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import os
import csv
import cv2
import matplotlib.pyplot as plt

# Define the path to the dataset
dataset_path = "./datasets"

# Retrieve all .jpg files in the dataset directory
file_list = [f for f in os.listdir(dataset_path) if f.endswith(".jpg") and
not f.startswith(".")]

# Initialize a list to store output data
output = []

for i, filename in enumerate(file_list):
    # Read the image
    image = cv2.imread(os.path.join(dataset_path, filename))

    # Convert the image to grayscale
    gray = cv2.cvtColor(image, cv2.COLOR_RGB2GRAY)

    # Apply Otsu's thresholding to binarize the image
    _, bw_image = cv2.threshold(gray, 0, 255, cv2.THRESH_OTSU)

    # Calculate total number of pixels
    total_pixels = bw_image.size

    # Count the number of white pixels
    white_pixels = cv2.countNonZero(bw_image)

    # Calculate the number of black pixels
    black_pixels = total_pixels - white_pixels

    # Calculate the percentage of black pixels
    black_ratio = (black_pixels / total_pixels) * 100
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    # Append the results to the output list
    output.append((i + 1, filename, total_pixels, white_pixels, black_pixels,
black_ratio))

# Write the results to a CSV file
with open(os.path.join(dataset_path, 'result.csv'), 'w', newline='') as f:
    writer = csv.writer(f)
    header = ["File No", "File Name", "Total Pixels", "White Pixels", "Black
Pixels", "Black Pixel Ratio (%)"]
    writer.writerow(header)
    writer.writerows(output)
```