**CS 7650 – Digital Image Processing**

Assignment 3 – Image Transformations for Data Augmentation

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**Abstract**

This assignment’s purpose was to familiarize ourselves with image transformations using built in functions in OpenCV.

***PART 1***

Translate by (tx, ty) (10 points)

**Input Image**

**A picture containing person, smiling, posing, close

Description automatically generated**

**Output Images**

**A black rectangle with a white background

Description automatically generated with low confidenceA person smiling for the camera

Description automatically generated with low confidence**

**A close up of a person

Description automatically generated with medium confidence**

**Graphical user interface

Description automatically generated with medium confidenceA close up of a person's face

Description automatically generated**

***PART 2***

Crop and Scale/Resize, upper left crop location and crop region size (15 points)

**A person with a beard

Description automatically generated with low confidence**

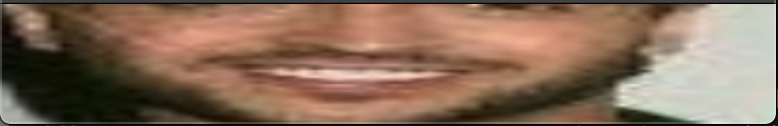
**Input Image**

**Output Images**

A close up of a person

Description automatically generated with low confidence





A person with a beard

Description automatically generated with low confidence

A close up of a person's face

Description automatically generated with medium confidence

***PART 3***

Vertical-Flip about y-axis (10 points)

**Input Image**

**A person wearing glasses

Description automatically generated with low confidence**

**Output Images**

A picture containing person, glasses, person, smiling

Description automatically generated

***PART 4***

Horizontal-Flip about x-axis (5 points)

**Input Image**

**A person wearing glasses

Description automatically generated with low confidence**

**Output Images**

A picture containing glasses

Description automatically generated

***PART 5***

Rotate by five random angles between -180 deg to +180 deg (15 points)

**Input Image**

**A person with a mustache

Description automatically generated with low confidence**

**A picture containing text, person, person

Description automatically generatedOutput Images**

**A picture containing text, person, person

Description automatically generatedA picture containing text, person, person, indoor

Description automatically generatedA picture containing text, person, person, indoor

Description automatically generated**

**A picture containing text, person, person, music

Description automatically generated**

***PART 6***

Randomly erase three (small) rectangular regions in the original image each at a different location and size (15 points)

**Input Image**

**A person with a mustache

Description automatically generated with medium confidence**

A picture containing text, person, indoor

Description automatically generatedA picture containing text, person

Description automatically generated**Output Images**

**A picture containing text, person, person, indoor

Description automatically generatedA person with a mustache

Description automatically generated with low confidenceA picture containing person, indoor

Description automatically generated**

***PART 7a***

Random intensity stretch for grayscale images (15 points)

**Input Image**

**A close up of a person

Description automatically generated with medium confidence**

**A close up of a person

Description automatically generated with low confidenceOutput Images**

**A close up of a person

Description automatically generated with low confidenceA picture containing wall, indoor, person, looking

Description automatically generatedA close up of a person

Description automatically generated with low confidenceA picture containing text, wall, indoor, person

Description automatically generated**

***PART 7b***

Random contrast stretch one or more channels in RGB images (15 points)

**Input Image**

**A person smiling for the camera

Description automatically generated with medium confidence**

**Output Images**

A picture containing text

Description automatically generated

Shape

Description automatically generated with low confidence

A person smiling for the camera

Description automatically generated with medium confidence

***PART 8***

Blurring using local averaging, use a box filter (all ones) of three sizes: 3x3, 5x5, 7x7 (15 points)

**Input Image**

**A picture containing person, glasses, person, smiling

Description automatically generated**

**Output Images**

**A person wearing glasses

Description automatically generated with low confidenceA person wearing glasses

Description automatically generated with low confidenceA person wearing glasses

Description automatically generated with low confidenceA picture containing person, person, glasses, smiling

Description automatically generatedA person wearing glasses

Description automatically generated with low confidence**