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Automatica si Calculatoare
Machine Learning
2025

Image Augmentation System Documentation

1. Overview

This project implements a configurable image augmentation system designed for computer vision and machine learning tasks. The program loads .jpg images from a selected folder and applies augmentation operations defined in a configuration file. It supports chained operations and automatic output naming.

2. **Implemented** Algorithms

Algorithm	Type	Low-Level	Description
Brightness	Pixel	Yes	Adds a constant to pixels with manual clamping
Contrast	Pixel	Yes	Scales pixel values around 128 reference point
Grayscale	Pixel	Yes	Computes luminance using weighted RGB coefficients
FlipH	Geometric	Yes	Horizontal flip via reverse indexing
Rotation	Geometric	No	Uses affine rotation via OpenCV
Resize	Geometric	No	Resizes image to target width and height

3. Configuration Syntax

Each line in the config file defines one or more operations, optionally chained using '|'.

Examples:

a. Example 1

   Brightness 25

   Grayscale

   FlipH

b. Example 2

   Brightness 10 | Contrast 1.1 | Grayscale

   Rotation 15 | Resize 640x480

Processed images are saved in a new folder with suffix "_aug".

Simple operation format: originalName_Operation_counter.jpg

Chained operations format: originalName_OpA+OpB_counter.jpg

4. Bibliography

OpenCV Documentation – https://docs.opencv.org
NumPy Documentation – https://numpy.org/doc/
Python Tkinter Docs – https://docs.python.org/3/library/tkinter.html
Dan Pescaru – CV UPT laboratory examples