Image parsing

The file *raw_images.bin* contains one or more images in RAW 8bit Bayer format recorded with an OpenMV cam M7 (it's an Open Source camera) at a resolution of 640x480px.
The *image_writer.py* script was written in May of 2020 to record these images.

Write a program to read the raw images, transform them into RGB and write them to disk using as lossless-compressed image file. Your program should be able to handle binary files that exceed the size of RAM.

Expected results: source code, executable or equivalent with instructions how to use it.

Image processing

Propose an algorithm to transform the *salads.png* image into a binary mask showing the location of salad pixels (vs. background/soil pixels).
Transform the image (original or mask) such that the salad rows appear parallel. You don't have to do the transformation on the whole image, and may transform a portion of it.

Data generation

Write a program that can create a dataset of 1000 synthetic images composed of a textured background and between 0 and 4 instances of an object. The background base texture is given in background.png. The object.png should be blended with background at random positions and at random angles.
Write an COCO-style annotations for object detection for the generated dataset (only id and bbox attributes are mandatory).

Expected results: code or description of your generation procedure, annotation file.

Machine Learning

The file *yolo_training.png* shows the results of training a Yolo v4 on thermal images. The mAP is very high on validation data set, but the results on the test set and on real data (same domain, but not present in the dataset) are disappointing and do not match the mAP at all.
What could cause such results?