

# Image Lab

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*An Image Editor by ALI Media for CS 335 in Fall 2023*

## Features

- Opening and saving image files in various formats such as .jpg, .jpeg, and .png
- Image Processing techniques
  - Image transformations
  - Image filtering
- Drawing on a image

## Dependencies

This project uses several packages to render the user interface and the logic behind image processing:

- Python - general-purpose programming language used to build the program
- OpenCV - computer vision and image processing library that provides more sophisticated image processing tools
- PyQt6 - library to develop a desktop-based graphical user interface
- Numpy - scientific library that provides linear algebra tools necessary for image transformations

## Installing Dependencies

Packages and libraries can be installed individually in the environment the program will be located at by doing:

```
pip install opencv-python  
pip install numpy  
pip install PyQt6
```

Or you can install all dependencies in one command by doing:

```
pip install -r requirements.txt
```

## Running the Program

To run the program, ensure all dependencies have been installed and run the command in the directory the file is installed:

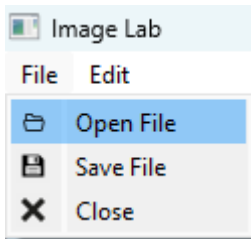
```
python image_editor_GUI.py
```

This will bring up a full screen application of the image editor

## Using the Editor

### Opening and Saving an Image File:

- To open, click on 'File' on the menu bar, then select 'Open File'



- Look for a location where you have images, filter image by types using the dialog, and select an image.  
Note: only the certain image file formats are supported as noted above
- To save, click on 'File' on the menu bar, then select 'Save File' then name the file and choose the desired format and click save on dialog.

### Performing Image Transformations:

- Currently, there are 4 image transformations supported.
  - Rotation 90 degrees clockwise and counterclockwise
  - Mirror/Flipping with respect to x-axis and y-axis
- Hovering over the buttons indicates the type of transformation that can be applied, then simply click the desired option



### Performing Image Filtering:

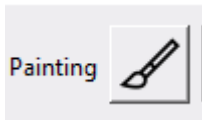
- Currently there are 6 filters that can be applied to an image
  - Image blurring Note: clicking opens dialog to enter strength of blurring as an integer on the range 1 to 50 inclusive. 1 being low blur and 50 being maximum blur.
  - Black and White conversion
  - Pixelation Note: clicking opens dialog to enter pixel size as an integer on the range 1 to 100 inclusive. 1 being small pixel sizes and 100 being very large pixel sizes.
  - Contrast modification Note: clicking opens dialog to enter contrast level as an integer on the range -255 to 255 inclusive. Negative contrast level decreases difference between colors and positive contrast level increases difference.
  - Converting to pencil sketch
  - Inverting the image / negative effect
- Hovering over the buttons indicates the filter that can be applied, then simply click the desired option



### Drawing on the Image:

- To Draw on the image, it is necessary to first have an image open on the editor.

- Click on the paintbrush to toggle on or off.



- You can also choose the color of the brush to draw on the image by clicking on the color buttons.



- To draw on the image, toggle the paintbrush on and select a color. Then right-click and hold mouse/mousepad to draw on the image.

#### Reverting Edits:

- To revert filters, transformations, or drawings on an image, click on 'Edit' on the menu bar and then click on 'Revert'
- Note: Clicking 'Revert' reverts the image to the original version of image and every edit will be undone.

