Project Documentation: Image Collage Generator

Introduction:

The Image Collage Generator is a Python script that allows users to create a collage of multiple images. The script utilizes the PIL (Python Imaging Library) library for image manipulation and the Tkinter library for the graphical user interface (GUI) components.

Step-by-Step Guide:

Installation: To use the Image Collage Generator, you need to have the following dependencies installed: PIL (Python Imaging Library): You can install it using the command `pip install pillow`. And for tkinter 'pip install tkinter'

Step 1: Select the Image Folder

1. When you run the script, a folder dialog window will open, providing a graphical interface for selecting a folder.

2. The user is prompted to browse and select the folder that contains the images they want to include in the collage.

3. Once the folder is selected, the user clicks "OK" or presses "Enter" to proceed.

Step 2: Select the Images

1. After selecting the folder, another dialog window will open, allowing the user to multi-select the image files they want to include in the collage.

2. The user can use the file dialog to navigate to the desired folder and select multiple image files by holding down the Ctrl or Shift key while clicking on the files.

3. Once the images are selected, the user clicks "OK" or presses "Enter" to proceed.

Step 3: Image Processing

1. The script begins by processing the selected images one by one.

2. It uses the PIL library to open each image file and create an image object.

3. The image objects are stored in a matrix (list) for further manipulation.

4. Additionally, the script determines the size (width and height) of each image and stores it in a separate list.

Step 4: Determine Image Positions and Border Sizes

1. The script calculates the positions of the images in the collage based on their sizes.

2. It starts with the first image and positions it at the top-left corner (coordinates 0, 0).

3. For subsequent images, the script automatically calculates the position based on the size of the previous image and the available space in the collage.

4. To calculate the position, the script uses the coordinates (x, y) which represent the top-left corner of each image.

5. It also keeps track of the maximum x-coordinate (max_x) and the maximum y-coordinate (max_y) reached so far to determine the size of the collage canvas.

6. If there is enough space horizontally, the script positions the image to the right of the previous image.

7. If there is not enough space horizontally but enough vertically, the script positions the image below the previous image.

8. If there is not enough space horizontally or vertically, the script starts a new row at the bottom.

9. The script prompts the user to enter the desired border size for each image, allowing customization of the collage appearance.

Step 5: Generate the Collage

1. Once the positions and border sizes are determined, the script creates a blank canvas for the collage using the PIL library.

2. The canvas is initialized with a white background and dimensions based on the maximum x-coordinate (max_x) and maximum y-coordinate (max_y) calculated in the previous step.

3. The script iterates through the image matrix and the position mapping to paste each image onto the collage canvas.

4. It retrieves the image object from the matrix and the position (x, y) from the position mapping.

5. To add a border around each image, the script uses the PIL ImageOps module to expand the image with the specified border size and color.

6. The bordered image is then pasted onto the collage canvas at the specified position.

Step 6: View and Save the Collage

1. After generating the collage, the script opens a separate window to display the final result using the PIL library.

2. The user can view the collage and make any adjustments if needed, such as resizing or cropping.

3. If the user wants to save the collage, they can use the "Save" or "Export" option provided by the image viewer.

4. The saved collage can be used for various purposes, such as sharing on social media, printing, or incorporating into other projects.

Conclusion:

The Image Collage Generator is a versatile tool that allows users to create customized collages of multiple images. By following the step-by-step guide, users can easily select the image folder, choose the images, and specify their positions and border sizes. The script takes care of the image processing and collage generation, providing the user with a visually appealing collage that can be viewed and saved for further use.