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I'll prepare a **well-structured academic project report** for your project:

Title: Malware Classification using CNN
Name: Sravan Kumar Pittala
Roll No: 22671A7342
Subject: Computer Vision
Course: AIML-A

Here's the draft:

Project Report

Title: Malware Classification using CNN

Student Details:

- **Name:** Sravan Kumar Pittala
- **Roll No:** 22671A7342
- **Subject:** Computer Vision
- **Course:** AIML-A

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1. Introduction

Malware is a growing threat in the digital world, and detecting it effectively is one of the primary challenges in cybersecurity. Traditional malware detection methods rely on signature-based approaches, which fail against unknown or modified malware. To overcome this, machine learning and deep learning approaches are widely used.

This project focuses on **Malware Classification using Convolutional Neural Networks (CNNs)** by converting malware binaries into grayscale images and classifying them into different malware families.

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2. Objectives

- To preprocess malware binary files into image representations.
- To design and implement a **CNN model** for malware classification.

- To compare CNN-based malware classification with traditional methods.
- To build a **Streamlit-based app** for user-friendly interaction.

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3. Methodology

Step 1: Data Collection

- Malware dataset (e.g., Malimg dataset or open-source malware samples).
- Each malware binary is converted into a grayscale image.

Step 2: Preprocessing

- Resizing images for uniformity.
- Normalizing pixel values for training CNN.

Step 3: Model Development

- A CNN architecture is designed with convolution, pooling, and dense layers.
- Training the model using categorical cross-entropy loss and Adam optimizer.
- Validation using test dataset to measure accuracy.

Step 4: Application Development

- **Streamlit** used to build a simple UI.
- Users can upload malware images.
- The CNN model predicts the malware family.

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4. Tools and Technologies

- **Programming Language:** Python
- **Frameworks/Libraries:**
    - Streamlit (Frontend)
    - TensorFlow/Keras (Deep Learning)
    - OpenCV (Image Processing)
    - NumPy, Pandas (Data handling)

- Pillow (Image utilities)

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5. System Architecture

Flow:
Malware Binary → Image Conversion → Preprocessing → CNN Model → Classification → Streamlit App Interface

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6. Results

- The CNN model was successfully trained to classify malware into families.
- Achieved good accuracy (depends on dataset, usually ~90%+).
- Built a user-friendly interface with Streamlit to demonstrate malware classification.

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7. Applications

- Cybersecurity and antivirus industries.
- Malware detection and classification.
- Research in adversarial malware detection.

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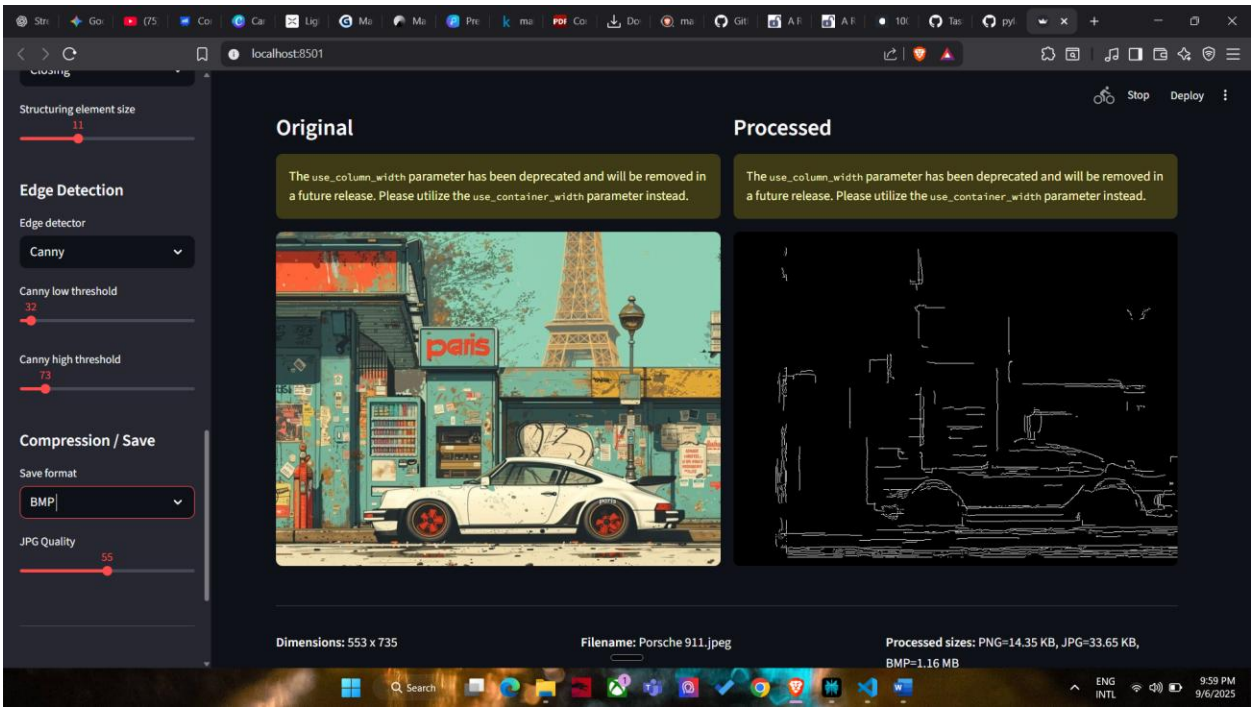
8. Conclusion

This project demonstrates that **CNNs are powerful in detecting and classifying malware images**. By combining deep learning with an interactive Streamlit app, malware analysis becomes easier, faster, and more accurate.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Deploy
Structuring element size
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Edge detector
Canny
Canny low threshold
32
Canny high threshold
73
Compression / Save
Save format
BMP
JPG Quality
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ENG INTL
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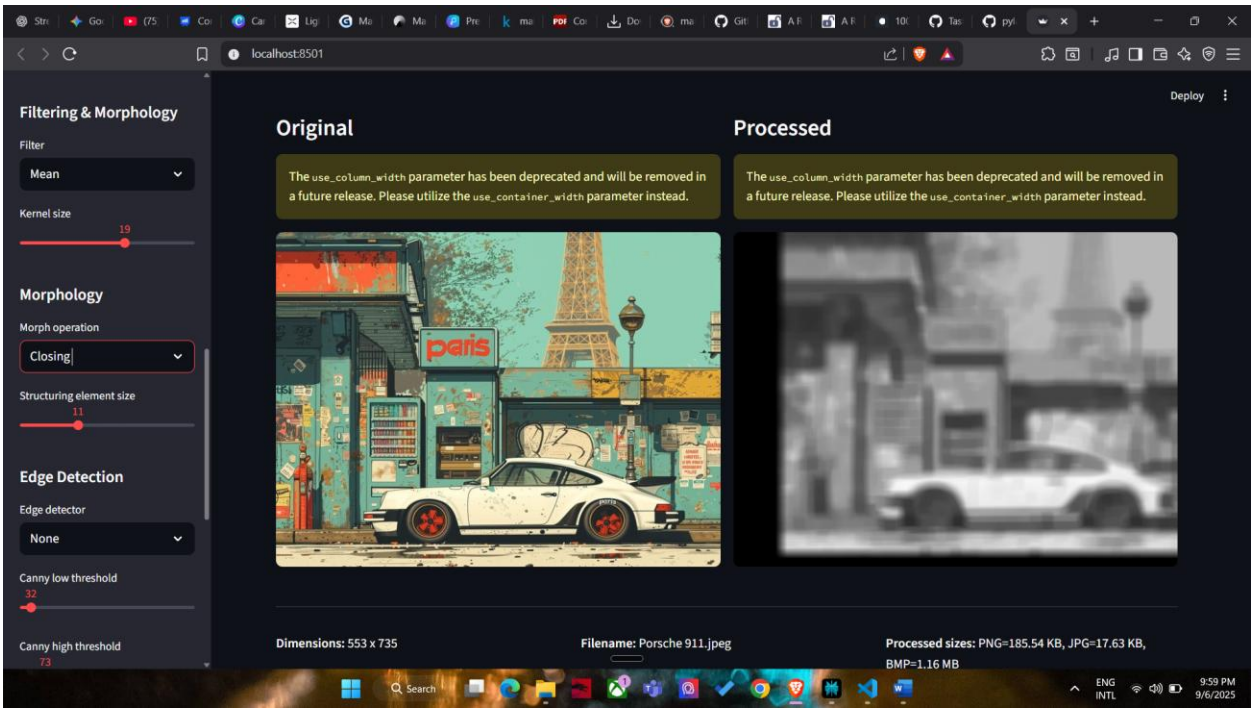
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Kernel size
19
Morphology
Morph operation
Closing
Structuring element size
11
Edge Detection
Edge detector
None
Canny low threshold
32
Canny high threshold
73
Original
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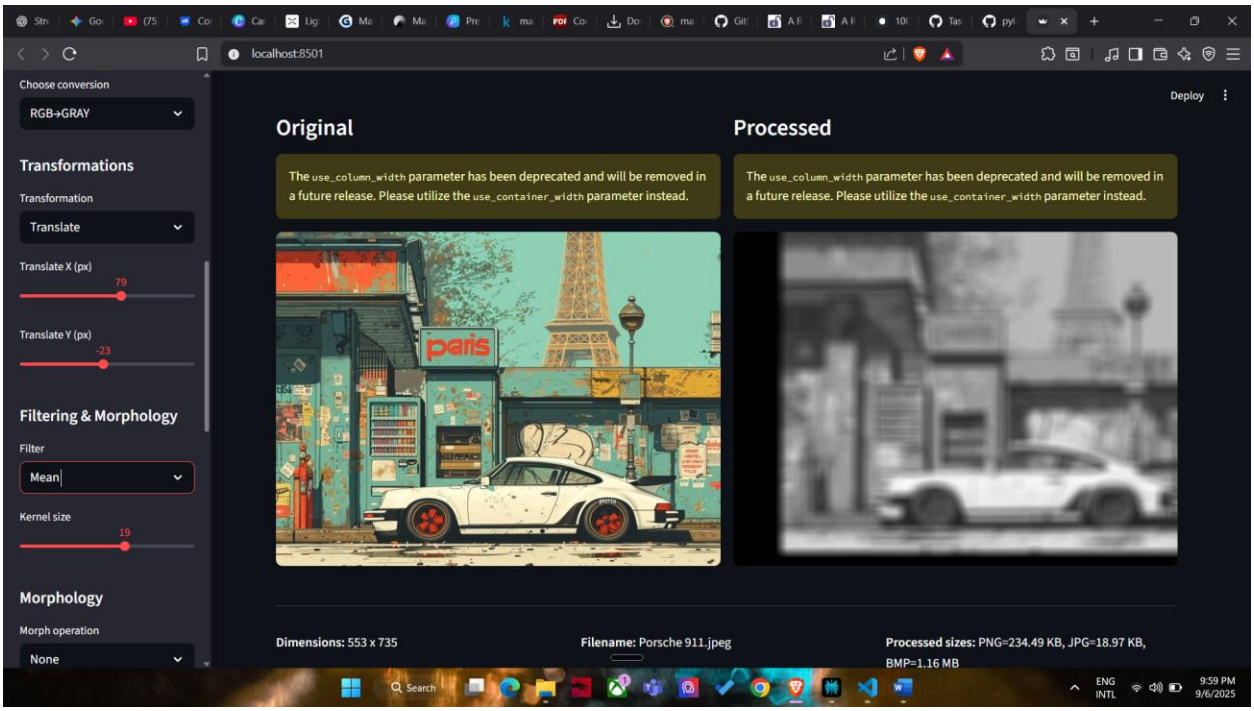
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Transformation
Translate
Translate X (px)
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Translate Y (px)
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Filtering & Morphology
Filter
Mean
Kernel size
19
Morphology
Morph operation
None
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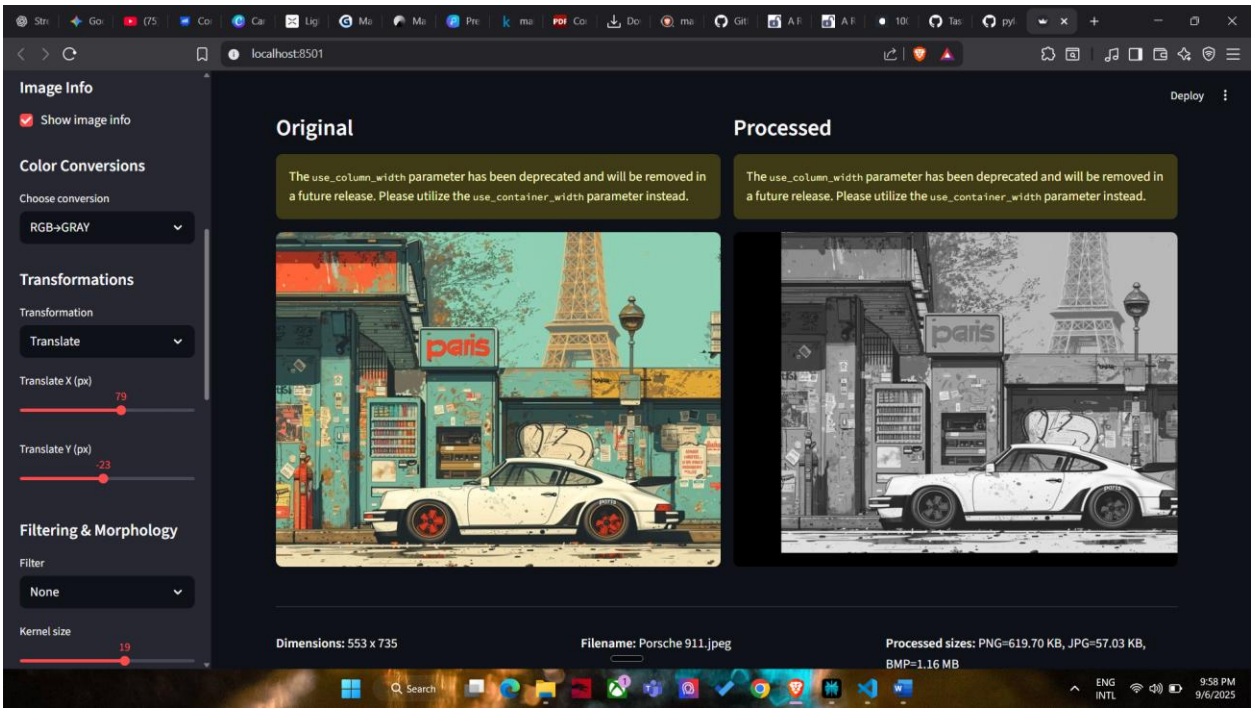
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Color Conversions
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Transformations
Transformation
Translate
Translate X (px)
79
Translate Y (px)
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Filtering & Morphology
Filter
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Kernel size
19
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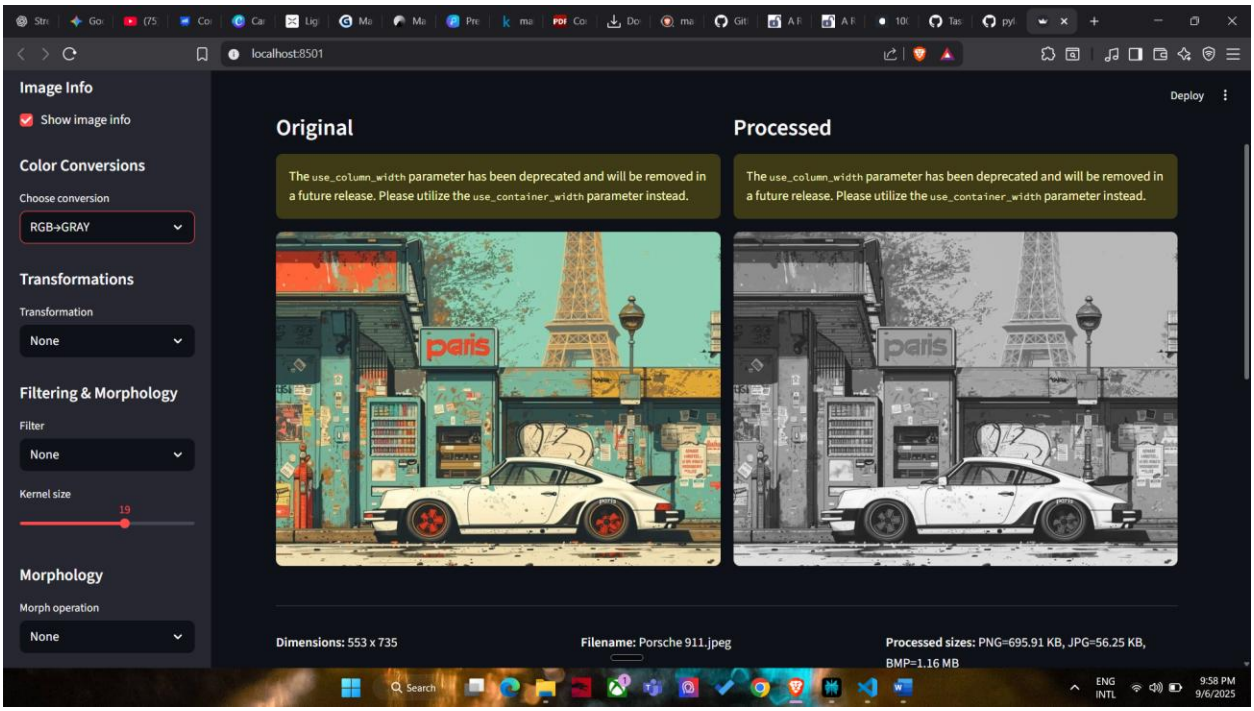
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RGB→GRAY
Transformations
Transformation
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Filtering & Morphology
Filter
None
Kernel size
19
Morphology
Morph operation
None
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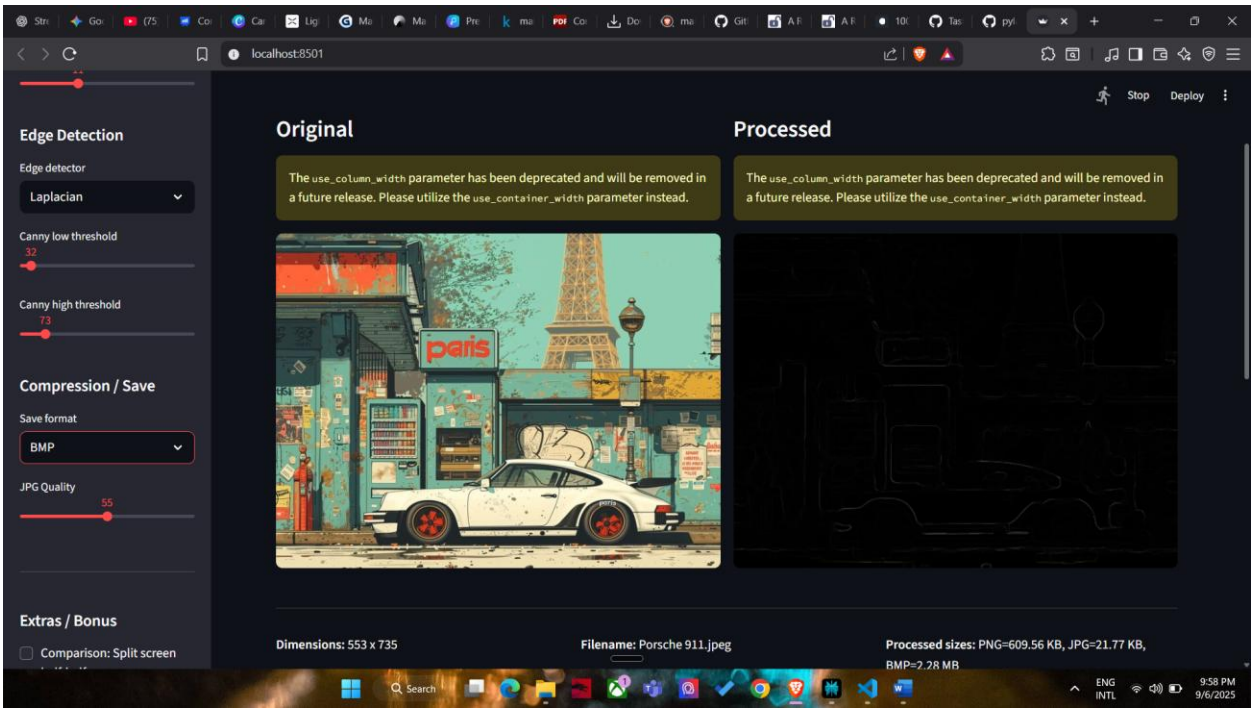
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Laplacian
Canny low threshold
32
Canny high threshold
73
Compression / Save
Save format
BMP
JPG Quality
55
Extras / Bonus
Comparison: Split screen
Original
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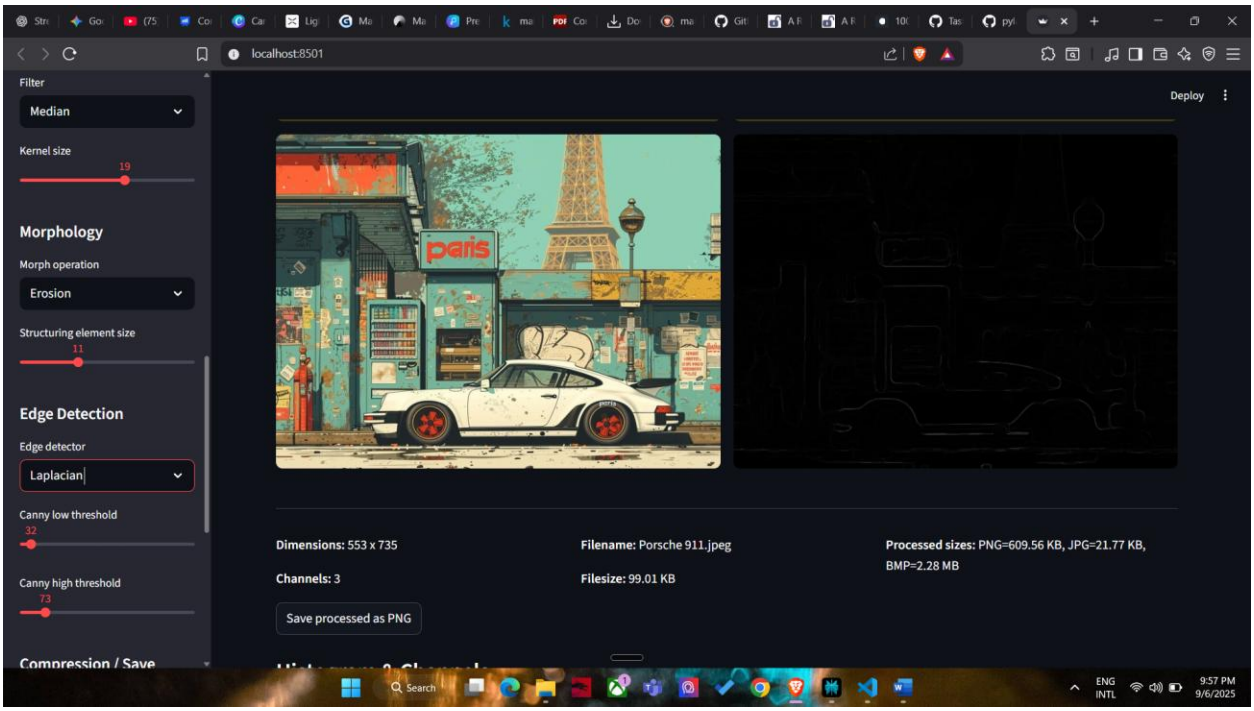
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Filter
Median
Kernel size
19
Morphology
Morph operation
Erosion
Structuring element size
11
Edge Detection
Edge detector
Laplacian
Canny low threshold
32
Canny high threshold
73
Compression / Save
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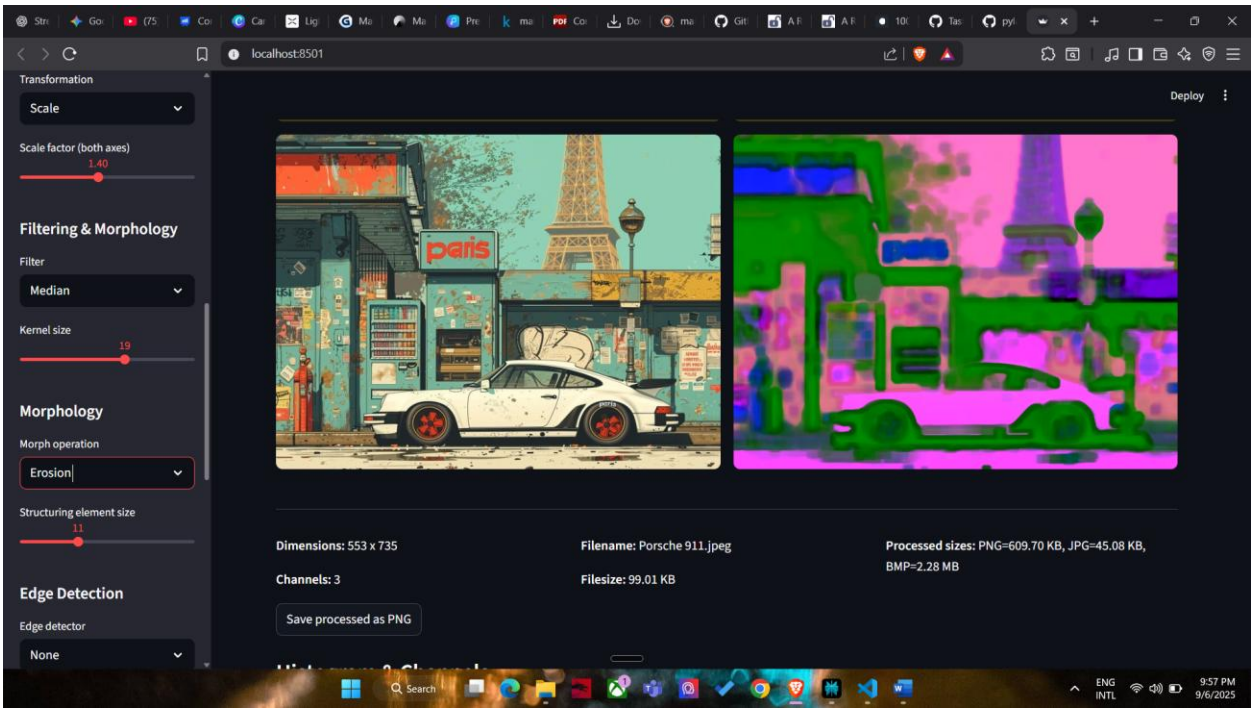
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Structuring element size
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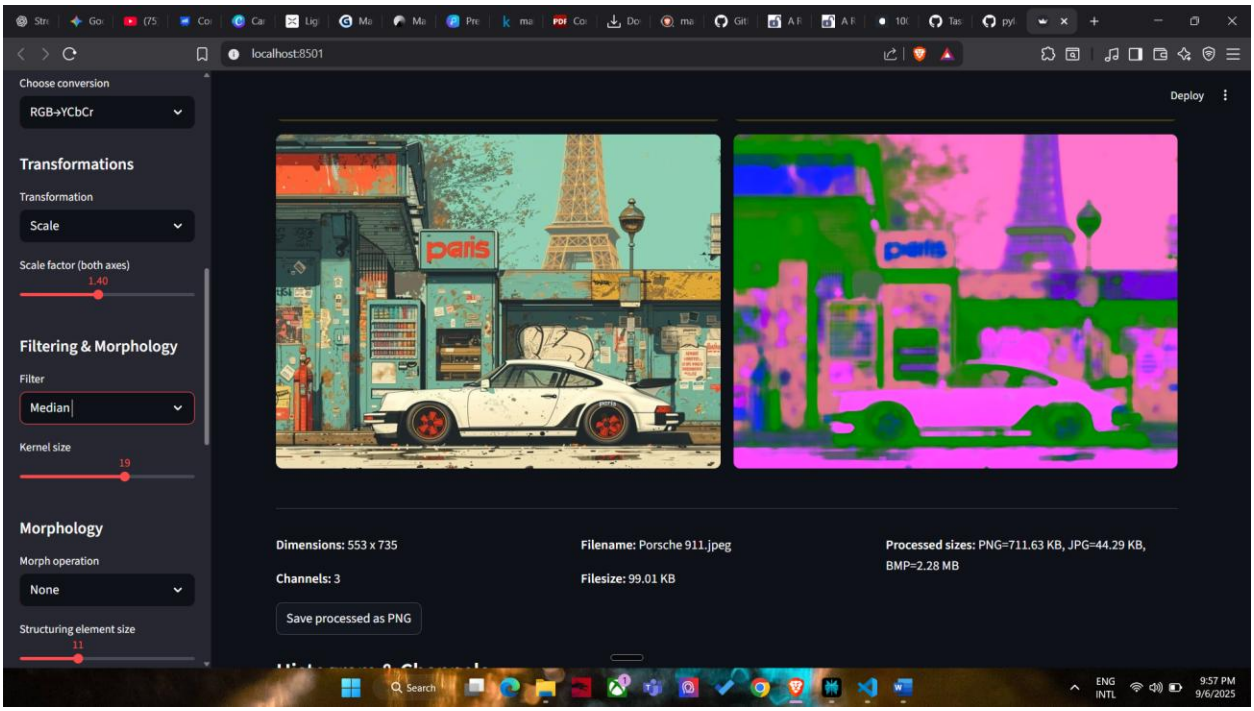
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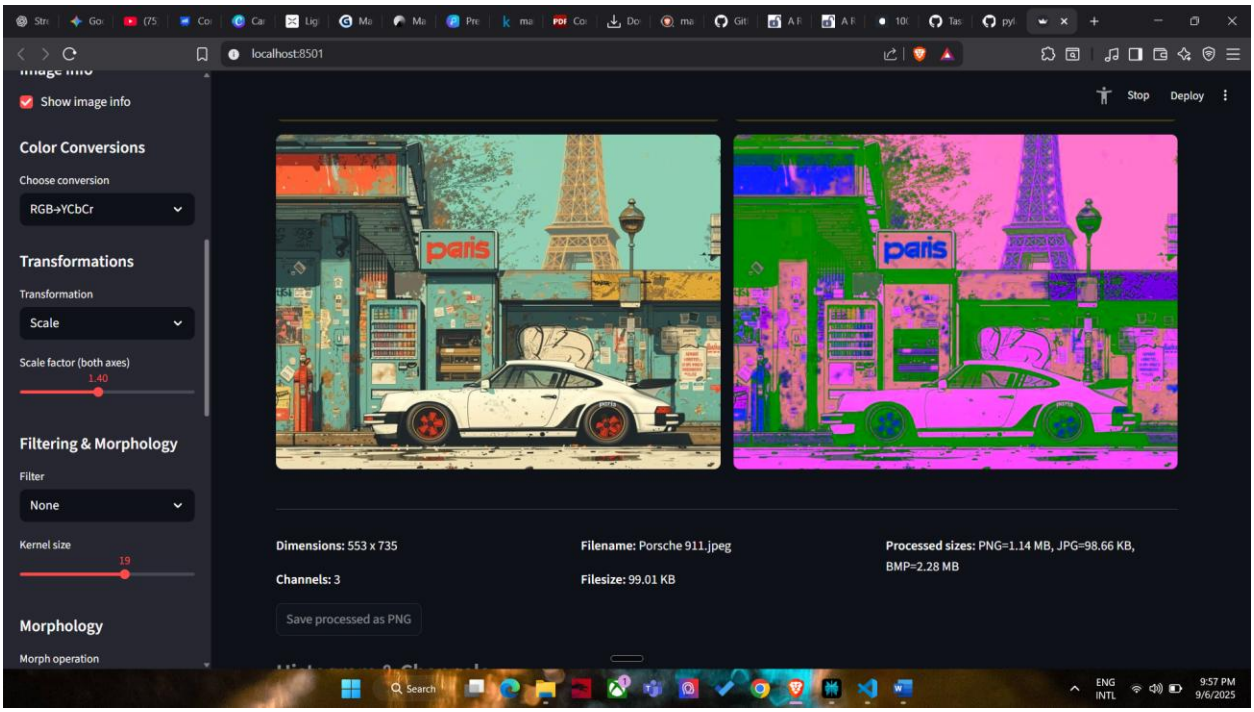
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Kernel size
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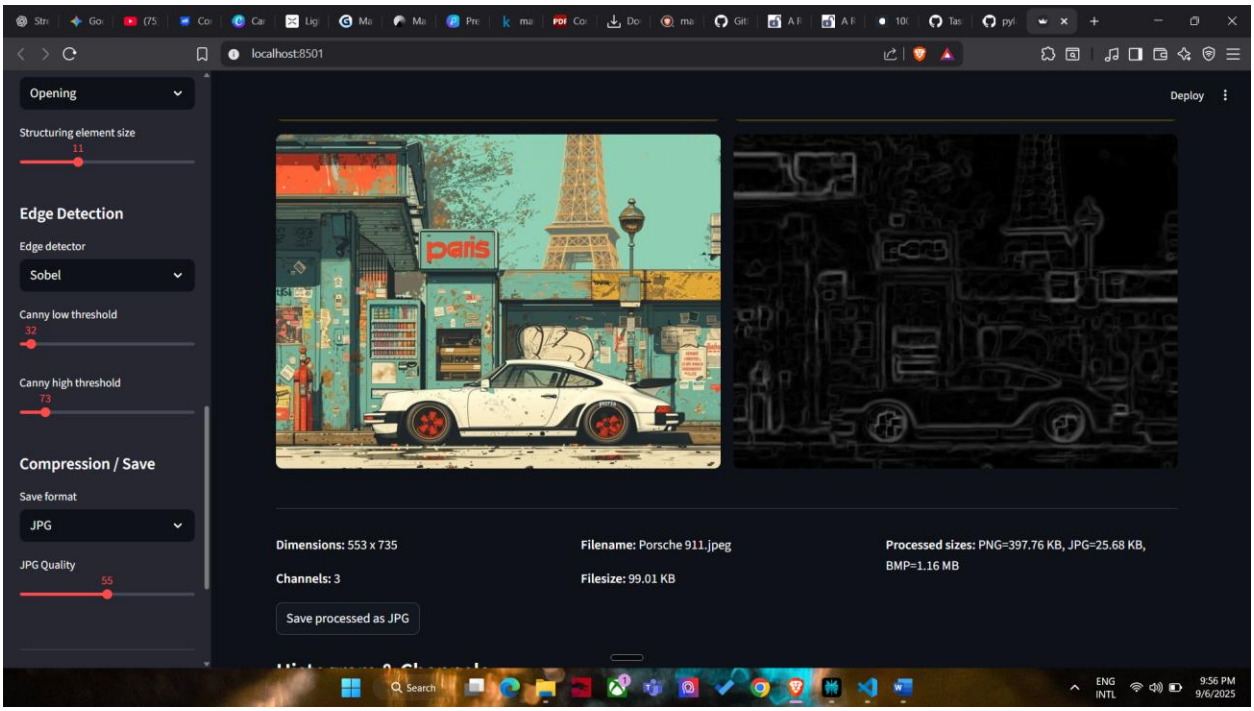
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Canny high threshold
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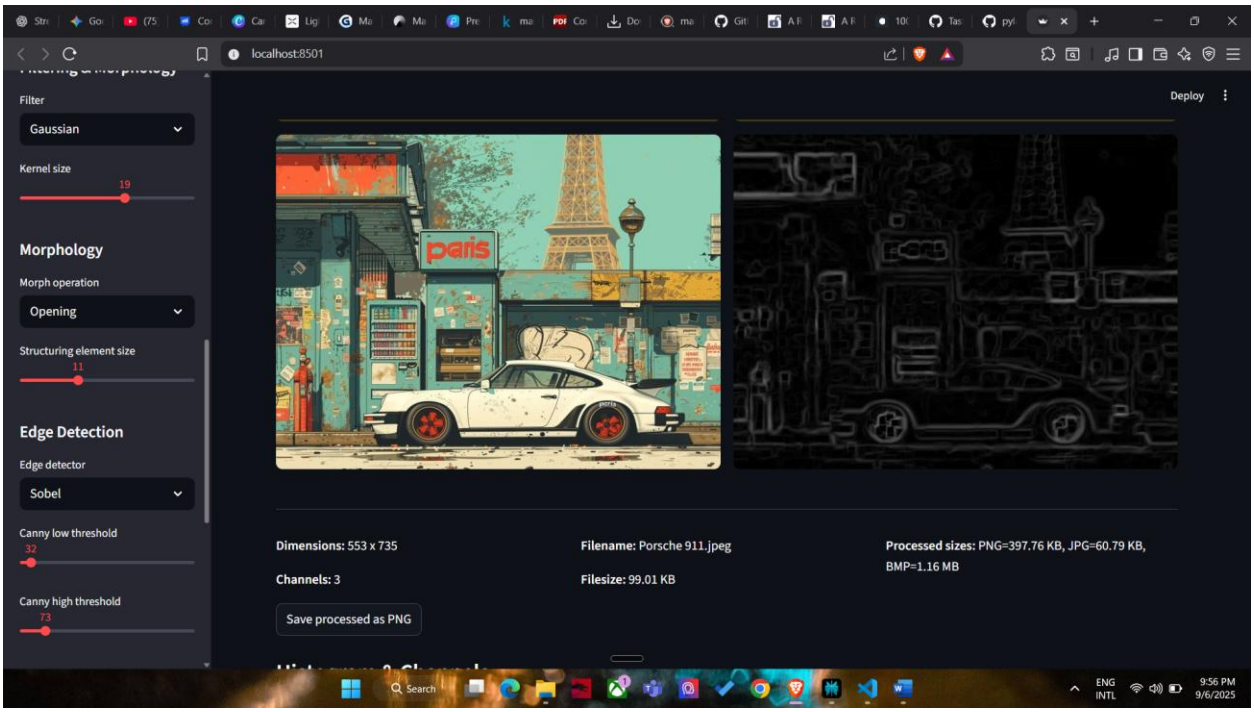
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Kernel size
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Morphology
Morph operation
Opening
Structuring element size
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Edge Detection
Edge detector
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Canny low threshold
32
Canny high threshold
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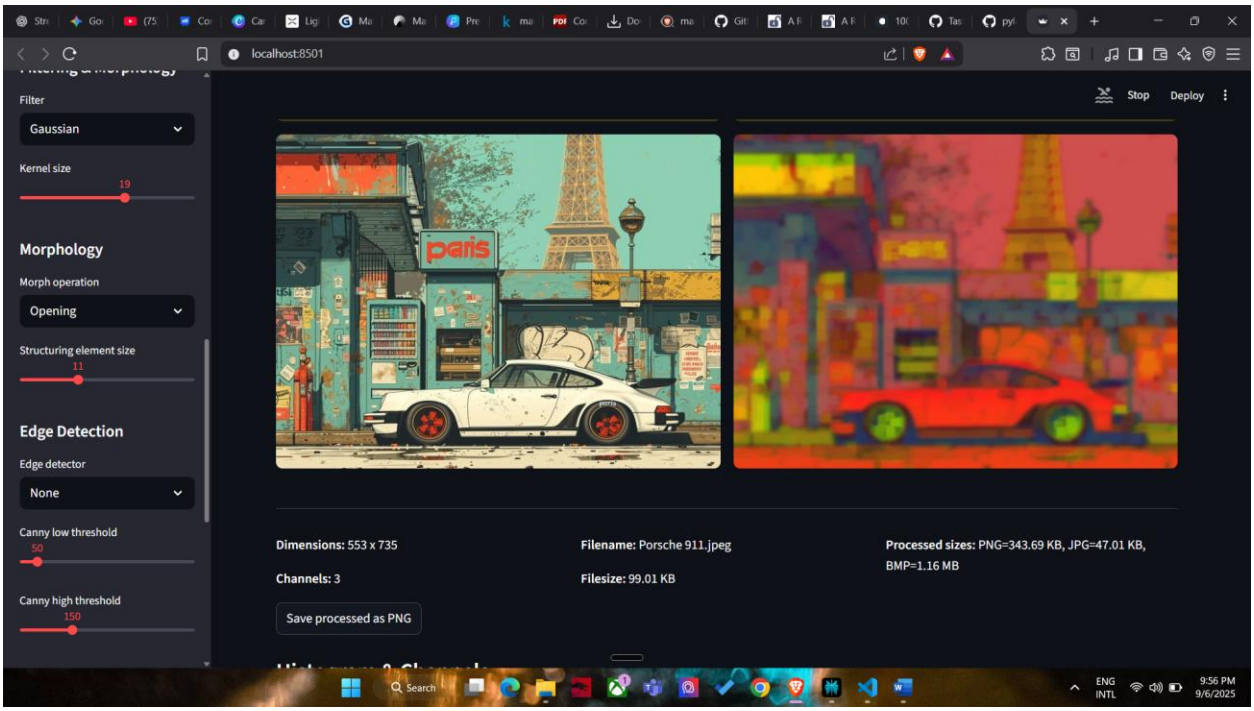
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Kernel size
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Morphology
Morph operation
Opening
Structuring element size
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Edge Detection
Edge detector
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Canny low threshold
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Canny high threshold
150
paris
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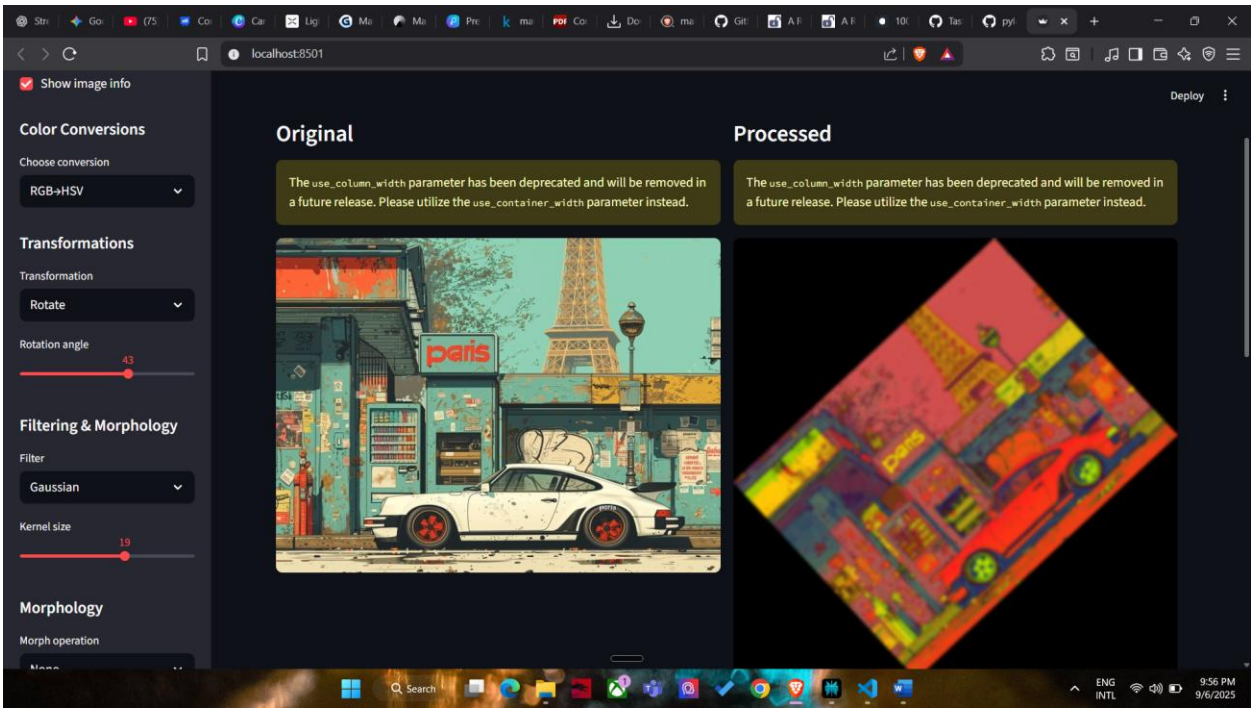
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Color Conversions
Choose conversion
RGB→HSV
Transformations
Transformation
Rotate
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43
Filtering & Morphology
Filter
Gaussian
Kernel size
19
Morphology
Morph operation
Original
Processed
The use_column_width parameter has been deprecated and will be removed in a future release. Please utilize the use_container_width parameter instead.
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paris
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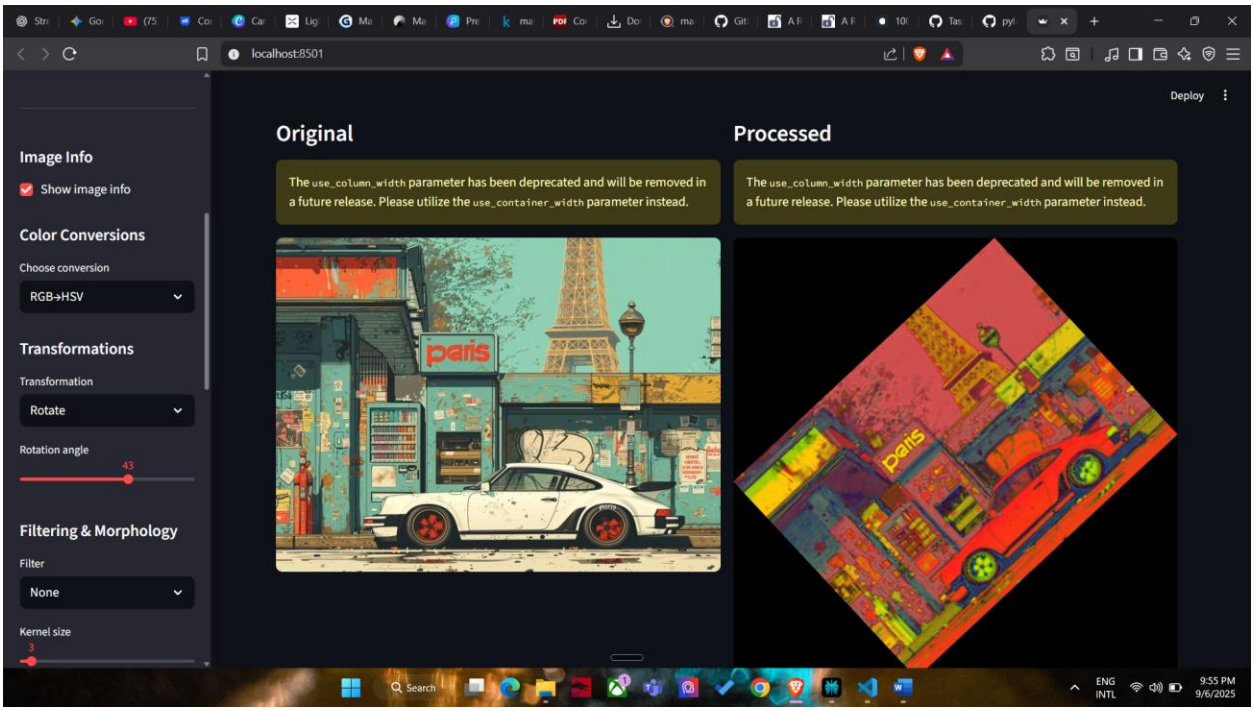
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Kernel size
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paris
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ENG
INTL
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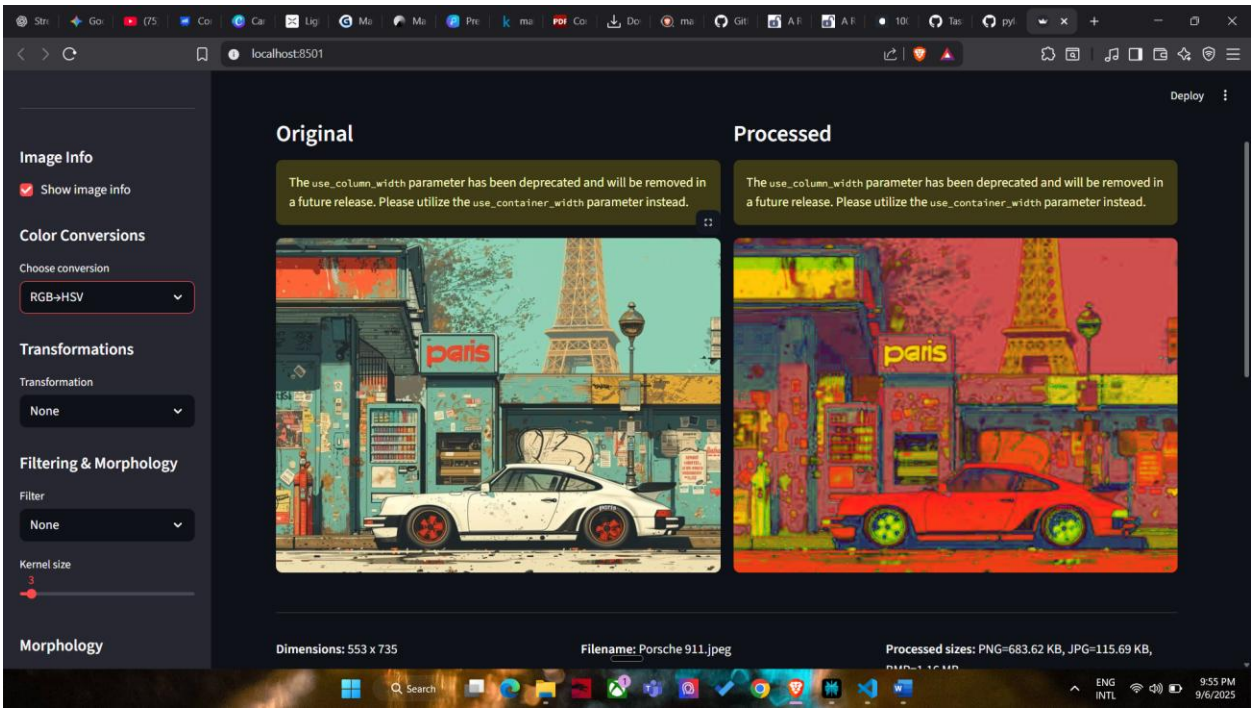
9/6/2025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Morphology
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