ME 5405 Machine Vision

Assignment – AY20/21 Semester 1

Computing Project

You are required to form a group of 2-3 students to work on the computing project. The software must be developed using MATLAB. Your report should include the followings:

1. an introduction to the problem,
2. a description of your algorithm and flow chart,
3. screen dumps of every stage of the image processing,
4. an explanation on why you choose the method employed in your project, and
5. a conclusion including comments on how processing the two images are similar and/or different.

Image 1: Available on LumiNUS-ME5405-Files-Lecture Notes – charact1.txt
Image 2: Available on LumiNUS-ME5405-Files-Lecture Notes – charact2.jpg

Images 1 is a 64x64, 32 level images. The image is shown a coded array that contains an alphanumeric character for each pixel in the image. The range of these characters is 0-9 and A-V, which corresponds to 32 gray levels.

Image 2 is a JPEG image of a label on a microchip. The characters are inverted. You are required to invert them before proceed with the following tasks.

For each image, perform the following tasks sequentially:

1. Display the original image on screen.
2. Create a binary image using thresholding.
3. Segment the image to separate and identify the different characters.
4. Rotate the characters in the image about their own respective centroids by 90 degrees clockwise.
5. Rotate the characters in the image from Step 4 about their own respective centroids by 35 degrees counterclockwise.
6. Determine the outline(s) of characters of the image.
7. Determine a one-pixel thin image of the characters.
8. Arrange the characters in one line with the sequence:
   A1B2C3 for Image 1 and **81344100ARHDFS** for image 2.

You should upload your report and software to LumiNUS-ME5405-Files-Student Submission by 20 November 2020, 23:00 hours.

This is a group project. Please submit only one set of report and software. All members of the group will receive the same scores.

Image 1

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0000000004MJ0000000000000000002STRRD00000000000000000NNLM9000000
000000004LMH000000000000000005OMPPOMO000000000000008JKHOJJD00000
000000BONMMI00000000000000000KOE00DNM80000000000000IJ6003CI10000
00000007FOKMH0000000000000000NL0000HMD0000000000004KE0000BJ50000
0000000009MI00000000000000000BA0000FME0000000000000000000EJ30000
0000000008MH00000000000000000000000KNA000000000000000000FJ900000
0000000008MI0000000000000000000000JMK10000000000000000007JJH000000
0000000008MI000000000000000000000LNL40000000000000000004CIJ40000
0000000008MH00000000000000000000MOI3000000000000000000000007OF0000
0000000006MH0000000000000000000LOD000000000000000005000001OH0000
0000000007MH000000000000000000JMB00000000000000000DJB00005HO0000
0000000007MH00000000000000000AMMJADFID0000000000003IK4003OID0000
00000000061D00000000000000000JPOOOONK00000000000000AKJJIIJF10000
0000000000100000000000000000BAAAABA7400000000000000005EHOE7000000
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000000000BJH0000000000000000MURRRSLS000000000000000COJJKLL000000
000000004LLK5000000000000000KNNOPONKO0000000000000HJNHDEJKJ00000
00000000CMMLJ000000000000000MOD4579MMF00000000000BKL40004FJC0000
00000002LMILM400000000000000LMS0000EMJ00000000000JM7000003C90000
00000005MJ4OMO00000000000001MO40000CMF00000000005KK0000000000000
0000000BMB07NM00000000000002LNA00003NM3000000000DKH0000000000000
0000000JL301KN2000000000001MOMPROLM300000000000CLO0000000000000
0000002JJ000FMB000000000002NOMHHIMNP00000000000BKO0000000000000
0000004MJ000OMO000000000002MO40000CNM0000000000SLK0000000000000
000000DNOUUUMML0000000000003ON300000MN10000000001KM4000000LN0000
000001KLHOFFFMMD000000000003LO500001MN20000000000FLK00000BJH0000
000007LI00000FML000000000000MO70000MOL000000000002LLM500JMK50000
00000DMD000004JK000000000000NPPTVUONPA0000000000003KNJJJKMA00000
00000CE3000000A8000000000000JNNNLNMLO400000000000009OIOB00000000
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<u>Image 2</u>