AMERICAN UNIVERSITY OF ARMENIA

*College of Science and Engineering*

**CS 260 Image Processing**

**PROJECT**

**PRELIMINARY DEADLINE**: Sunday, December 08 2019, before 09:00 am SHARP

**FINAL DEADLINE**: Tuesday, December 17 2019, before 09:00 am SHARP

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**Stage 1**

1. Experiments led to some good smoothening techniques:

Technique 1 - Median (Radius 1.0) 🡪 Gaussian Blur (Radius 0.5) 🡪 Mean (Radius 0.7) (slight smoothening)

Technique 1 - Mean (Radius 2) 🡪 Gaussian Blur (Radius 1) 🡪 Min (Radius 1) 🡪 Mean (Radius 2) (medium smoothening)

Technique 1 - Gaussian Blur (1.0) 🡪 Mean (2) 🡪 Unmask (1, 0.6) 🡪 Min(1) 🡪 Gaussian Blur (1) 🡪 Median (2) 🡪 Gaussian Blur (2) (strong smoothening)

Smoothing is done in way that the binary layer extraction won’t be damaged.

After the last one, applied binary layers show more smoothened and homogenous results.

1. Using the following matrix in Convolve, gave very similar results to the ones obtained in point1.

Matrix1 (light smoothening)

30 30 30

30 90 30

30 30 30

Matrix2 (strong smoothening)

-1000 -1000 -1000

-1000 10 -1000

-1000 -1000 -1000

Using the last matrix three times in a row gives similar results to Stage1.1.

1. For the following task, some visual observations have been made. In addition, a plugin was created for the calculation of Orientation and Eccentricity (Stage0 🡪 A09…93 folder path).

Though I have a moment calculation plugin (in Stage0 🡪 A09…93) I decided to include only the visual analysis.

For layer\_0: Rotation of the head changes the amount of light distribution of the face and some parts become lighter, some more shadowy. For 44\_11 the light around neck and borders of the face is more or less uniformly distributed, however in other cases, especially 44-10, more intense black pixels appear on some parts of the neck, while in other parts black pixels decrease.

For layer\_1: As layer\_1 basically highlights the less accented parts in layer\_0 and decrease pixel in regions where layer\_0 is dense, the same pattern is observed here.

For layer\_2: For layer\_2 the rotation affects orientation and especially eccentricity.

For layer\_3: Besides the fact that the more head is rotated, the less central region is displayed and also one ear becomes invisible, interesting difference between the images is the highlight on nostrils. They are better visible at rotated positions.