Module Code & Module Title HIT137-SOFTWARE NOW

Assessment Weightage

30%

Year and Semester
2026- SUMMER

GROUP – SYDN30

STUDENT NAME	STUDENT ID
AMAN KOIRALA	S398424
SULAV SAPKOTA	S397121
NABIN PATHAK	S398878
SIDDHANTA LAMICHHANE	S398870

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1. Introduction

This project is based on developing a desktop application for an Image Editor using Python programming along with OpenCV and Tkinter libraries. This application will allow the user to perform different operations on images by using the graphical user interface. This project also includes the application of Object-Oriented Programming.

2. Technologies Used

The technologies that are used while doing this assignment are

- Python
- Tkinter
- OpenCV (cv2)
- Pillow (PIL)
- NumPy
- Git & GitHub

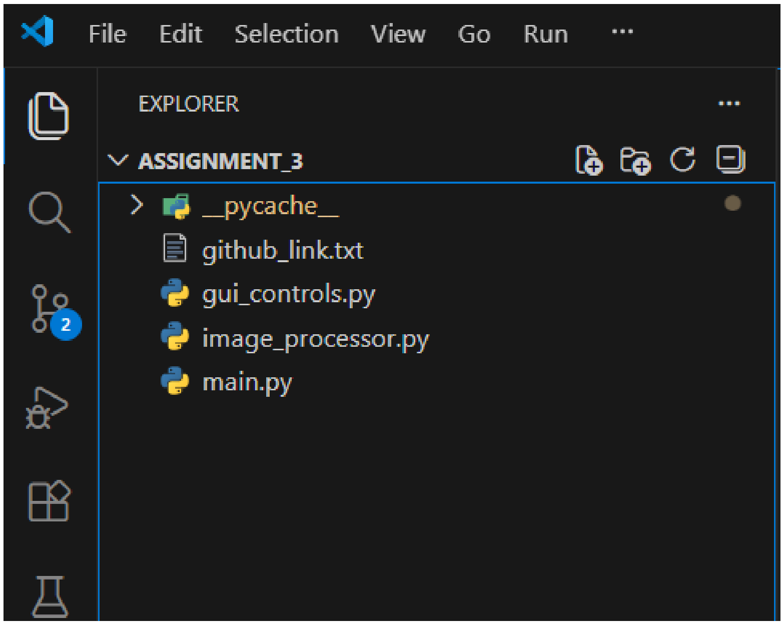
3. System Architecture

The application follows modular architecture:

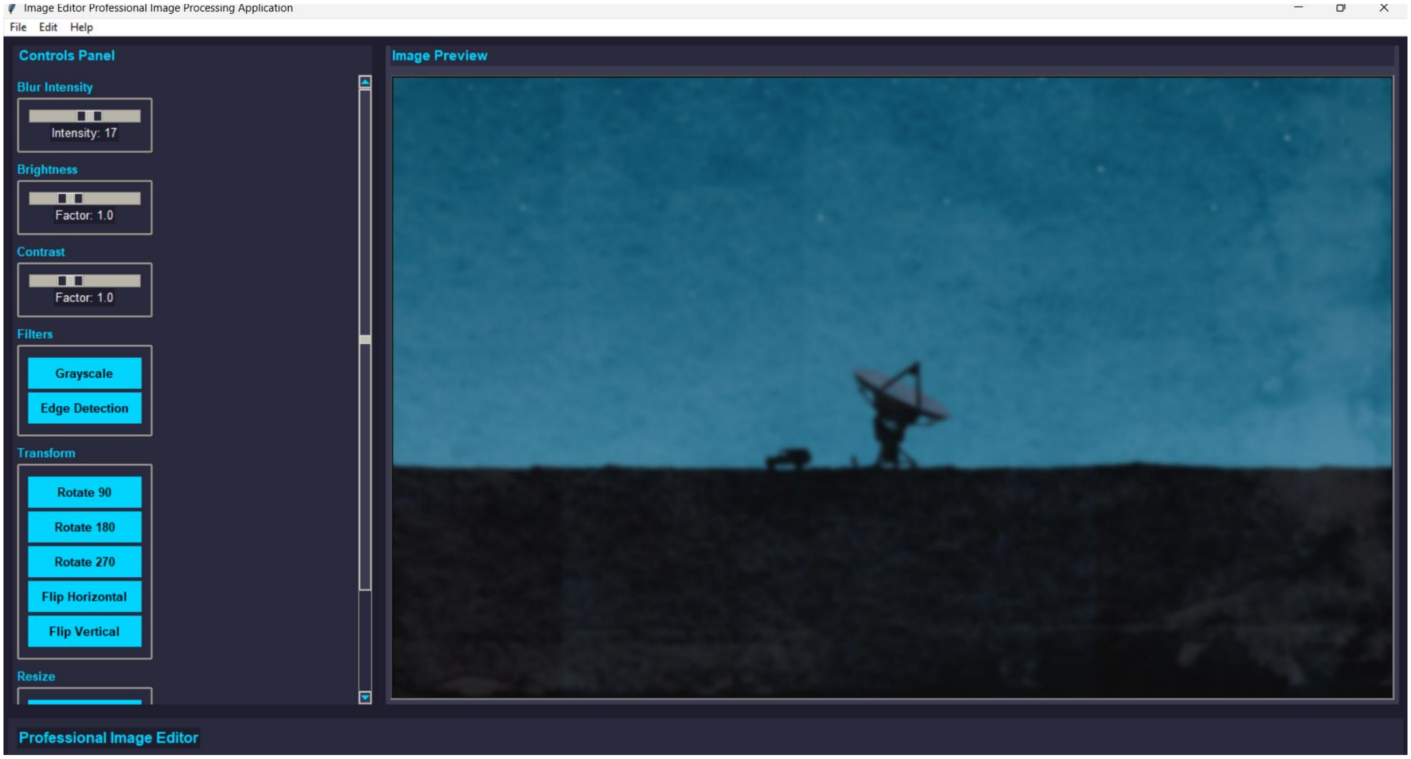
gui_controls.py – it manages ui controls and status bar

image_processor.py – it handles image processing logic

main.py – it integrates all components into the main application



4. Image Processing Features



Blur Intensity

Intensity: 17

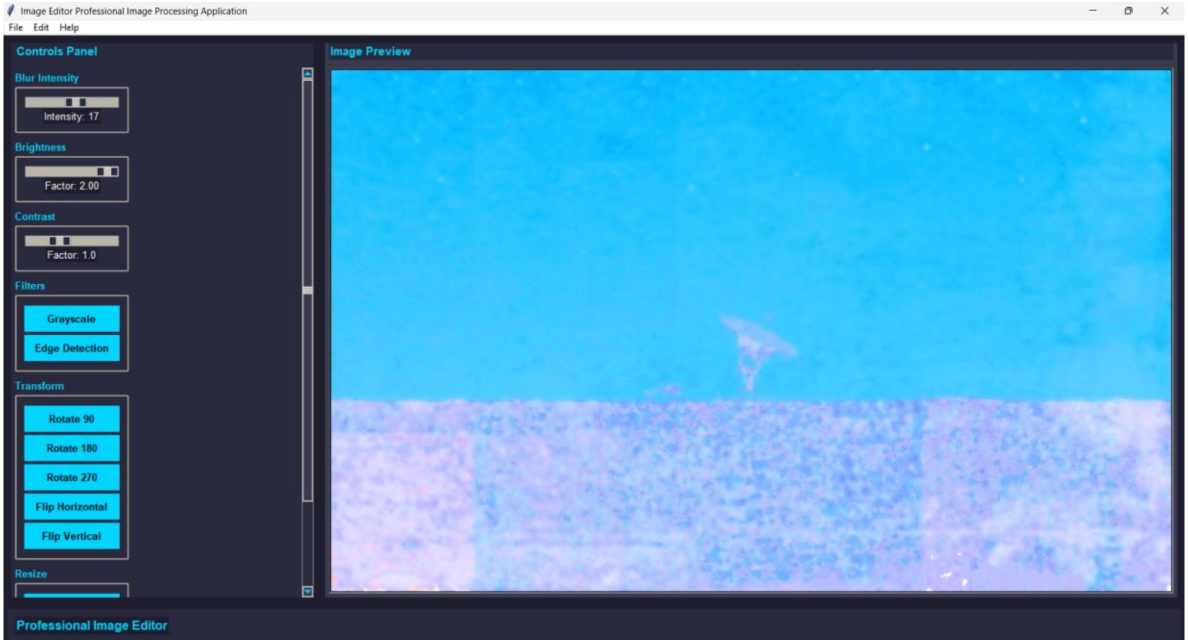
Brightness

Factor: 1.0

Contrast

Factor: 1.0

Figure 1 Blur Effect

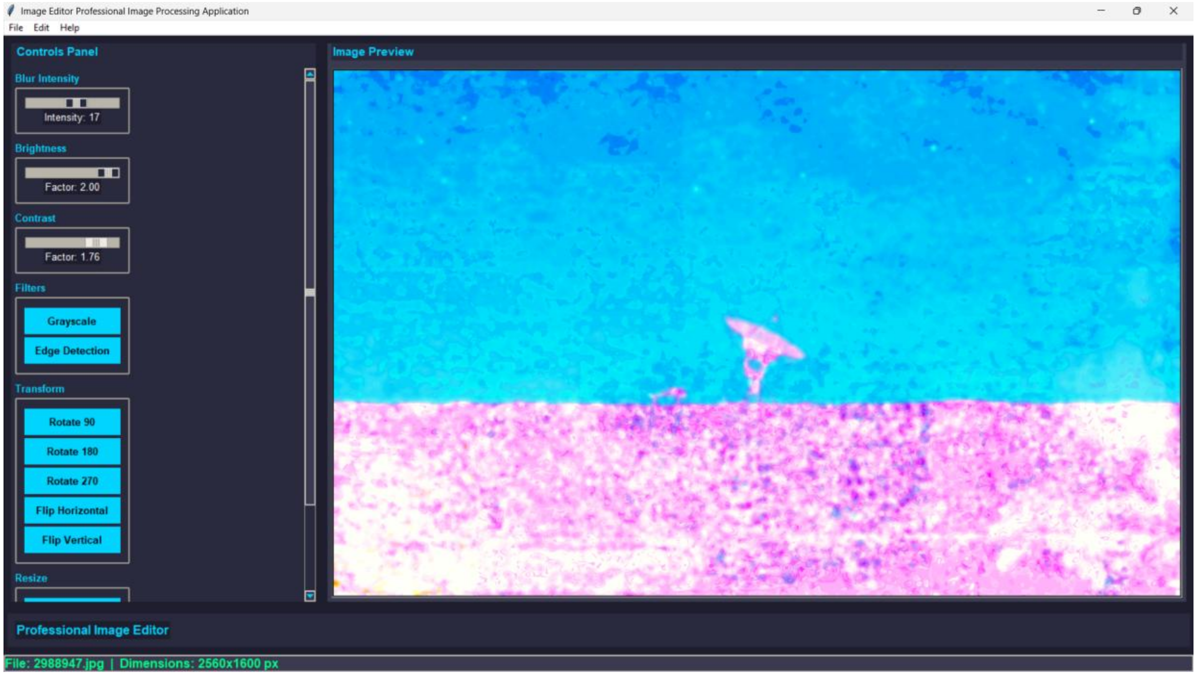


Blur Intensity: Intensity: 17

Brightness: Factor: 2.00

Contrast: Factor: 1.0

Figure 2 Brightness Adjustment



Blur Intensity: Intensity: 17

Brightness: Factor: 2.00

Contrast: Factor: 1.76

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File: 2988947.jpg | Dimensions: 2560x1600 px
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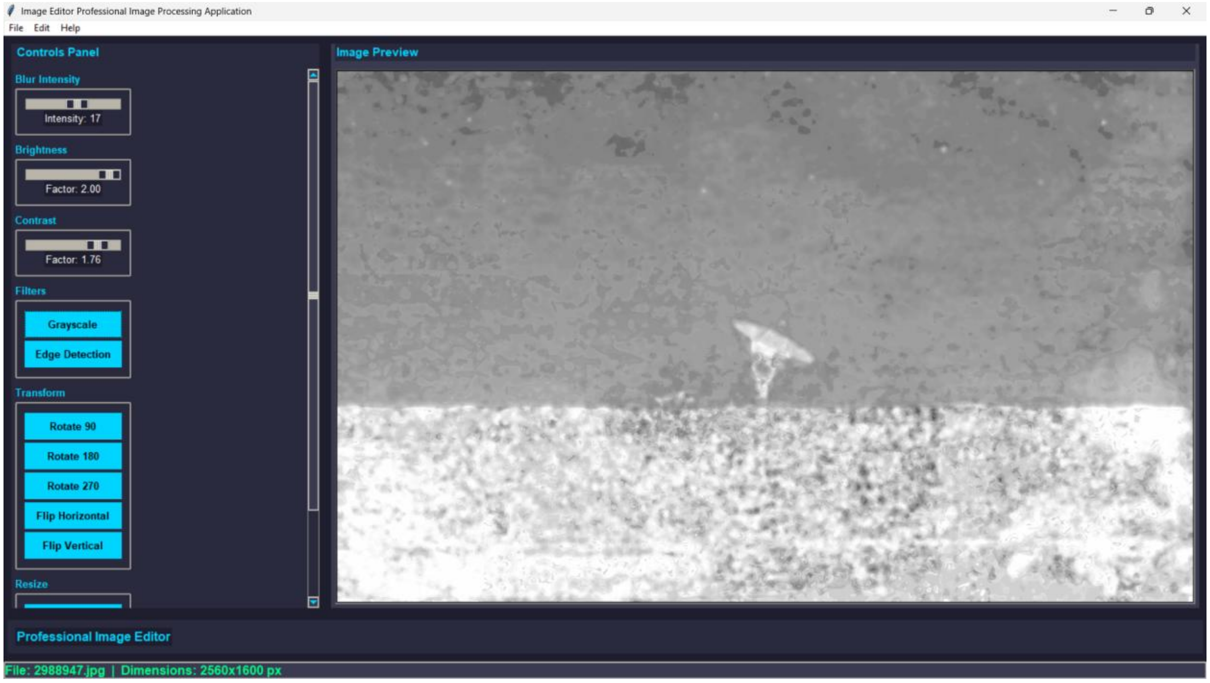
Figure 3 Contrast Adjustment



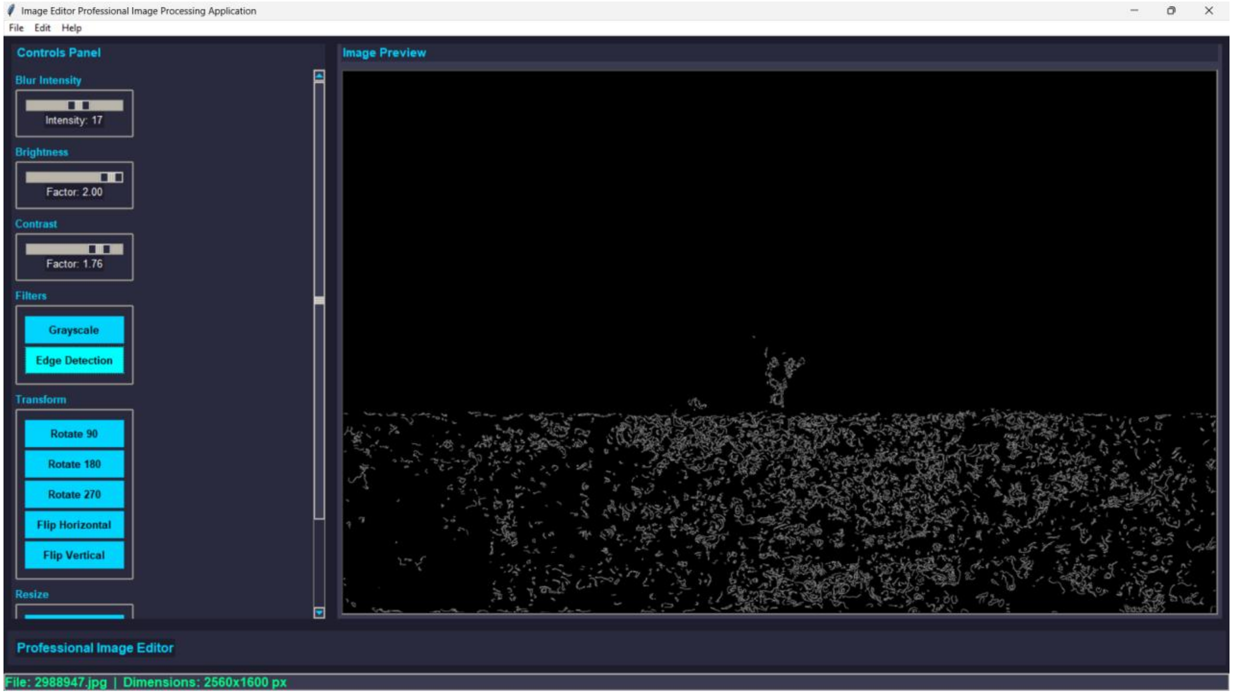
Intensity: 17

Factor: 2.00

Factor: 1.76

File: 2988947.jpg | Dimensions: 2560x1600 px

Figure 4 Grayscale conversion



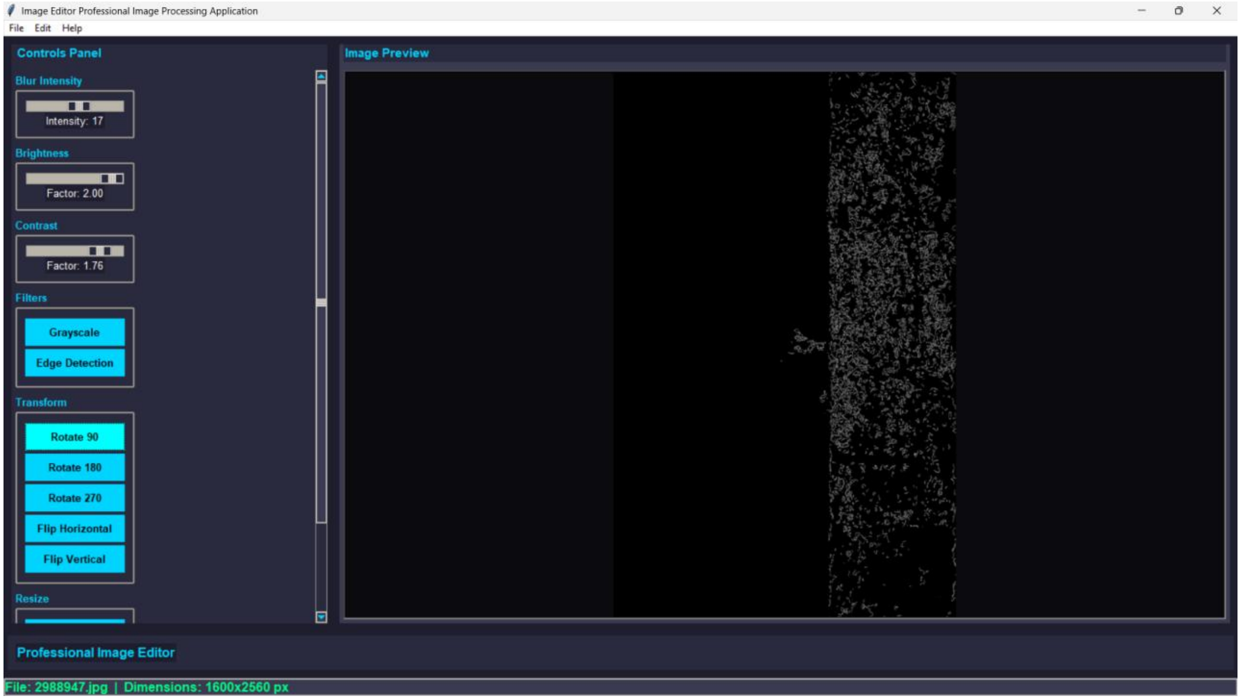
Intensity: 17

Factor: 2.00

Factor: 1.76

File: 2988947.jpg | Dimensions: 2560x1600 px

Figure 5 Edge Detection

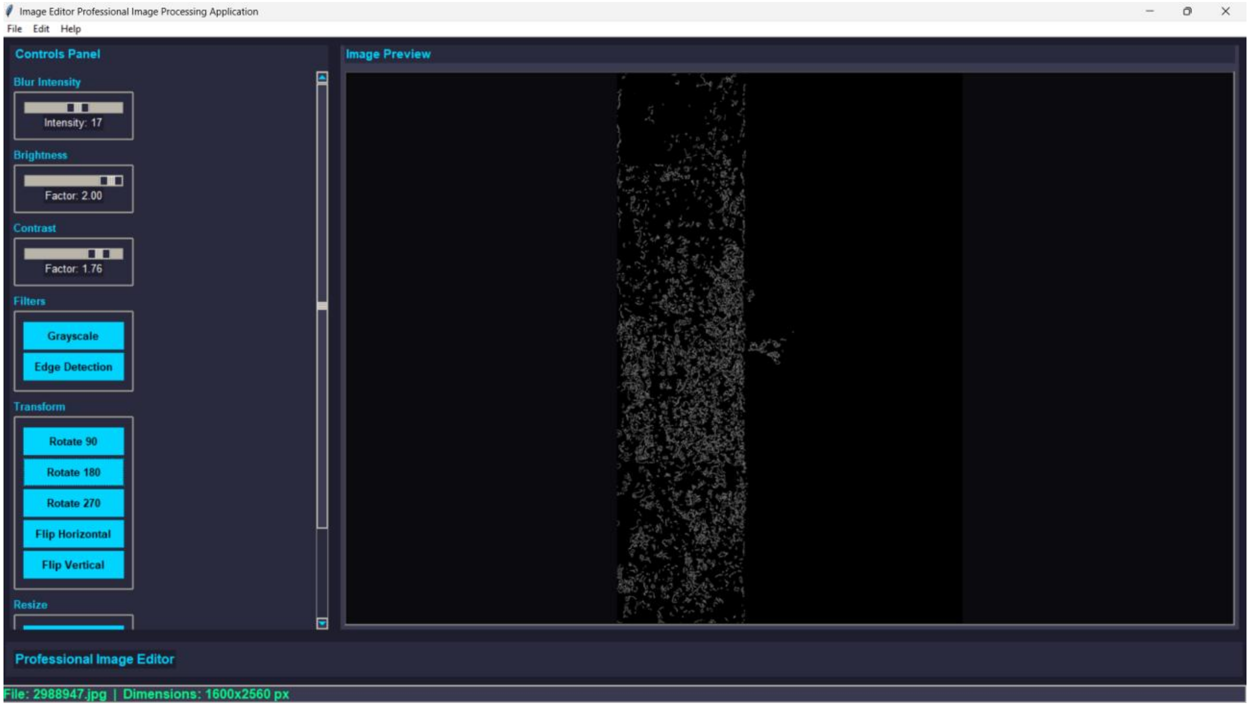


Blur Intensity: Intensity: 17

Brightness: Factor: 2.00

Contrast: Factor: 1.76

File: 2988947.jpg | Dimensions: 1600x2560 px

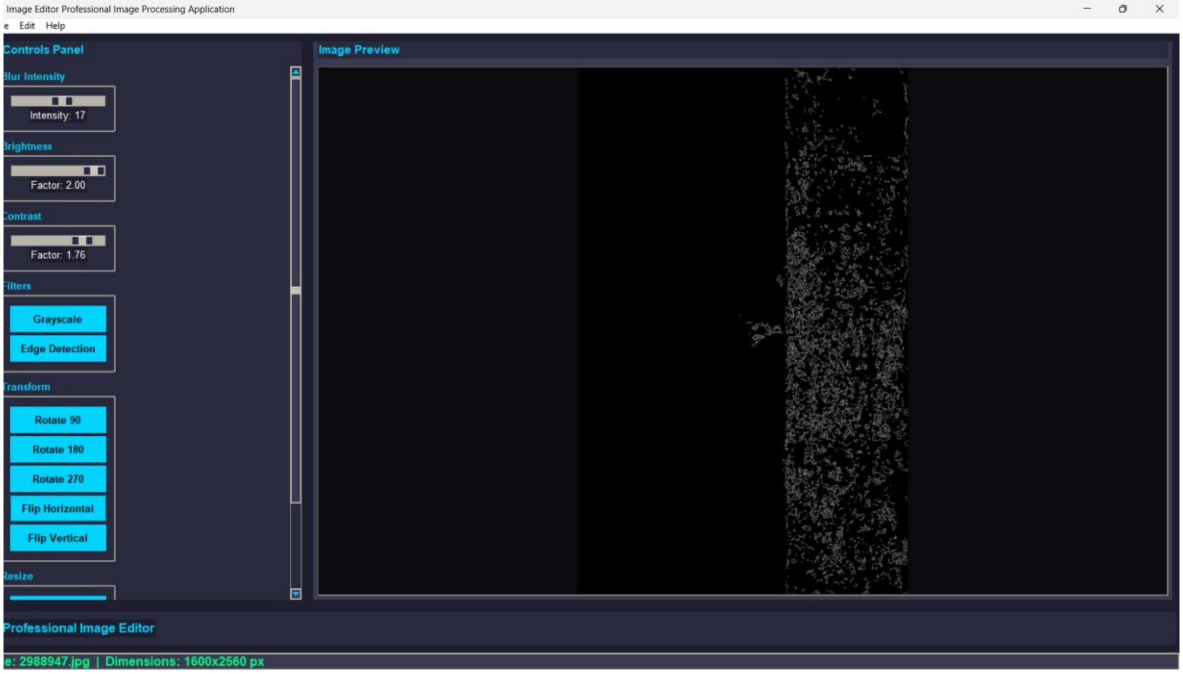


Blur Intensity: Intensity: 17

Brightness: Factor: 2.00

Contrast: Factor: 1.76

File: 2988947.jpg | Dimensions: 1600x2560 px



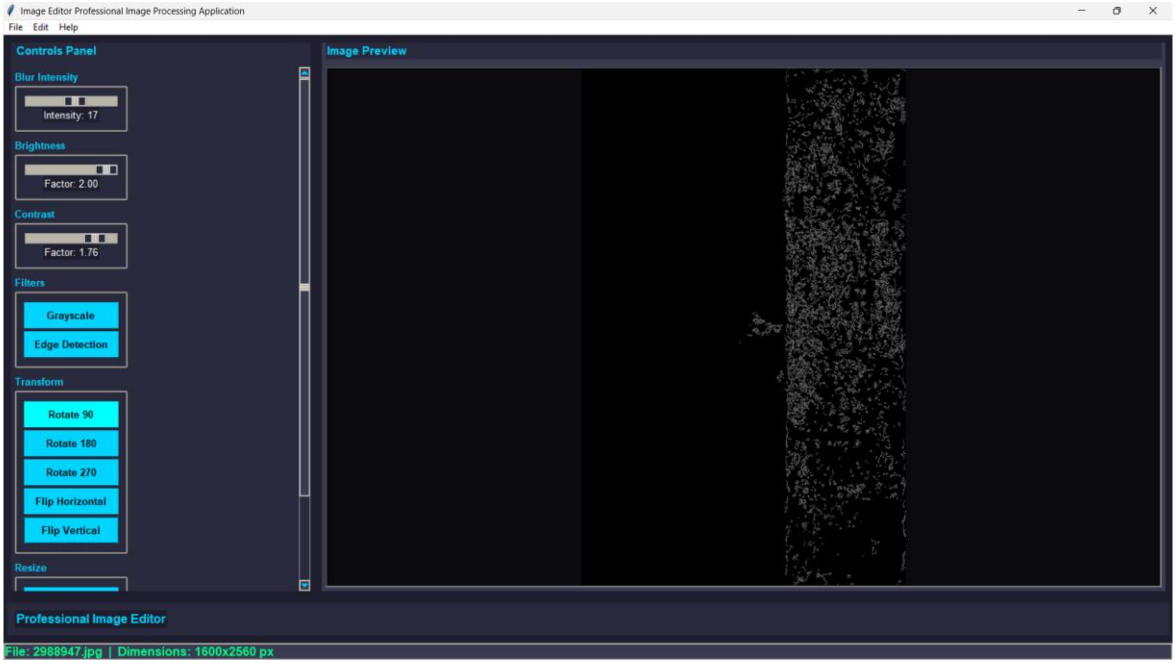
Intensity: 17

Factor: 2.00

Factor: 1.76

e: 2988947.jpg | Dimensions: 1600x2560 px

Figure 6 Rotate 90, 180 and 270



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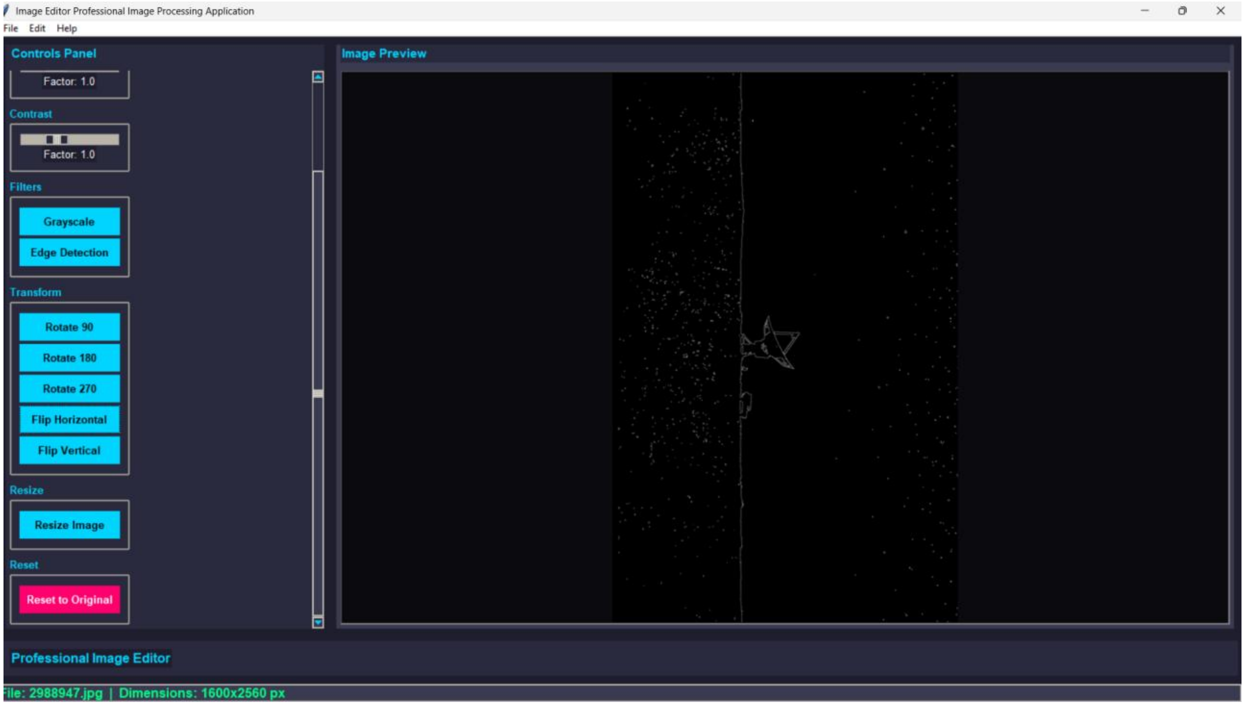
Factor: 2.00

Factor: 1.76

File: 2988947.jpg | Dimensions: 1600x2560 px

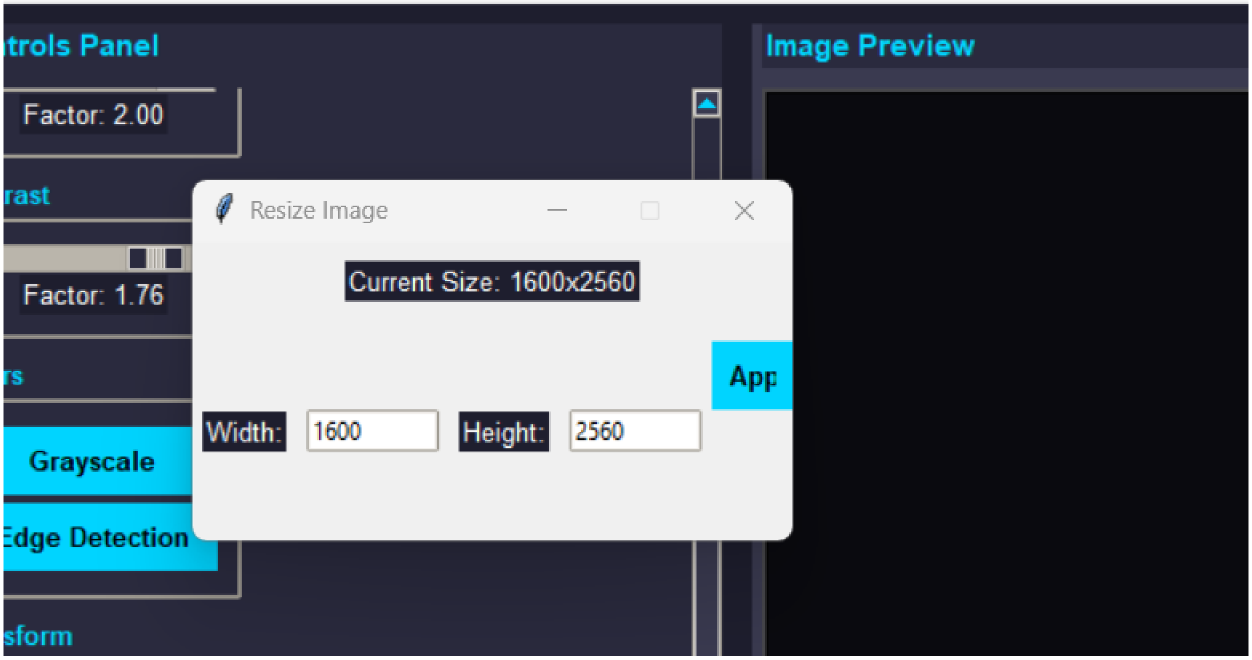


Factor: 1.0

Contrast Factor: 1.0

ile: 2988947.jpg | Dimensions: 1600x2560 px

Figure 7 Flip Image



Factor: 2.00

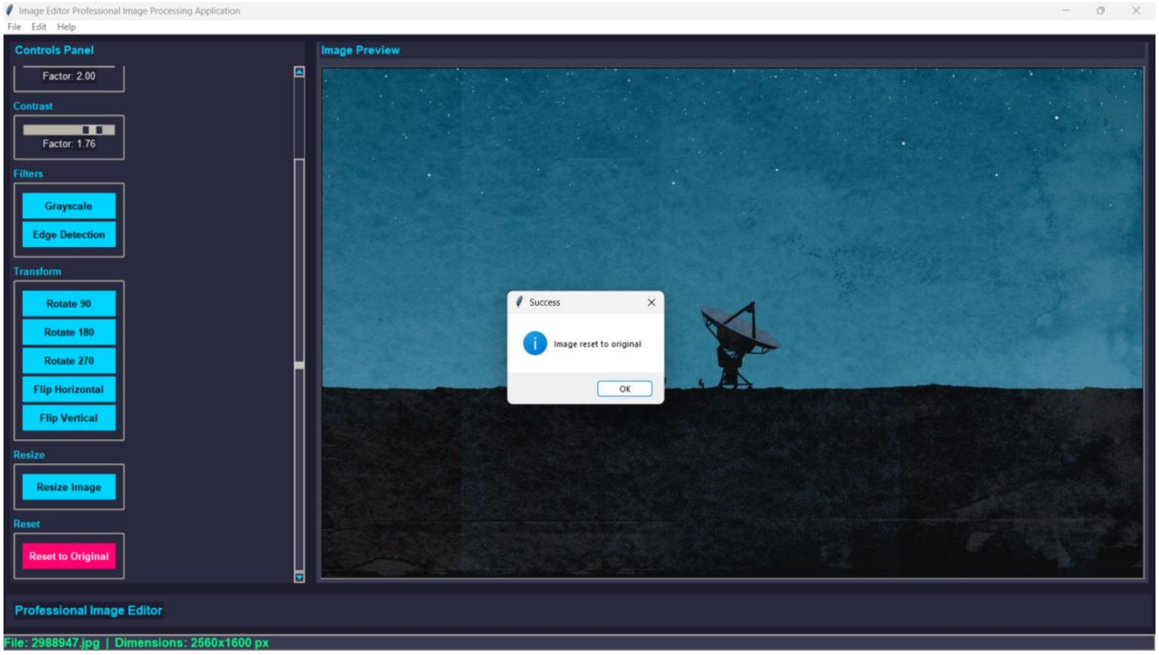
Factor: 1.76

Current Size: 1600x2560

Width: 1600

Height: 2560

Figure 8 Resize scale



Factor: 2.00

Contrast Factor: 1.76

Success: Image reset to original

File: 2988947.jpg | Dimensions: 2560x1600 px

Figure 9 Reset to Original

5. GUI Design

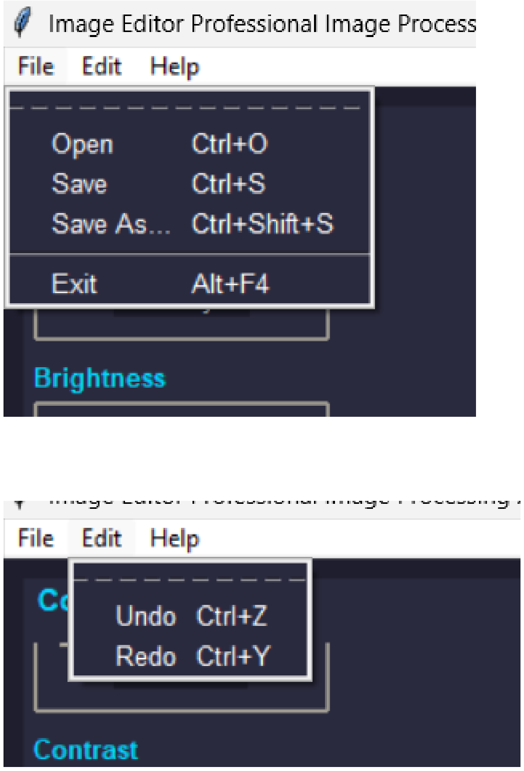
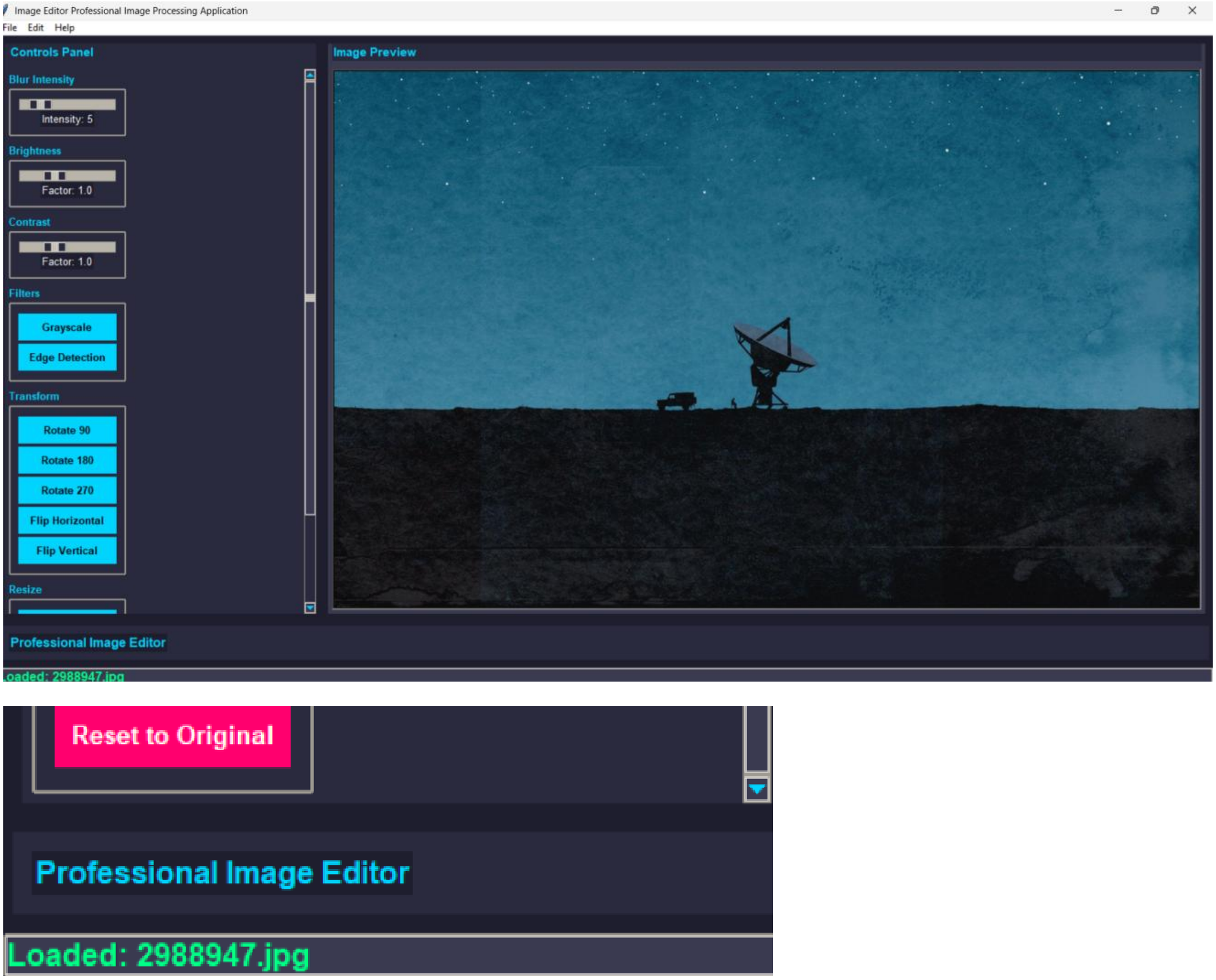


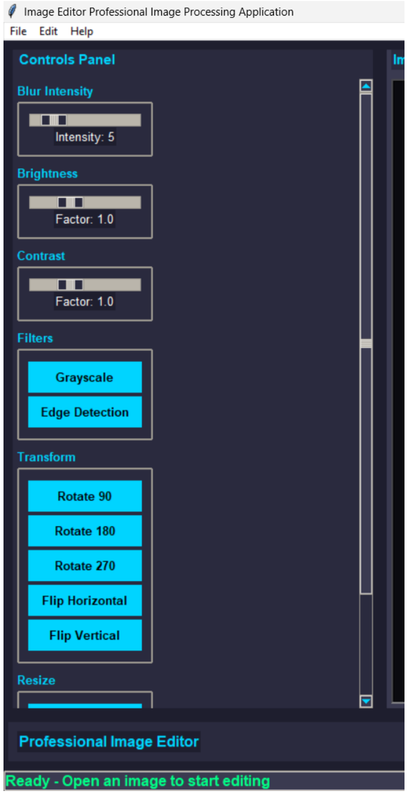
Figure 10 Menu Bar



Loaded: 2988947.jpg

Loaded: 2988947.jpg

Figure 11Image display area with the name



Blur Intensity — Intensity: 5

Brightness — Factor: 1.0

Contrast — Factor: 1.0

Ready - Open an image to start editing

Figure 12 Control panel

6. OOPs Concepts Used

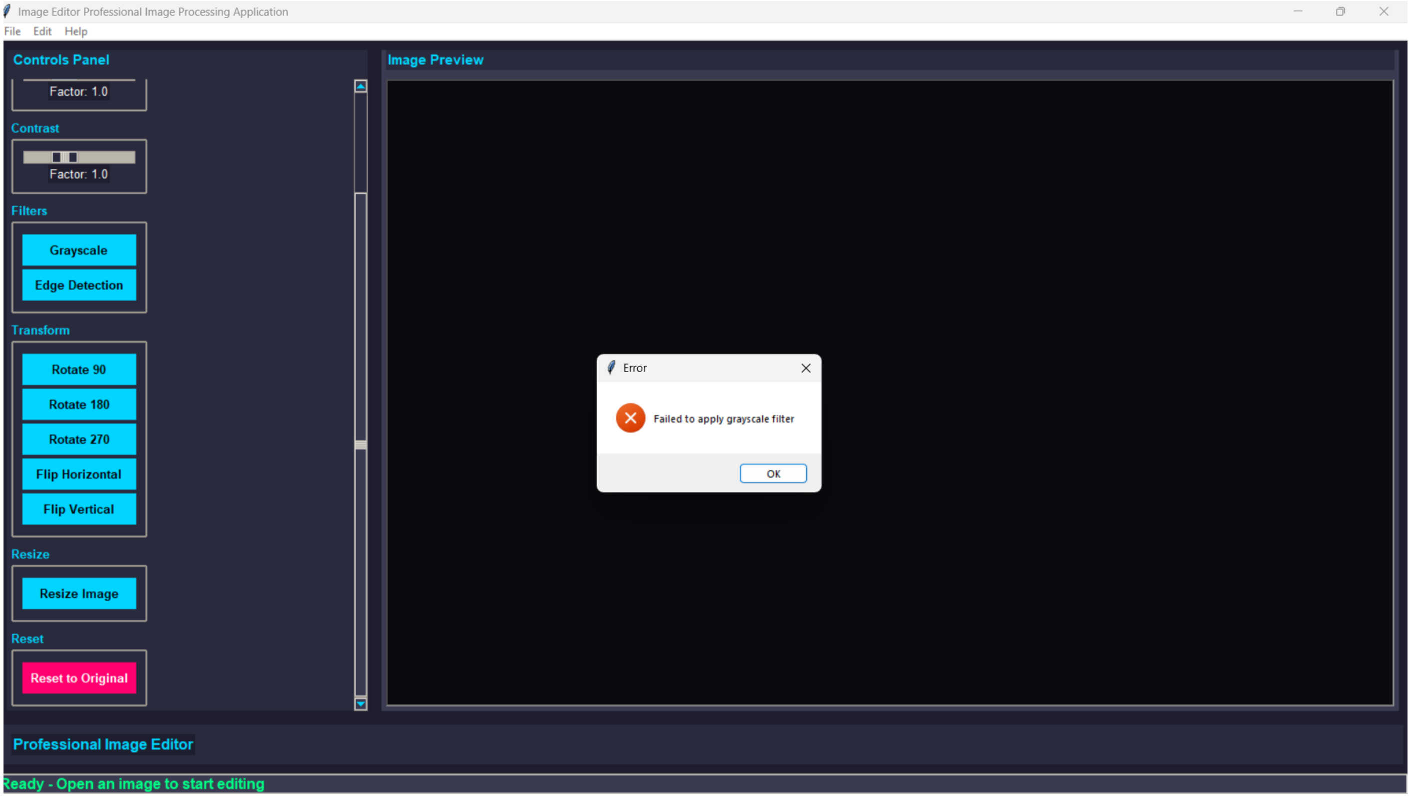
Encapsulation -It is implemented by bundling the image data and the processing logic inside the ImageProcessor class. Direct access to the image data is restricted, and any changes made to the data are done via the methods.

Constructors -The constructor of the class is used to create an instance of the ImageProcessor class. It loads the image and sets the default values. This way, an object of the class is ready for use immediately after it is created.

Class Interaction - The class has several methods that handle specific image processing tasks. These tasks include converting an image to grayscale, blurring an image, and finding the edges of an image. These tasks are well defined.

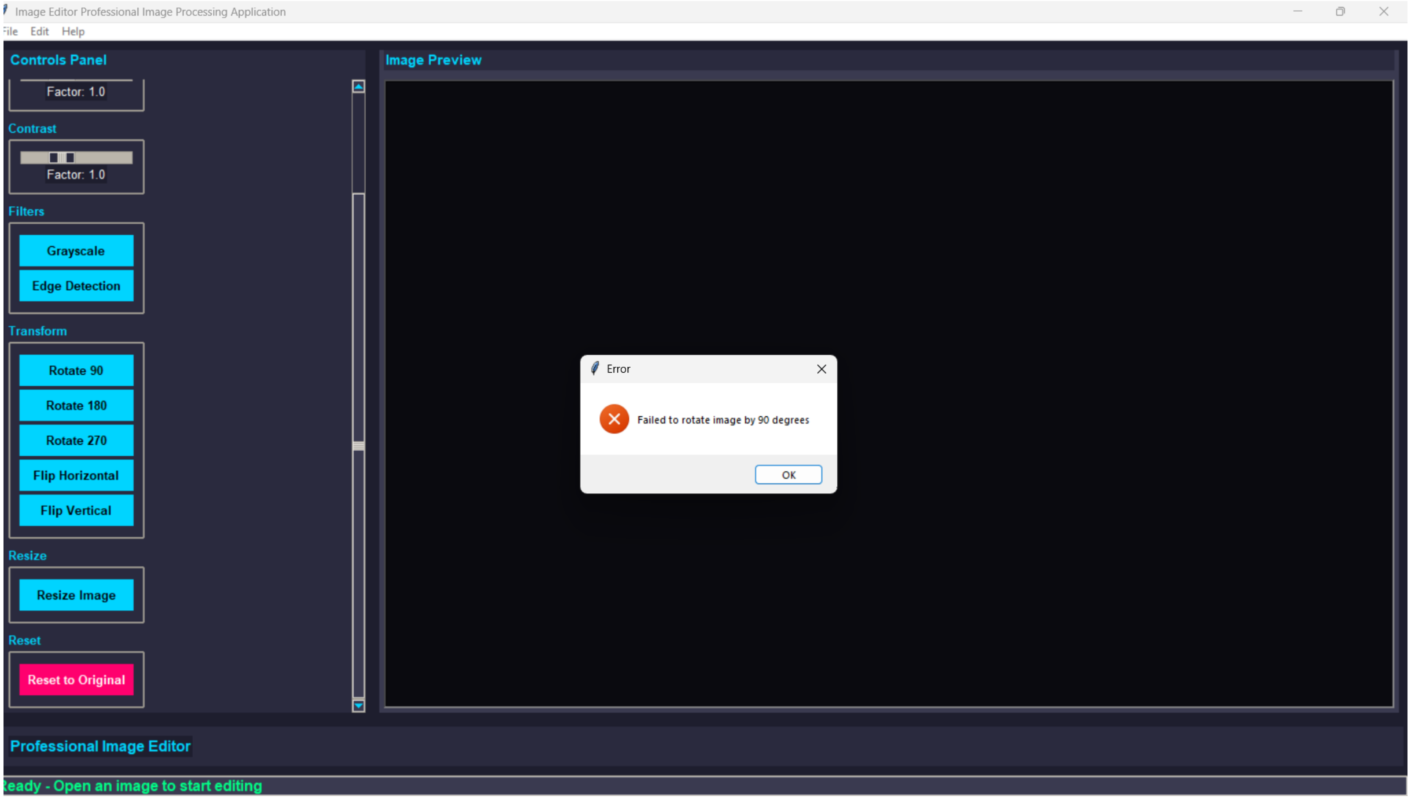
Methods - The interaction of the class with other classes is done in the main.py file. It creates an object of the ImageProcessor class and calls its methods based on user input.

7. Error Handling



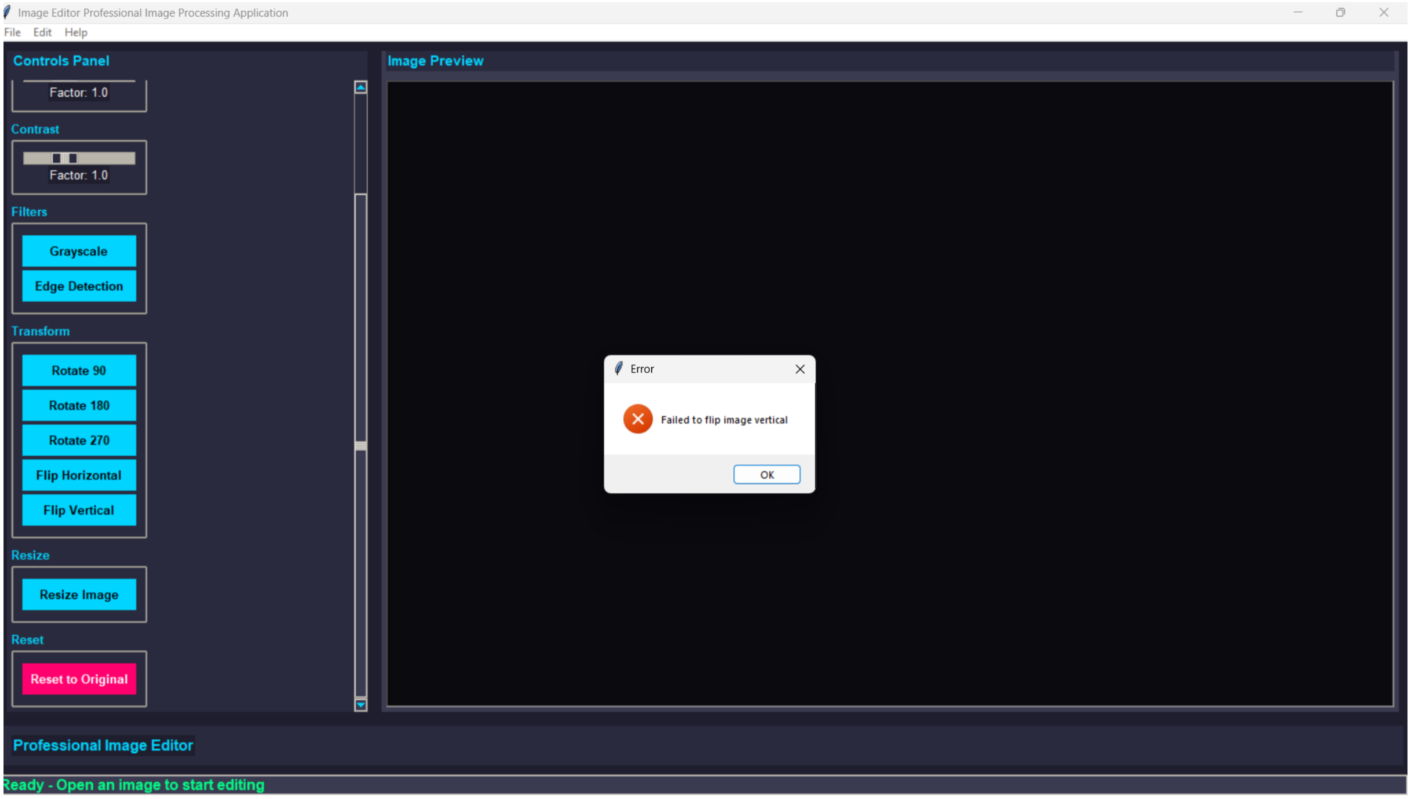
Failed to apply grayscale filter

Ready - Open an image to start editing



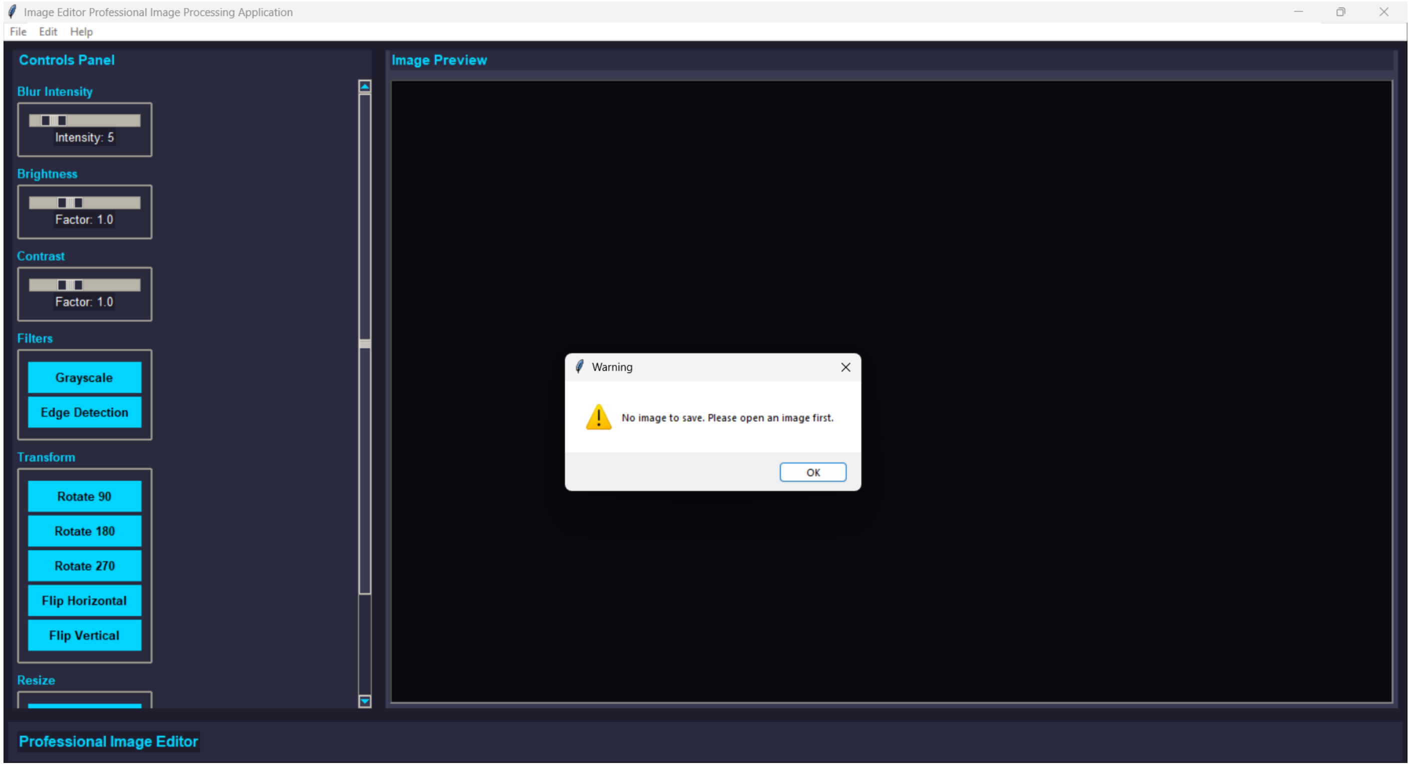
Failed to rotate image by 90 degrees

eady - Open an image to start editing

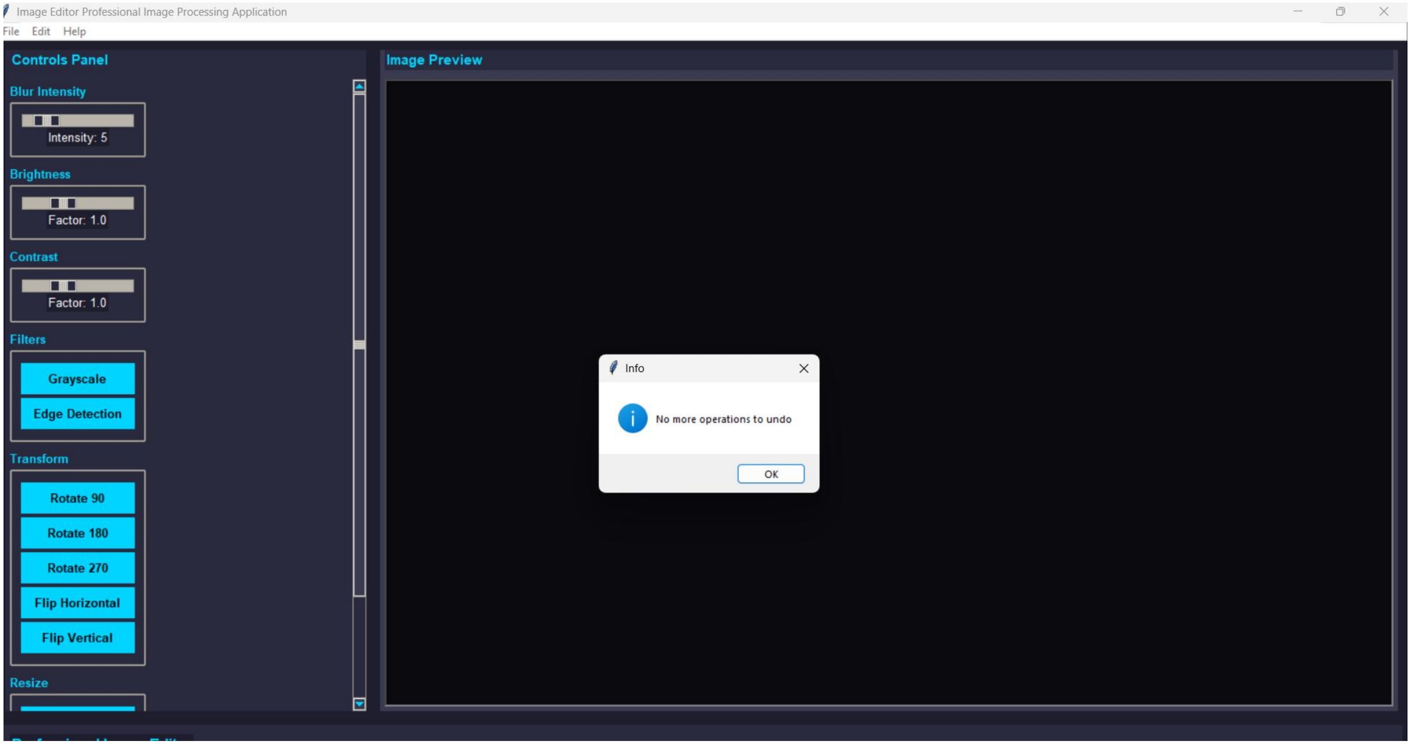


Failed to flip image vertical

Ready - Open an image to start editing



No image to save. Please open an image first.



No more operations to undo

Figure 13 Dialog box

8. References

(n.d.). Retrieved from W3 Schools: https://www.w3schools.com/python/ref_module_tkinter.asp