Image and Video Processing – Individual Lab 2

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Problem

In this assignment, you must implement some geometric image processing using OpenCV in C++. Your program is called by command line arguments and perform the following functions

1. Load the input image by reading it from a file.
2. Save the processed output image to a file.
3. Zoom in/out an image. The command line is

   <Program.exe> -zoom <interp> <s_x> <s_y> <InputFilePath> <OutputFilePath>

   where

   - *Program.exe*: the name of executable file
   - *InputFilePath*: the path name of the input file
   - *OutputFilePath*: the path name of the output file
   - *-zoom*: the command name
   - s_x: horizontal scale coefficient
   - s_y: vertical scale coefficient
   - *interp*: interpolation method (using **"-bl"** for *bilinear interpolation* or **"-nn"** for *nearest neighbor*)
4. Resize an image. The command line is

   <Program.exe> -resize <interp> <n_w> <n_h> <InputFilePath> <OutputFilePath>

   where

- *Program.exe*: the name of executable file
- *InputFilePath*: the path name of the input file
- *OutputFilePath*: the path name of the output file
- *-resize*: the command name
- n_w: new width
- n_h: new height
- *interp*: interpolation method (using **"-bl"** for *bilinear interpolation* or **"-nn"** for *nearest neighbor*)

5. Rotate an image around its center, and crop the result image such that the result size is unchanged. The command line is

   <Program> -rotK <interp> <*angle*> <InputFilePath> <OutputFilePath >

   where

   - *Program.exe*: the name of executable file
   - *InputFilePath*: the path name of the input file
   - *OutputFilePath*: the path name of the output file
   - *-rotK*: the command name
   - *angle*: the rotation angle
   - *interp*: interpolation method (using **"-bl"** for *bilinear interpolation* or **"-nn"** for *nearest neighbor*)

6. Rotate an image around its center, keep the whole image, and fill the missing area with black color. The command line is

   <Program> -rotP <interp> <*angle*> <InputFilePath> <OutputFilePath>

   where

   - *Program.exe*: the name of executable file
   - *InputFilePath*: the path name of the input file
   - *OutputFilePath*: the path name of the output file
   - *-rotP*: the command name
   - *angle*: the rotation angle
   - *interp*: interpolation method (using **"-bl"** for *bilinear interpolation* or **"-nn"** for *nearest neighbor*)

7. Flip an image vertically. The command line is

   ```
   <Program.exe> -flipV  <interp> <InputFilePath> <OutputFilePath>
   ```

   where

   - *Program.exe*: the name of executable file
   - *InputFilePath*: the path name of the input file
   - *OutputFilePath*: the path name of the histogram image file
   - *-flipV*: the command name
   - *interp*: interpolation method (using **"-bl"** for *bilinear interpolation* or **"-nn"** for *nearest neighbor*)

8. Flip an image horizontally. The command line is

   ```
   <Program.exe> -flipH  <interp> <InputFilePath> <OutputFilePath>
   ```

   where

   - *Program.exe*: the name of executable file
   - *InputFilePath*: the path name of the input file
   - *OutputFilePath*: the path name of the output file
   - *-flipH*: the command name
   - *interp*: interpolation method (using **"-bl"** for *bilinear interpolation* or **"-nn"** for *nearest neighbor*)

Submission

Your submission must organize into 2 folders and compressed in 1 file *StudentID.zip*

1. Document (contains your own report, personal inforamtion, your solution, and user guide)
2. Release (contains executed file)
3. Sources (contain source code). Your source code must be followed the template code provided in moodle.