Notebook

<https://colab.research.google.com/drive/1iviwr6a9ymgtL_t_U-pJPm1T5w2kHJGi?usp=sharing>

FFT stuff

<https://homepages.inf.ed.ac.uk/rbf/HIPR2/fourier.htm#:~:text=The%20Fourier%20Transform%20is%20an,its%20sine%20and%20cosine%20components.&text=The%20Fourier%20Transform%20is%20used,image%20reconstruction%20and%20image%20compression>.

<https://scikit-image.org/docs/0.3/api/scikits.image.transform.html>

<http://scipy-lectures.org/intro/scipy/auto_examples/solutions/plot_fft_image_denoise.html>

<https://opencv-python-tutroals.readthedocs.io/en/latest/py_tutorials/py_imgproc/py_transforms/py_fourier_transform/py_fourier_transform.html>

<https://scikit-image.org/docs/dev/auto_examples/edges/plot_circular_elliptical_hough_transform.html>

<https://peteris.rocks/blog/extrapolate-lines-with-numpy-polyfit/>

THE BEST MATCH IS THE ONE THAT MINIMIZES THE INCREASE IN CURVATURE OF FIT SPLINES (AND DISTANCE?)

Also just realized extending a poly fit would just be sampling outside bounds

As post discussed fit order one line to shape to get axis for fitting the rotate

Do high order poly fit saving result and rotation / translation

Extend rotate back onto image check for intersection

A very good stack overflow post

<https://stackoverflow.com/questions/48322740/curvature-of-a-one-pixel-wide-curve>

Provides Skeleton to csgraph

<https://jni.github.io/skan/api/skan.csr.html>

Skeleton to csgraph produces below

<https://docs.scipy.org/doc/scipy/reference/sparse.csgraph.html>

<https://jni.github.io/skan/api/skan.draw.html>

Creating a tree from the above

<https://docs.scipy.org/doc/scipy/reference/generated/scipy.sparse.csgraph.breadth_first_tree.html#scipy.sparse.csgraph.breadth_first_tree>

<https://numpy.org/doc/stable/reference/generated/numpy.polynomial.polynomial.Polynomial.fit.html#numpy.polynomial.polynomial.Polynomial.fit>

<https://matplotlib.org/3.1.1/gallery/color/colormap_reference.html>

Other efforts

Look into deformable contours for stuff

Older notes

Me looking for thinning ops

<https://www.pyimagesearch.com/2016/02/01/opencv-center-of-contour/>

<http://opencvpython.blogspot.com/2012/05/skeletonization-using-opencv-python.html?m=1>

<https://stackoverflow.com/questions/33095476/is-there-any-build-in-function-can-do-skeletonization-in-opencv>

Thinning

https://docs.opencv.org/4.4.0/df/d2d/group\_\_ximgproc.html#ga37002c6ca80c978edb6ead5d6b39740c

https://docs.opencv.org/master/d9/d29/namespacecv\_1\_1ximgproc.html

https://docs.opencv.org/master/df/d2d/group\_\_ximgproc.html

Interpolation after thinning

https://scipy-cookbook.readthedocs.io/items/RadialBasisFunctions.html

https://docs.scipy.org/doc/scipy/reference/tutorial/interpolate.html

<https://docs.scipy.org/doc/scipy/reference/interpolate.html>

https://stackoverflow.com/questions/61103400/fit-a-spline-on-image

https://pomax.github.io/bezierinfo/

Papers

<https://www.semanticscholar.org/paper/An-Algorithm-for-Curve-Identification-in-the-of-Gnecco/9a205572bea220b4afc61eb92a65904dcdabc2b3>

<https://www.semanticscholar.org/paper/CURVE-TRACING-AND-CURVE-DETECTION-IN-IMAGES-Raghupathy/48a12fb85ad6f1f5f0f43f8e48a8ee5f836892f6?p2df>