Mosquito Larvae Frame Extraction, Annotation, and Augmentation

Overview

This project prepares a dataset of mosquito larvae for deep neural network (DNN) training. The workflow consisted of four stages:

1. **Frame Extraction**: Random frames were extracted from provided videos (video_00.avi, video_01.mp4) using OpenCV. Five frames were saved from video_00.avi and seven frames were saved from video_01.mp4.

2. **Annotation**: The extracted frames were annotated using LabelMe. Rectangular bounding boxes were drawn around larvae, and saved as JSON files.

3. **Image Augmentation**: To expand the dataset, both geometric and photometric augmentations were applied. Geometric (flips, rotations) required bounding box updates, while photometric (brightness, contrast, blur) kept them unchanged.

4. **Saving Augmented Data**: Each augmented image was saved with an updated JSON annotation.

Annotation Format

- Tool: LabelMe v5.2.1

- Format: JSON per image.

- Each JSON includes image path and shapes, where each shape contains label name and two corner points [x1,y1], [x2,y2].

Augmentation Strategy

- **Geometric**: random flips, small rotations.

- **Photometric**: brightness, contrast, Gaussian blur.

- Updated JSONs ensured consistency between images and bounding boxes.

Replication Instructions

- Requirements: Python 3.x, OpenCV, LabelMe v5.2.1.

- Steps:

  1. Run extract_frames.py
  2. Annotate frames with LabelMe
  3. Run augment_dataset.py

References

- OpenCV Documentation: https://docs.opencv.org

- LabelMe Tool: https://github.com/wkentaro/labelme