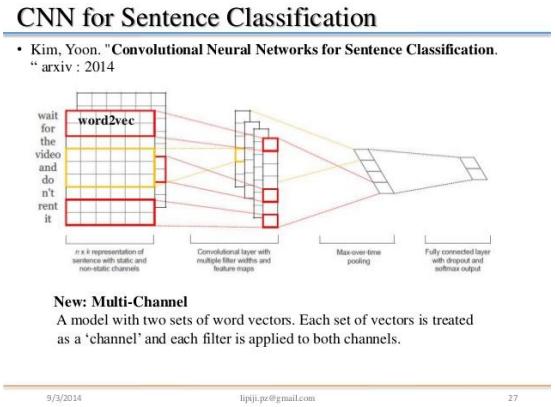
Sound :





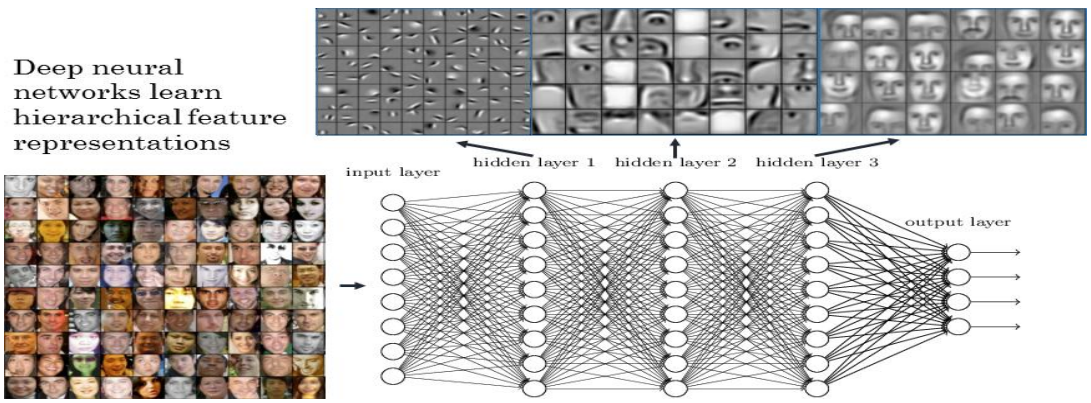
Text :





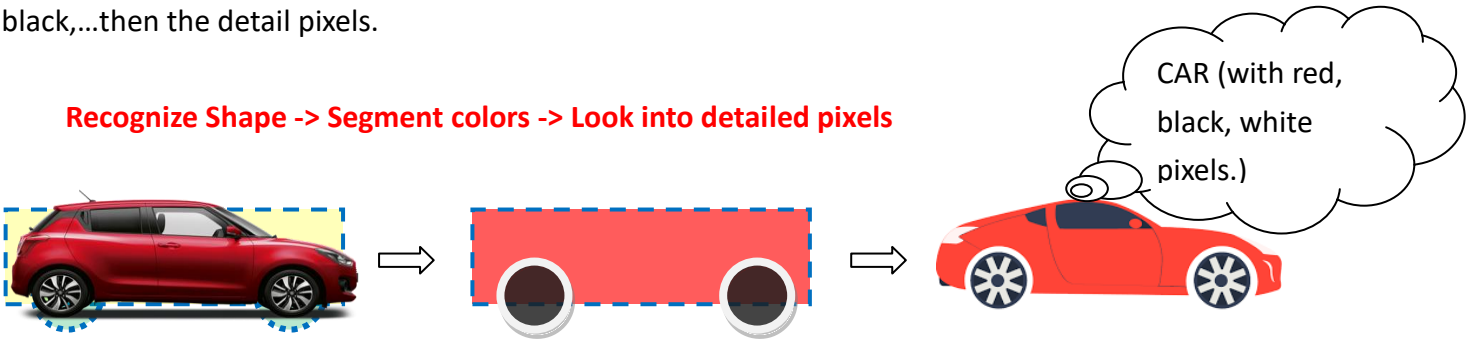
The computer process data directly from pixels, the most basic element of visual data. Even the Convolution Neural Network, it grouping the partial pixels step by step with filter weights, still work in the same, processing the pixels first, then extract the features of shapes.

Weights Pixels -> Extract Shapes -> Classification



What happened in human seems working in a reversed path. While we try to recognize an object, first we recognize the shape roughly, circle, rectangle, slim, thick, long, short…, then the color, green, white, black,…then the detail pixels.

Recognize Shape -> Segment colors -> Look into detailed pixels



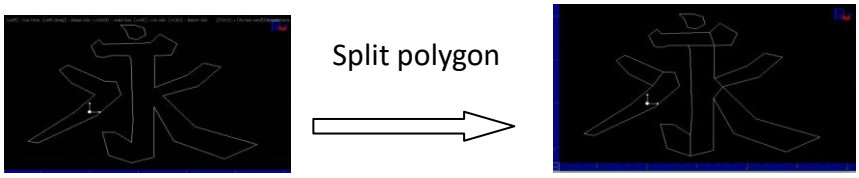
So, will it helpful if we simulate the human's classifying process. Can computer do the better job than directly processing the pixels data?

What came to my mind, if we did previous vector processing, like Raster to Vector (polygon, skeleton), Polygon splitting (get shapes), extract features from these vector data, like roundness, straightness, length, size, area, angles…etc. Will that helps to improve the current Neural Network?

Polygon Splitting:

https://goo.gl/3aZ2Y3

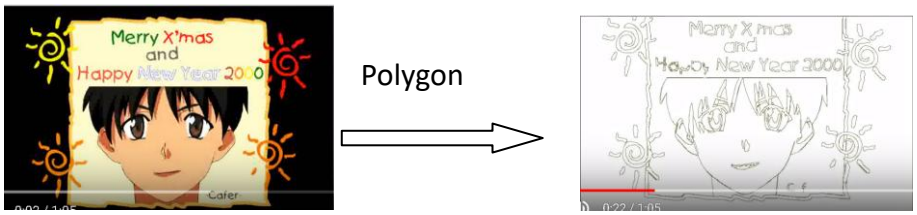
https://goo.gl/4SEuyW



Raster To Vector Polygon:

https://goo.gl/xXBHDm

https://goo.gl/2VaqA9

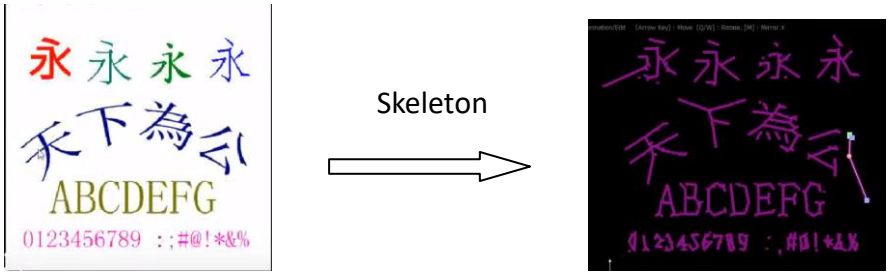


Raster To Vector Skeleton :

https://goo.gl/6tcujd

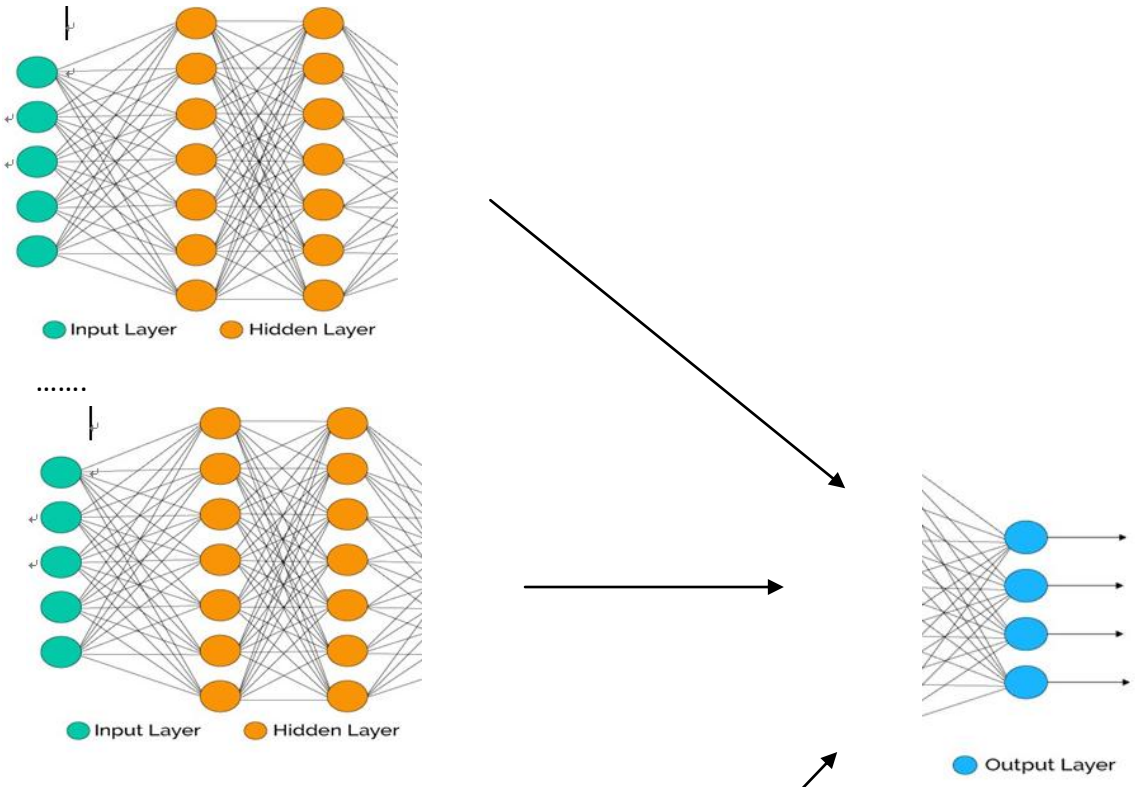
https://goo.gl/gh8sFu

https://goo.gl/VkwxhA

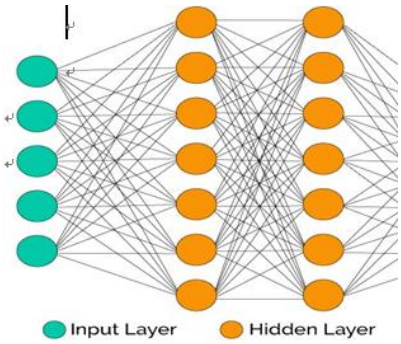


Add a new channel of input, vector input for Neural Network.

Channel[1..n], R, G, B…



Channel[n+1], Vector Input



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