Image to Pencil Sketch Converter

This project converts an image to a pencil sketch using OpenCV and displays each step of the process. The project is designed to run in Google Colab.

Image Processing

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Brief Introduction

The project is titled "Image to Pencil Sketch Converter". It aims to convert an image into a pencil sketch using OpenCV and display each step of the process. The project is designed to run in Google Colab.

Problem Definition

The challenge addressed by this project is the need for an automated and efficient method to convert images into pencil sketches. This can be useful for artistic purposes, educational tools, or enhancing visual content in various applications.

Proposed Methodology

The methodology involves several steps to transform an image into a pencil sketch:

- **1- Image Upload:** Users upload an image file.
- **2- Grayscale Conversion**: The uploaded image is converted to grayscale.
- **3- Inversion:** The grayscale image is inverted.
- **4- Gaussian Blur:** A Gaussian blur is applied to the inverted image.
- **5- Inverted Blur**: The blurred image is inverted.
  6- Pencil Sketch Creation: The grayscale image is blended with the inverted blurred image to create a pencil sketch.

7- Step-by-Step Display: Each step of the process is displayed for better understanding.

Solution Definition & Core Functionality Examples

The solution implements the above methodology using Python and OpenCV. Here are some code snippets:

Example: Displaying Images

```python
import cv2
import numpy as np
from google.colab import files
from IPython.display import Image, display
import matplotlib.pyplot as plt

def display_image(image, title, position):
    """Helper function to display an image with a title"""
    plt.subplot(position)
    plt.imshow(cv2.cvtColor(image, cv2.COLOR_BGR2RGB))
    plt.title(title)
    plt.axis('off')
```

Example: Converting Image to Pencil Sketch

```python
def convert_to_sketch(image):
    """Convert the image to a pencil sketch and display each step"""

    # Display original image
    display_image(image, "Original Image", 231)

    # Convert to grayscale
    gray_image = cv2.cvtColor(image, cv2.COLOR_BGR2GRAY)
    display_image(gray_image, "Grayscale Image", 232)

    # Invert the grayscale image
    inverted_image = 255 - gray_image
    display_image(inverted_image, "Inverted Grayscale Image", 233)

    # Apply Gaussian blur
    blurred_image = cv2.GaussianBlur(inverted_image, (21, 21), 0)
    display_image(blurred_image, "Blurred Image", 234)

    # Invert the blurred image
    inverted_blurred = 255 - blurred_image
    display_image(inverted_blurred, "Inverted Blurred Image", 235)

    # Create the pencil sketch by blending
    pencil_sketch = cv2.divide(gray_image, inverted_blurred, scale=256.0)
    display_image(pencil_sketch, "Pencil Sketch", 236)

    return pencil_sketch
```

Code & Libraries Used

- Language: Python 3.x
- Core Libraries: OpenCV, NumPy, Matplotlib
- Platform: Google Colab