Digital Image Processing: Lab Assignment
Image Morphing [100 points]

Issue date: - -April 12th, 2020   Due date: - April 20th, 2020

Instructions

- Do not copy code from any other source (internet or friend). In case, any plagiarism detected, strictly zero mark will be assigned for that assignment.

- Show your results on sample images given in the assignment. Any other won't be considered for evaluation.

- Clearly state your name and Entry number on the lab report.

- Any additional materials used during the completion of the assignment must be cited. Failure to correctly reference sources will result in mark deduction(-10p/day).

- Submit a PDF file with proper. If the report is handed in more than three days after the deadline, the assignment will be marked zero marks. Up to fifty bonus points may be awarded to the student for very good lab assignments that comply with the criteria described below:

  +10p ← Report is clearly written and easy to follow.
  +10p ← Code is well documented.
  +10p ← Explanations and Observations are well written.
  +10p ← For overall exceptional reports, that confirm to all scientific writing standards.
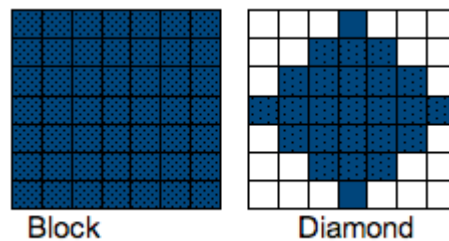 +10p ← Extra experiments performed on other set of images for better understanding.

Image Morphing

Question 1: [40]

[1] Compare the results of 1 x Dilate (DIAMOND, 5) and 1 x Dilate(BLOCK, 5) on "notes.jpeg". Are they the same? Why?

[2] Compare the results of 3 x Close (BLOCK, 3) and 1 x Close (BLOCK, 3) on "notes.jpeg". Are they the same? Why?

Block   Diamond

[3] **Detect black note heads**

Propose an algorithm to detect only the black heads of the notes based on morphological operators and a final thresholding. The goal is to replace the black heads in the image "notes.jpeg" by small squares (e.g. 7x7 pixels) and to remove everything else as shown in figure below Result.jpeg.

Save the result image and briefly describe your algorithm in the report.

Notes.jpeg   Result.jpeg
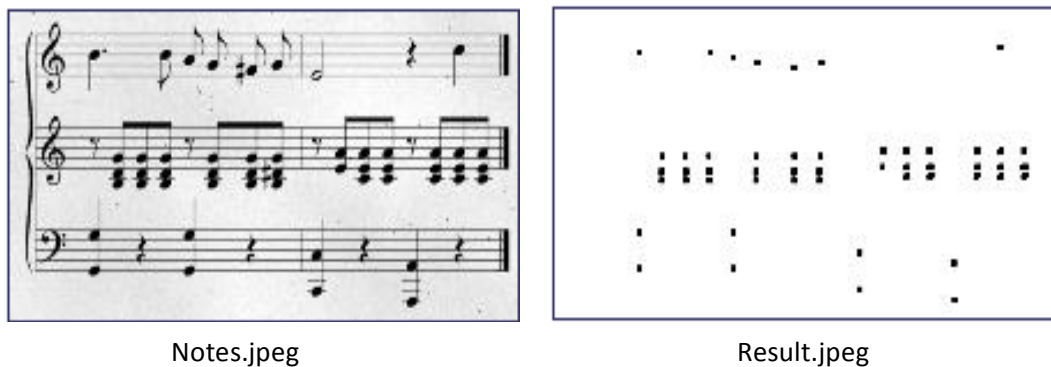
Question 2: [30]

In the image lines.bmp shown below, count only the circular objects by assigning a different label to a disconnected circular object. Use appropriate morphological operations and show the corresponding output image with a brief description of your algorithm.
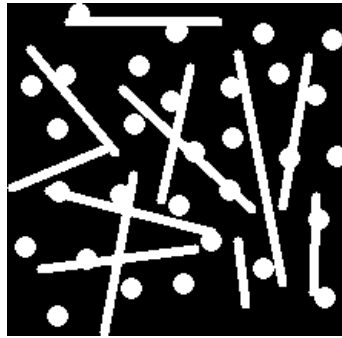
Question 3: [30]

Occluding objects are difficult to segment into individual objects, observe the image Q3_1.bmp.

(a) Write a program to separate the two objects using morphology and thresholding operations. The result should be a binary image containing these two objects, not connected to each other. Explain your algorithm in detail in the report with proper explanation.

Q3_1.bmp
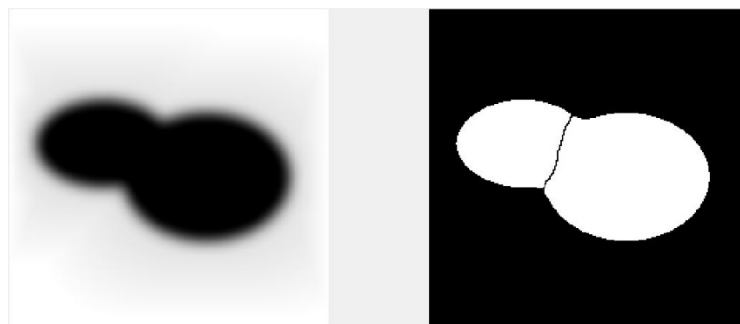
(b) Also, explain any circumstance in which your algorithm might fail