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[CSE 340] Digital Image Processing
Project Proposal

Automated Handwritten Flowchart Converter

A flowchart is one of the most commonly used methods to chalk out a plan of action, or the steps in a process, or an algorithm. We plan to automate the process of converting a handwritten draft of a flowchart into a graph object using image-processing techniques. We will follow a rough methodology as follows:

- take jpg image of the flowchart (using mobile camera or some other input device),
- remove noise, apply filters, carry out geometric/spatial transforms,
- detect edges for distinguishing the pertinent shapes/components,
- identify each component, estimate the equivalent size and dimensions in the graph object using different parameters,
- establish the direction of flow using the arrows, and finally,
- reconstruct the graph object in a suitable language (preferably Python).

Objectives:

1. Use digital image processing techniques to analyse the visual structure of the handwritten flowchart.
2. Apply these techniques to reconstruct the digital image of the flowchart.
3. Analyse the errors and evaluate the results using simpler images.

Bonus Objectives (if time permits):

1. Incorporate text written in the image to the graph object at the appropriate location.
2. Improve the base model using advanced techniques.
3. Evaluate complex images.
4. Create an android app for an interactive experience.

Timeline:

1. *Mid evaluation*: Obtain image dataset and finalize the project objectives and workflow. Complete main objective 1.
2. *Final evaluation*: Complete and refine the algorithm and finish with main objective 2. Evaluate the results so obtained. Try bonus objectives if time permits.

References:

1. http://ceur-ws.org/Vol-1178/CLEF2012wn-CLEFIP-MorzingerEt2012.pdf
2. https://link.springer.com/content/pdf/10.1007%2Fs10791-013-9234-3.pdf
3. https://web.stanford.edu/class/ee368/Project_Winter_1718/Posters/Hsu_Lyu_Zhang_Yu.pdf