**LAB 02**

Digital Image & Video Processing – 19TGMT



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# Information

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# Solution

Using 2D affine transformations and two interpolation method (using both two-way) to calculate:

**Bilinear interpolation** is an extension of linear interpolation for interpolating functions of two variables (e.g., x and y) on a rectilinear 2D grid.

**Nearest neighbour interpolation** is the simplest approach to interpolation. Rather than calculate an average value by some weighting criteria or generate an intermediate value based on complicated rules, this method simply determines the “nearest” neighbouring pixel, and assumes the intensity value of it.

* In my opinion, Bilinear interpolation gives smoother image results than Nearest neighbour interpolation.

# User guide

Using command line to run the program with source image:

A picture containing dog, sitting, blue

Description automatically generated

The results:

## Bilinear interpolation

Zoom in/out an image with :

A dog sitting on a person's lap

Description automatically generated with low confidence

Resize an image with :

A puppy lying on a blanket

Description automatically generated with low confidence

Rotate an image around its center, and crop the result image such that the result size

is unchanged with angle = :

A dog sitting on a blue blanket

Description automatically generated with low confidence

Rotate an image around its center, keep the whole image, and fill the missing area with

black color and the angle is :

A picture containing dog, monitor, screen

Description automatically generated

Flip an image vertically:

A dog sitting on a blanket

Description automatically generated with low confidence

Flip an image horizontally:

A dog lying on its back

Description automatically generated with medium confidence

## Nearest neighbor interpolation

Zoom in/out an image with :

A dog sitting on a person's lap

Description automatically generated with low confidence

Resize an image with :

A small puppy on a blue blanket

Description automatically generated with low confidence

Rotate an image around its center, and crop the result image such that the result size

is unchanged with angle = :

A dog sitting on a blue blanket

Description automatically generated with low confidence

Rotate an image around its center, keep the whole image, and fill the missing area with

black color and the angle is :

A picture containing dog, monitor, screen

Description automatically generated

Flip an image vertically:

A dog sitting on a blanket

Description automatically generated with low confidence

Flip an image horizontally:

A dog lying on its back

Description automatically generated with medium confidence

# Reference

1. GeekforGeeeks
2. Wikipedia