

## **LAB11: Geometric Transformation (part1)**

### **Objectives**

Upon completion of this lab, you will be able to:

1. Write a program in MATLAB to decrease the size of an original image using point sampling and local averaging.
2. Write a program in MATLAB to increase the size of the original image using pixel replication and midpoint interpolation.
3. Write a program in MATLAB for increasing and decreasing the size of the original image using nearest neighbor interpolation and bilinear interpolation.

### **Exercises**

Note that you should create your own program in MATLAB. It means that you cannot call MATLAB built-in function, which generates output in the same manner as your own program. You can use the images provided in the folder \Google Drive\EGCI486\_60-1\LABs\LAB11\_Part1 for your exercises.

#### 1) Decreasing the original image size

1.1 Write a program in MATLAB to decrease the size of an original image using point sampling, with the following program name: Propointsam.m. Using this program on the image “woman\_blonde.tif” should give you result as shown in Figure 1.

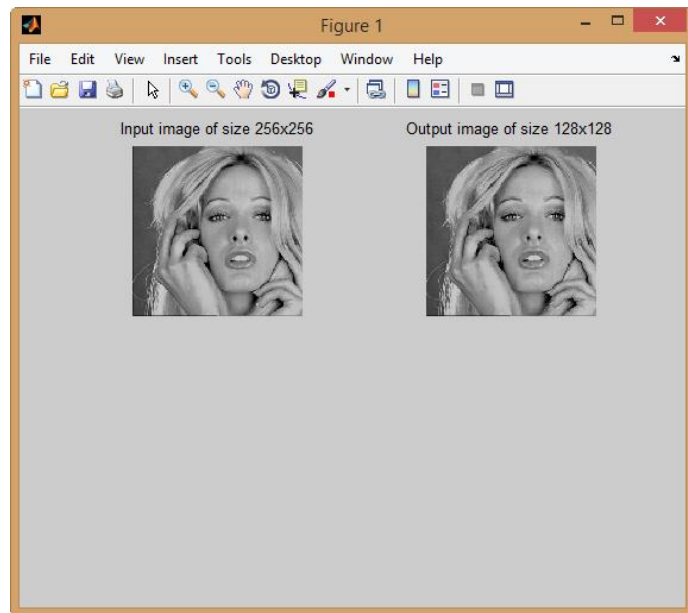


Figure 1: The decrease image resulted from resizing the original image size from  $256 \times 256$  to  $128 \times 128$ , using point sampling.

1.2 Write a program in MATLAB to decrease the size of an original image using local averaging, with the following program name: Prolocalaver.m. When this program is used with the image "woman\_blonde.tif" result as shown in Figure 2.

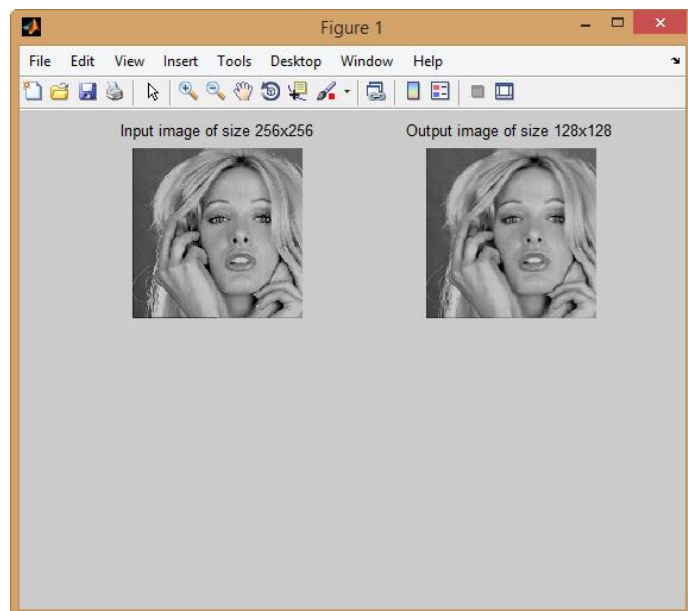


Figure 2: The decrease image resulted from resizing the original image size from  $256 \times 256$  to  $128 \times 128$ , using local averaging.

## 2) Increasing the original image size

2.1 Write a program in MATLAB to increase the size of the original image using pixel replication, with the following program name: Propixelrep.m. Using this program on the image “woman\_blonde.tif” should give you result as shown in Figure 3.

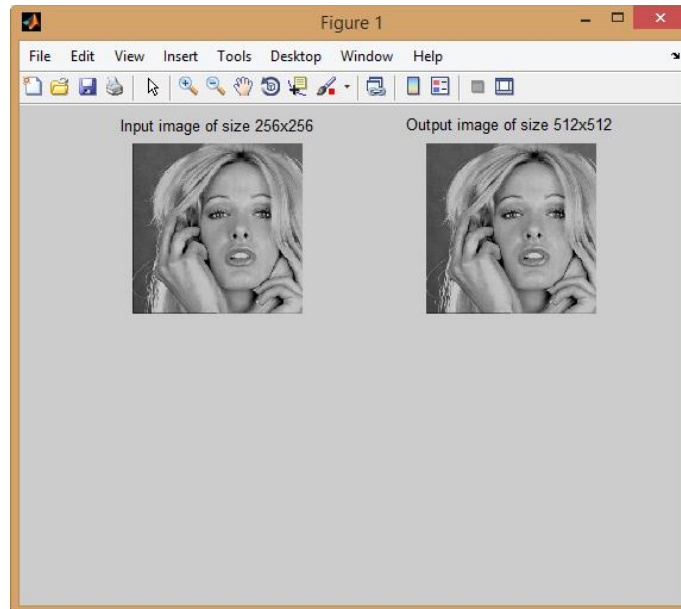


Figure 3: The increase image resulted from resizing the original image size from  $256 \times 256$  to  $512 \times 512$ , using pixel replication.

2.2 Write a program in MATLAB to increase the size of the original image using midpoint interpolation, with the following program name: Promidpoint.m. When this program is used with the image “woman\_blonde.tif” result as shown in Figure 4.

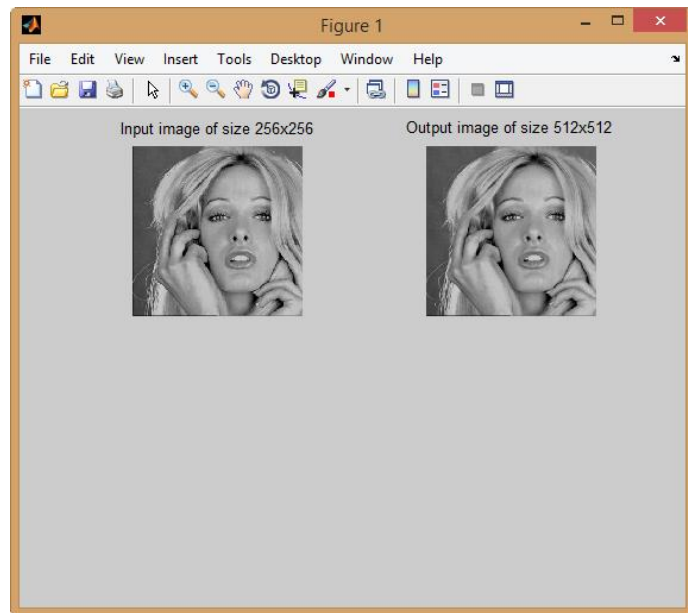


Figure 4: The increase image resulted from resizing the original image size from  $256 \times 256$  to  $512 \times 512$ , using midpoint interpolation.

### 3) Adjusting the original image size

3.1 Write a program in MATLAB for increasing and decreasing the size of the original image using nearest neighbor interpolation, with the following program name: `Pronearest.m`. Using this program on the image “`woman_blonde.tif`” should give you result as shown in Figure 5.

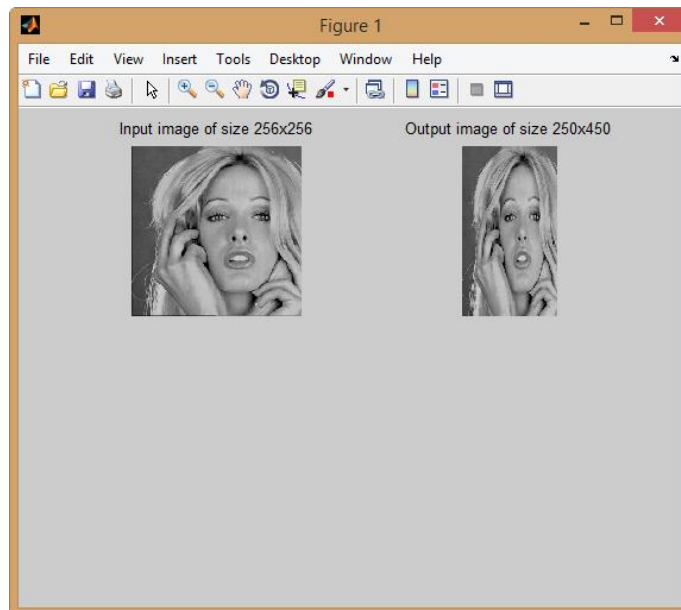


Figure 5: The adjust image resulted from resizing the original image size from  $256 \times 256$  to  $250 \times 450$ , using nearest neighbor interpolation.

3.2 Write a program in MATLAB for increasing and decreasing the size of the original image using bilinear interpolation, with the following program name: Probilinear.m. When this program is used with the image “woman\_blonde.tif” result as shown in Figure 6.

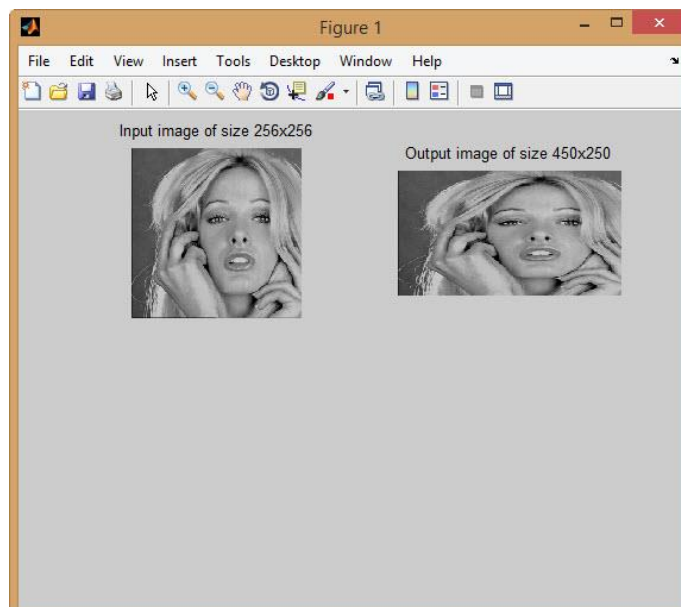


Figure 6: The adjust image resulted from resizing the original image size from  $256 \times 256$  to  $450 \times 250$ , using bilinear interpolation.

**What you need to submit:**

Prepare a zip file that contains all matlab files (m-file extension). Email the zip file to the account **send2narit@hotmail.com** with the following subject line: **EGCO486\_LABxx\_yyy**, which xx is a number of LAB and yyy is the last 3 digits of the student identification number. Your email should reach us before Tuesday 11:59 PM.