What to do

* Document Scan
* Scanned Image File Upload
* Image Preprocessing Pipeline
* OCR - Text Detection & Extraction
* Information Extraction with NLP
* Text to Speech Conversion

## Image Preprocessing Pipeline

Processing Techniques

* Brightness Correction
* Contour Detection
* Scaling of Image
* Skewness Correction
* Noise Removal
* Binarization

Document Detection

* https://indiantechwarrior.com/canny-edge-detection-for-image-processing/

Preprocessing

* https://towardsdatascience.com/pre-processing-in-ocr-fc231c6035a7

Skewness

* <https://blog.ekbana.com/skew-correction-using-corner-detectors-and-homography-fda345e42e65>
* <https://muthu.co/skew-detection-and-correction-of-document-images-using-hough-transform/>

Detect Blurry Images ---- Blur correction (sharpening)

* <https://www.pyimagesearch.com/2015/09/07/blur-detection-with-opencv/>
* <https://www.analyticsvidhya.com/blog/2020/09/how-to-perform-blur-detection-using-opencv-in-python/>
* <https://www.geeksforgeeks.org/python-sharpen-function-in-wand/>
* <https://stackoverflow.com/questions/58231849/how-to-remove-blurriness-from-an-image-using-opencv-python-c>
* <https://www.analyticsvidhya.com/blog/2021/08/sharpening-an-image-using-opencv-library-in-python/>

Noise

* <https://medium.com/image-vision/noise-filtering-in-digital-image-processing-d12b5266847c>
* https://towardsdatascience.com/denoising-noisy-documents-6807c34730c4

Segmentation

* <https://towardsdatascience.com/segmentation-in-ocr-10de176cf373>

Shadow Detection

* <http://dhoiem.cs.illinois.edu/publications/cvpr11_shadow.pdf>
* https://stackoverflow.com/questions/44047819/increase-image-brightness-without-overflow/44054699#44054699

Edge Detection

Edge detection is nothing but a filtering process. There are so many types of filters like Sobel, Roberts, Prewitt and Canny filters available these filters are based on the first-order derivative. The Laplacian of Gaussian is based on the Second-order derivative. The type of filter to be used depends on the application and the efficiency too depends on various factors like type of filter and the value of threshold, etc. Some other filters include Morphological Gradient & Laplacian.

Canny Edge Detection

Canny edge detection uses linear filtering with a Gaussian kernel to smooth noise and then computes the edge strength and direction for each pixel in the smoothed image. Candidate edge pixels are identified as the pixels that survive a thinning process called non-maximal suppression. In this process, the edge strength of each candidate edge pixel is set to zero if its edge strength is not larger than the edge strength of the two adjacent pixels in the gradient direction. Thresholding is then done on the thinned edge magnitude image using hysteresis. In hysteresis, two edge strength thresholds are used. All candidate edge pixels below the lower threshold are labeled as non-edges and all pixels above the low threshold that can be connected to any pixel above the high threshold through a chain of edge pixels are labeled as edge pixels.

The Canny edge detector requires the user to input three parameters. The first is sigma, the standard deviation of the Gaussian filter specified in pixels. The second parameter, low, is the low threshold which is specified as a fraction of a computed high threshold. The third parameter high is the high threshold to use in the hysteresis and is specified as a percentage point in the distribution of gradient magnitude values for the candidate edge pixels.