Neuron Segmentation

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Approaches

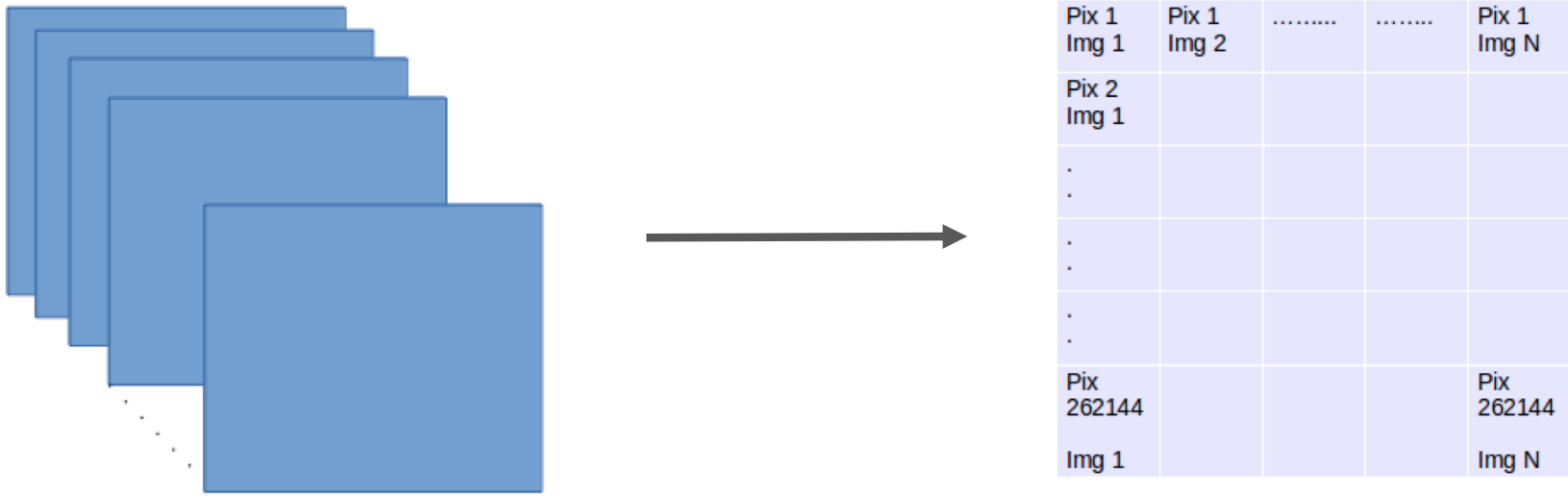
- Nonnegative Matrix Factorization
- Dense Neural Networks

NMF

- The images are read into a single large matrix V, of dimensions (R*C, N) where R is # of rows, C is # of columns, N is # of images
- This matrix is factorized into W (features) and H (coefficients) matrices such that V - W*H ≈ 0
- Regions of interest are extracted over feature matrix where pixels exceed an overlap threshold and are looked in k-nearest neighbors

Dense Neural Network

- Data Preprocessing
  - Three dimensional data transformed to two dimensional data.



Pix 1 Img 1	Pix 1 Img 2	……..	……..	Pix 1 Img N
Pix 2 Img 1				
. .				
. .				
. .				
Pix 262144 Img 1				Pix 262144 Img N

Dense Neural Network

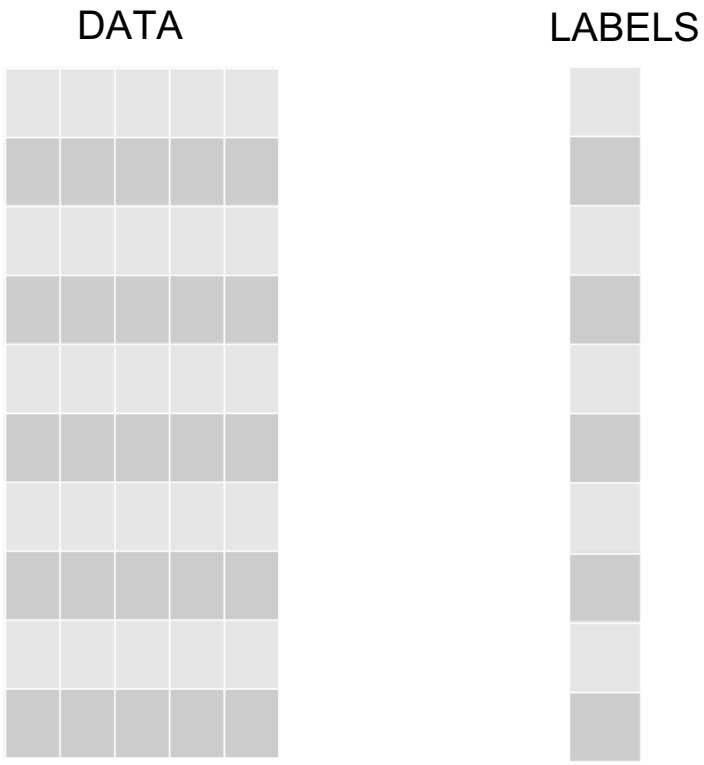
- Labels from the JSON to two dimensional matrix.

JSON 

Pix 1 0 or 1	Pix 2 0 or 1	……..	……..	Pix 512 0 or 1
Pix 2 0 or 1				
. .				
. .				
. .				
Pix 512 0 or 1				Pix 512 x 512 0 or 1

Dense Neural Network

- Dense neural network for binary classification.
- Predicts whether a pixel is neuron or not.
- Apply Laplacian Filter to give the surroundings of the neurons.
- OpenCV contours for blob detection to a list.
- List to JSON



Questions?

ThanQ

What worked well => PyCharm

What did not work well => Our code in PyCharm.