

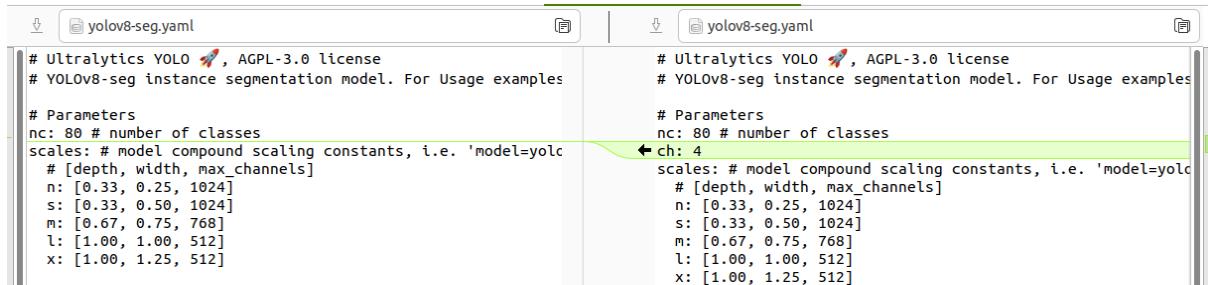
## My steps to modify YOLO to YOLO with 4 channels

author: Anna Gelencsér-Horváth  
Pázmány Péter Catholic University  
Budapest, Hungary  
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If you create a virtual env and would like to replace ultralytics with the modified directory:  
apptainer exec --nv instance://yolo4dinst python3.10 -m virtualenv -p python3.10 \$VENV

### cfg/models/v8

yolov8.yaml and yolov8-seg.yaml:



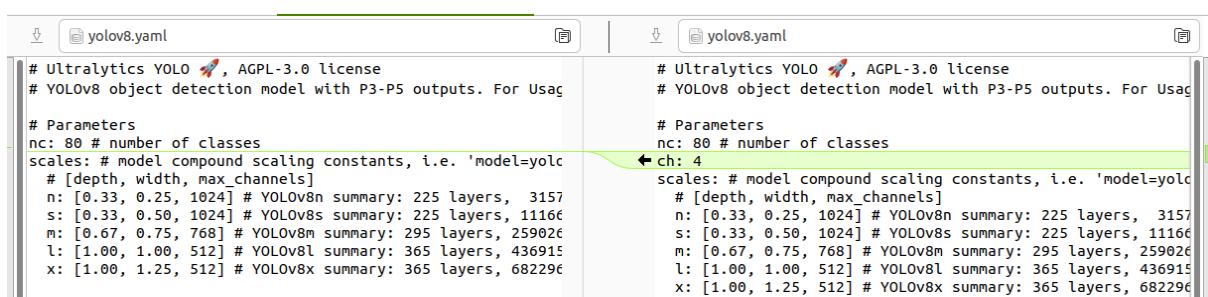
```
# Ultralytics YOLO 🚀, AGPL-3.0 license
# YOLOv8-seg instance segmentation model. For Usage examples

# Parameters
nc: 80 # number of classes
scales: # model compound scaling constants, i.e. 'model=yolo
# [depth, width, max_channels]
n: [0.33, 0.25, 1024]
s: [0.33, 0.50, 1024]
m: [0.67, 0.75, 768]
l: [1.00, 1.00, 512]
x: [1.00, 1.25, 512]

...
ch: 4
```

```
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# YOLOv8-seg instance segmentation model. For Usage examples

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nc: 80 # number of classes
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```



```
# Ultralytics YOLO 🚀, AGPL-3.0 license
# YOLOv8 object detection model with P3-P5 outputs. For Usage examples

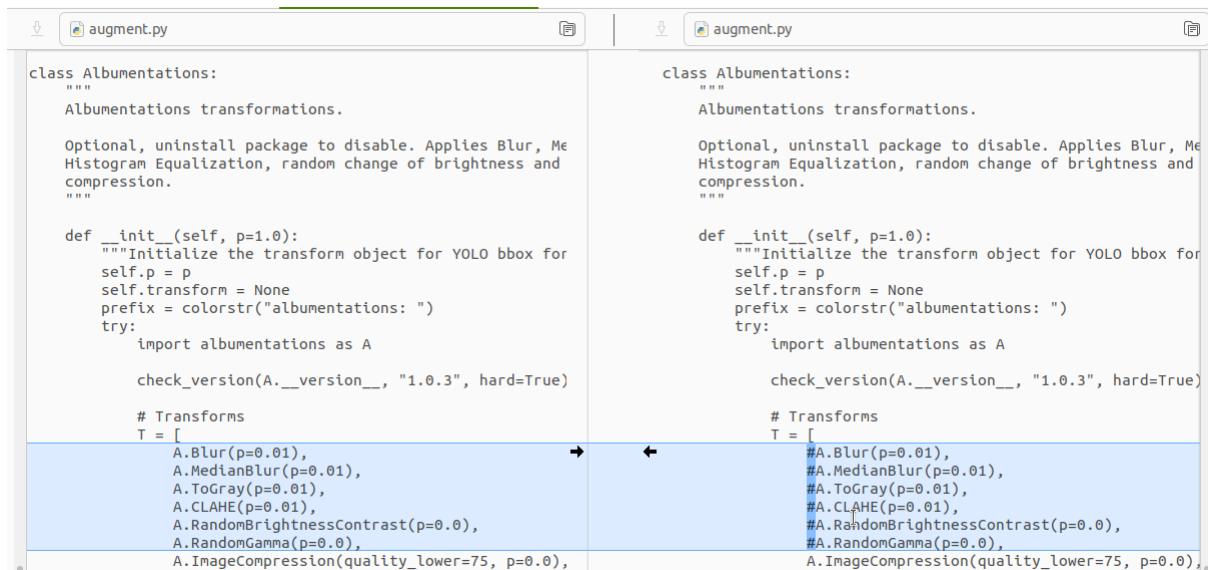
# Parameters
nc: 80 # number of classes
scales: # model compound scaling constants, i.e. 'model=yolo
# [depth, width, max_channels]
n: [0.33, 0.25, 1024] # YOLOv8n summary: 225 layers, 3157
s: [0.33, 0.50, 1024] # YOLOv8s summary: 225 layers, 11166
m: [0.67, 0.75, 768] # YOLOv8m summary: 295 layers, 259026
l: [1.00, 1.00, 512] # YOLOv8l summary: 365 layers, 436915
x: [1.00, 1.25, 512] # YOLOv8x summary: 365 layers, 682296

...
ch: 4
```

```
# Ultralytics YOLO 🚀, AGPL-3.0 license
# YOLOv8 object detection model with P3-P5 outputs. For Usage examples

# Parameters
nc: 80 # number of classes
ch: 4
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x: [1.00, 1.25, 512] # YOLOv8x summary: 365 layers, 682296
```

### data



```
class Albumentations:
    """
    Albumentations transformations.

    Optional, uninstall package to disable. Applies Blur, MedianBlur, ToGray, CLAHE, RandomBrightnessContrast, RandomGamma and ImageCompression.
    """

    def __init__(self, p=1.0):
        """Initialize the transform object for YOLO bbox for self.p = p
        self.transform = None
        prefix = colorstr("albumentations: ")
        try:
            import albumentations as A
            check_version(A.__version__, "1.0.3", hard=True)
        # Transforms
        T = [
            A.Blur(p=0.01),
            A.MedianBlur(p=0.01),
            A.ToGray(p=0.01),
            A.CLAHE(p=0.01),
            A.RandomBrightnessContrast(p=0.0),
            A.RandomGamma(p=0.0),
            A.ImageCompression(quality_lower=75, p=0.0),
        ]
```

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            #A.RandomBrightnessContrast(p=0.0),
            #A.RandomGamma(p=0.0),
            A.ImageCompression(quality_lower=75, p=0.0),
```

```

'single_cls' (bool, optional): If True, single class t
classes (list): List of included classes. Default is
fraction (float): Fraction of dataset to utilize. De
Attributes:
    im_files (list): List of image file paths.
    labels (list): List of label data dictionaries.
    ni (int): Number of images in the dataset.
    ims (list): List of loaded images.
    npy_files (list): List of numpy file paths.
    transforms (callable): Image transformation function
"""
def __init__(
    self,
    img_path,
    imgs_size=640,
    cache=False,
    augment=True,
    hyp=DEFAULT_CFG,
    prefix="",
    rect=False,
    batch_size=16,
    stride=32,
    pad=0.5,
    single_cls=False,
    classes=None,
    fraction=1.0,
):

```

```

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    npy_files (list): List of numpy file paths.
    transforms (callable): Image transformation function
"""
#augment=True
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    self,
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    cache=False,
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    stride=32,
    pad=0.5,
    single_cls=False,
    classes=None,
    fraction=1.0,
):

```

**N.B. in base.py:**  
**there are a LOT OF cv2.imread-s.**  
**Search for ALL and add: cv2.IMREAD\_UNCHANGED**

e.g.:

```

        continue
    class_name = parts[8]
    class_idx = class_mapping[class_name]
    coords = [float(p) for p in parts[:8]]
    normalized_coords = [
        coords[i] / image_width if i % 2 == 0 else coords[i]
    ]
    formatted_coords = ["{:.6g}".format(coord) for coord in normalized_coords]
    g.write(f"{class_idx} {' '.join(formatted_coords)}\n"
phase in ["train", "val"]:
    image_dir = data_root_path / "images" / phase
    orig_label_dir = data_root_path / "labels" / f"{phase}_orig"
    save_dir = data_root_path / "labels" / phase
    save_dir.mkdir(parents=True, exist_ok=True)

    image_paths = list(image_dir.iterdir())
    for image_path in TQDM(image_paths, desc=f"Processing {phase}"):
        if image_path.suffix != ".png":
            continue
        image_name_without_ext = image_path.stem
        img = cv2.imread(str(image_path))
        h, w = img.shape[:2]
        convert_label(image_name_without_ext, w, h, orig_label_

```

```

        continue
    class_name = parts[8]
    class_idx = class_mapping[class_name]
    coords = [float(p) for p in parts[:8]]
    normalized_coords = [
        coords[i] / image_width if i % 2 == 0 else coords[i]
    ]
    formatted_coords = ["{:.6g}".format(coord) for coord in normalized_coords]
    g.write(f"{class_idx} {' '.join(formatted_coords)}\n"
phase in ["train", "val"]:
    image_dir = data_root_path / "images" / phase
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    save_dir = data_root_path / "labels" / phase
    save_dir.mkdir(parents=True, exist_ok=True)

    image_paths = list(image_dir.iterdir())
    for image_path in TQDM(image_paths, desc=f"Processing {phase}"):
        if image_path.suffix != ".png":
            continue
        image_name_without_ext = image_path.stem
        img = cv2.imread(str(image_path), cv2.IMREAD_UNCHANGED)
        h, w = img.shape[:2]
        convert_label(image_name_without_ext, w, h, orig_label_

```

### converter.py:

```

520 """
521     """
522     from tqdm import tqdm
523
524     from ultralytics import SAM
525     from ultralytics.data import YOLODataset
526     from ultralytics.utils import LOGGER
527     from ultralytics.utils.ops import xywh2xyxy
528
529     # NOTE: add placeholder to pass class index check
530     dataset = YOLODataset(im_dir, data=dict(names=list(range(1000))))
531     if len(dataset.labels[0]["segments"]) > 0: # if it's segment data
532         LOGGER.info("Segmentation labels detected, no need to generate new ones!")
533     return
534
535     LOGGER.info("Detection labels detected, generating segment labels by SAM model!")
536     sam_model = SAM(sam_model)
537     for l in tqdm(dataset.labels, total=len(dataset.labels), desc="Generating segment labels"):
538         h, w = l["shape"]
539         boxes = l["bboxes"]
540         if len(boxes) == 0: # skip empty labels
541             continue
542         boxes[:, [0, 2]] *= w
543         boxes[:, [1, 3]] *= h
544         im = cv2.imread([im_file], cv2.IMREAD_UNCHANGED)
545         sam_model(im, bboxes=xywh2xyxy(boxes), verbose=False, save=False)
546         l["segments"] = sam_results[0].masks.syn
547
548     save_dir = Path(save_dir) if save_dir else Path(im_dir).parent / "labels-segment"
549     save_dir.mkdir(parents=True, exist_ok=True)

```

## dataset.py:

```

        scale=scale,
        hflip=args.fliplr,
        vflip=args.flipud,
        erasing=args.erasing,
        auto_augment=args.auto_augment,
        hsv_h=args.hsv_h,
        hsv_s=args.hsv_s,
        hsv_v=args.hsv_v,
    )
    if augment
        else classify_transforms(size=args.imgsz, crop_f
    )

def __getitem__(self, i):
    """Returns subset of data and targets corresponding
    f, j, fn, im = self.samples[i] # filename, index, f
    if self.cache_ram and im is None:
        im = self.samples[i][3] = cv2.imread(f) → ←
    elif self.cache_disk:
        if not fn.exists(): # load npy
            np.save(fn.as_posix(), cv2.imread(f, allow_→ ←
            im = np.load(fn)
        else: # read image
            im = cv2.imread(f) # BGR → ←
    # Convert NumPy array to PIL image
    im = Image.fromarray(cv2.cvtColor(im, cv2.COLOR_BGR2→ ←
    sample = self.torch_transforms(im)
    return {"img": sample, "cls": j}

    scale=scale,
        hflip=args.fliplr,
        vflip=args.flipud,
        erasing=args.erasing,
        auto_augment=args.auto_augment,
        hsv_h=args.hsv_h,
        hsv_s=args.hsv_s,
        hsv_v=args.hsv_v,
    )
    if augment
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    f, j, fn, im = self.samples[i] # filename, index, f
    if self.cache_ram and im is None:
        im = self.samples[i][3] = cv2.imread(f, cv2.IMR→ ←
    elif self.cache_disk:
        if not fn.exists(): # load npy
            np.save(fn.as_posix(), cv2.imread(f, cv2.IMR→ ←
            im = np.load(fn)
        else: # read image
            im = cv2.imread(f, cv2.IMREAD_UNCHANGED) # BGR → ←
    # Convert NumPy array to PIL image
    im = Image.fromarray(cv2.cvtColor(im, cv2.COLOR_BGR→ ←
    sample = self.torch_transforms(im)
    return {"img": sample, "cls": j}

```

*crtl-c,crtl-v new function:*

```

def __getitem__(self, i):
    """Returns subset of data and targets corresponding to given indices."""
    f, j, fn, im = self.samples[i] # filename, index, filename.with_suffix('.npy'), image
    if self.cache_ram and im is None:
        im = self.samples[i][3] = cv2.imread(f, cv2.IMREAD_UNCHANGED)
    elif self.cache_disk:
        if not fn.exists(): # load npy
            np.save(fn.as_posix(), cv2.imread(f, cv2.IMREAD_UNCHANGED), allow_pickle=False)
            im = np.load(fn)
        else: # read image
            im = cv2.imread(f, cv2.IMREAD_UNCHANGED) # BGR
    # Convert NumPy array to PIL image
    im = Image.fromarray(cv2.cvtColor(im, cv2.COLOR_BGRA2RGB))
    sample = self.torch_transforms(im)
    return {"img": sample, "cls": j}

```

## loaders.py

```

if self.video_flag[self.count]:
    # Read video
    self.mode = "video"
    for _ in range(self.vid_stride):
        self.cap.grab()
    success, im0 = self.cap.retrieve()
    while not success:
        self.count += 1
        self.cap.release()
        if self.count == self.nf: # last video
            raise StopIteration
        path = self.files[self.count]
        self._new_video(path)
        success, im0 = self.cap.read()

        self.frame += 1
        # im0 = self._cv2_rotate(im0) # for use if cv2
        s = f"video {self.count + 1}/{self.nf} ({self.fr
    else:
        # Read image
        self.count += 1
        im0 = cv2.imread(path) # BGR → ←
        if im0 is None:
            raise FileNotFoundError(f"Image Not Found {p
            s = f"image {self.count}/{self.nf} {path}: "

```

```

if self.video_flag[self.count]:
    # Read video
    self.mode = "video"
    for _ in range(self.vid_stride):
        self.cap.grab()
    success, im0 = self.cap.retrieve()
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        self._new_video(path)
        success, im0 = self.cap.read()

        self.frame += 1
        # im0 = self._cv2_rotate(im0) # for use if cv2
        s = f"video {self.count + 1}/{self.nf} ({self.fr
    else:
        # Read image
        self.count += 1
        im0 = cv2.imread(path, cv2.IMREAD_UNCHANGED) #
        if im0 is None:
            raise FileNotFoundError(f"Image Not Found {p
            s = f"image {self.count}/{self.nf} {path}: "

```

## split\_data.py

```
def crop_and_save(anno, windows, window_objs, im_dir, lb_dir)
"""
Crop images and save new labels.

Args:
    anno (dict): Annotation dict, including 'filepath',
    windows (list): A list of windows coordinates.
    window_objs (list): A list of labels inside each window.
    im_dir (str): The output directory path of images.
    lb_dir (str): The output directory path of labels.

Notes:
    The directory structure assumed for the DOTA dataset
        - data_root
            - images
                - train
                - val
            - labels
                - train
                - val
"""

im = cv2.imread(anno["filepath"])
name = Path(anno["filepath"]).stem
for i, window in enumerate(windows):
    x_start, y_start, x_stop, y_stop = window.tolist()
    new_name = f'{name}_{[x_stop - x_start]}_{[y_start]}'
    patch_im = im[y_start:y_stop, x_start:x_stop]
    ph, pw = patch_im.shape[:2]

def crop_and_save(anno, windows, window_objs, im_dir, lb_dir)
"""
Crop images and save new labels.

Args:
    anno (dict): Annotation dict, including 'filepath',
    windows (list): A list of windows coordinates.
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Notes:
    The directory structure assumed for the DOTA dataset
        - data_root
            - images
                - train
                - val
            - labels
                - train
                - val
"""

im = cv2.imread(anno["filepath"], cv2.IMREAD_UNCHANGED)
name = Path(anno["filepath"]).stem
for i, window in enumerate(windows):
    x_start, y_start, x_stop, y_stop = window.tolist()
    new_name = f'{name}_{[x_stop - x_start]}_{[y_start]}'
    patch_im = im[y_start:y_stop, x_start:x_stop]
    ph, pw = patch_im.shape[:2]
```

## utils.py

```
l_new (str, optional): The path to the output image
max_dim (int, optional): The maximum dimension (width or height)
quality (int, optional): The image compression quality

Example:
```python
from pathlib import Path
from ultralytics.data.utils import compress_one_image

for f in Path('path/to/dataset').rglob('*.*'):
    compress_one_image(f)
```

try: # use PIL
    im = Image.open(f)
    r = max_dim / max(im.height, im.width) # ratio
    if r < 1.0: # image too large
        im = im.resize((int(im.width * r), int(im.height * r)))
    im.save(f_new or f, "JPEG", quality=quality, optimize=True)
except Exception as e: # use OpenCV
    LOGGER.info(f"WARNING HUB ops PIL failure {f}: {e}")
    im = cv2.imread(f)
    im_height, im_width = im.shape[:2]
    r = max_dim / max(im_height, im_width) # ratio
    if r < 1.0: # image too large
        im = cv2.resize(im, (int(im_width * r), int(im_height * r)))
    cv2.imwrite(str(f_new or f), im)

l_new (str, optional): The path to the output image
max_dim (int, optional): The maximum dimension (width or height)
quality (int, optional): The image compression quality

Example:
```python
from pathlib import Path
from ultralytics.data.utils import compress_one_image

for f in Path('path/to/dataset').rglob('*.*'):
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except Exception as e: # use OpenCV
    LOGGER.info(f"WARNING HUB ops PIL failure {f}: {e}")
    im = cv2.imread(f, cv2.IMREAD_UNCHANGED)
    im_height, im_width = im.shape[:2]
    r = max_dim / max(im_height, im_width) # ratio
    if r < 1.0: # image too large
        im = cv2.resize(im, (int(im_width * r), int(im_height * r)))
    cv2.imwrite(str(f_new or f), im)
```

## engine

### validator.py

```
imgsz = check_imgsz(self.args.imgsz, str=True)
if engine:
    self.args.batch = model.batch_size
elif not pt and not jit:
    self.args.batch = 1 # export.py models default to batch size 1
    LOGGER.info(f"Forcing batch=1 square inference (1,3,[1,1])")
if str(self.args.data).split(".")[-1] in ("yaml", "yml"):
    self.data = check_det_dataset(self.args.data)
elif self.args.task == "classify":
    self.data = check_cls_dataset(self.args.data, split=self.split)
else:
    raise FileNotFoundError(emoji(f"Dataset '{self.args.data}' not found"))

if self.device.type in ("cpu", "mps"):
    self.args.workers = 0 # faster CPU val as time dominant
    if not pt:
        self.args.rect = False
    self.stride = model.stride # used in get_dataloader() for self.dataloader = self.dataloader or self.get_dataloader(self.args)
model.eval()
model.warmup(imgsz=(1 if pt else self.args.batch, 3, imgsz, imgsz))
f.run_callbacks("on_val_start")
= (
Profile(device=self.device),
Profile(device=self.device),
Profile(device=self.device),
Profile(device=self.device))

if engine:
    self.args.batch = model.batch_size
elif not pt:
    self.args.rect = False
    self.stride = model.stride # used in get_dataloader() for self.dataloader = self.dataloader or self.get_dataloader(self.args)
model.eval()
#model.warmup(imgsz=(1 if pt else self.args.batch, 3, imgsz, imgsz))
model.warmup(imgsz=(1 if pt else self.args.batch, 4, imgsz, imgsz))

f.run_callbacks("on_val_start")
= (
Profile(device=self.device),
Profile(device=self.device),
Profile(device=self.device),
```

model.warmup(imgsz=(1 if pt else self.args.batch, 4, imgsz, imgsz)) # warmup for 4 channels

## predictor.py

```
predictor.py
anna on cl ~/envs/venv_yolo4d_v3/lib/python3.10/site-packages/ultralytics/engine
Save □ ×
Q | ▲ ▼

th self._lock: # for thread-safe inference
# Setup source every time predict is called
self.setup_source(source if source is not None else self.args.source)

# Check if save_dir/ label file exists
if self.args.save or self.args.save_txt:
    (self.save_dir / "labels" if self.args.save_txt else self.save_dir).mkdir(parents=True, exist_ok=True)

# Warmup model
if not self.done_warmup:
    #self.model.warmup(imgsz=(1 if self.model.pt or self.model.triton else self.dataset.bs, 3, *self.imgsz))
    self.model.warmup(imgsz=(1 if self.model.pt or self.model.triton else self.dataset.bs, 4, *self.imgsz))
    self.done_warmup = True
```

## nn

### autobackend.py

```
autobackend.py
y[1] = np.transpose(y[1], (0, 3, 1, 2)) # s
y = [x if isinstance(x, np.ndarray) else x.numpy()

# for x in y:
#     print(type(x), len(x)) if isinstance(x, (list,
# if isinstance(y, (list, tuple)):
#     return self.from_numpy(y[0]) if len(y) == 1 else
else:
    return self.from_numpy(y)

def from_numpy(self, x):
"""
Convert a numpy array to a tensor.

Args:
    x (np.ndarray): The array to be converted.

Returns:
    (torch.Tensor): The converted tensor
"""
return torch.tensor(x).to(self.device) if isinstance(x, np.ndarray) else self.from_numpy(x)

def warmup(self, imgsz=(1, 3, 640, 640)):
"""
Warm up the model by running one forward pass with a
dummy tensor.
Args:
    imgsz (tuple): The shape of the dummy input tensor
"""
pass
```

```
autobackend.py
y = [x if isinstance(x, np.ndarray) else x.numpy()

# for x in y:
#     print(type(x), len(x)) if isinstance(x, (list,
# if isinstance(y, (list, tuple)):
#     return self.from_numpy(y[0]) if len(y) == 1 else
else:
    return self.from_numpy(y)

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Args:
    x (np.ndarray): The array to be converted.

Returns:
    (torch.Tensor): The converted tensor
"""
return torch.tensor(x).to(self.device) if isinstance(x, np.ndarray) else self.from_numpy(x)

def warmup(self, imgsz=(1, 3, 640, 640)):
"""
Warm up the model by running one forward pass with a
dummy tensor.
Args:
    imgsz (tuple): The shape of the dummy input tensor
"""
pass
```

**def warmup(self, imgsz=(1, 4, 640, 640)):**

### tasks.py

```
tasks.py
def loss(self, batch, preds=None):
"""
Compute loss.

Args:
    batch (dict): Batch to compute loss on
    preds (torch.Tensor | List[torch.Tensor]): Predictions
"""
if not hasattr(self, "criterion"):
    self.criterion = self.init_criterion()

preds = self.forward(batch["img"]) if preds is None
return self.criterion(preds, batch)

def init_criterion(self):
"""
Initialize the loss criterion for the BaseModel.
raise NotImplementedError("compute_loss() needs to be implemented")
"""

class DetectionModel(BaseModel):
    """
    YOLOv8 detection model.
    """

    def __init__(self, cfg="yolov8n.yaml", ch=3, nc=None, verbose=False):
        """
        Initialize the YOLOv8 detection model with the given configuration.
        Args:
            cfg (str): Configuration file path.
            ch (int): Number of channels.
            nc (int): Number of classes.
            verbose (bool): Whether to print verbose logs.
        """
        super().__init__(cfg)
        self.yaml = cfg if isinstance(cfg, dict) else yaml.load(open(cfg, "r"), Loader=yaml.FullLoader)
        self.yaml["nc"] = nc if nc is not None else self.yaml["nc"]
        self.yaml["ch"] = ch if ch is not None else self.yaml["ch"]

    # Define model
    ch = self.yaml["ch"] = self.yaml.get("ch", ch) # if ch is None else self.yaml["ch"]
```

```
tasks.py
def loss(self, batch, preds=None):
"""
Compute loss.

Args:
    batch (dict): Batch to compute loss on
    preds (torch.Tensor | List[torch.Tensor]): Predictions
"""
if not hasattr(self, "criterion"):
    self.criterion = self.init_criterion()

preds = self.forward(batch["img"]) if preds is None
return self.criterion(preds, batch)

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    """
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    def __init__(self, cfg="yolov8n.yaml", ch=3, nc=None, verbose=False):
        """
        Initialize the YOLOv8 detection model with the given configuration.
        Args:
            cfg (str): Configuration file path.
            ch (int): Number of channels.
            nc (int): Number of classes.
            verbose (bool): Whether to print verbose logs.
        """
        super().__init__(cfg)
        self.yaml = cfg if isinstance(cfg, dict) else yaml.load(open(cfg, "r"), Loader=yaml.FullLoader)
        self.yaml["nc"] = nc if nc is not None else self.yaml["nc"]
        self.yaml["ch"] = ch if ch is not None else self.yaml["ch"]

    # Define model
    ch = self.yaml["ch"] = self.yaml.get("ch", ch) # if ch is None else self.yaml["ch"]
```

---

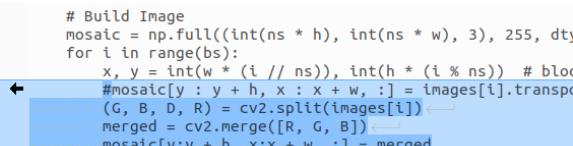
## utils

---

plotting.py:

```
# Build Image
mosaic = np.full((int(ns * h), int(ns * w), 3), 255, dtype=np.uint8)
for i in range(bs):
    x, y = int(w * (i // ns)), int(h * (i % ns)) # block origin
    mosaic[y:y + h, x:x + w, :] = images[i].transpose(1, 2, 0)

# Resize (optional)
scale = max_size / ns / max(h, w)
mosaic = cv2.resize(mosaic, (int(ns * h), int(ns * w)), interpolation=cv2.INTER_AREA)
```



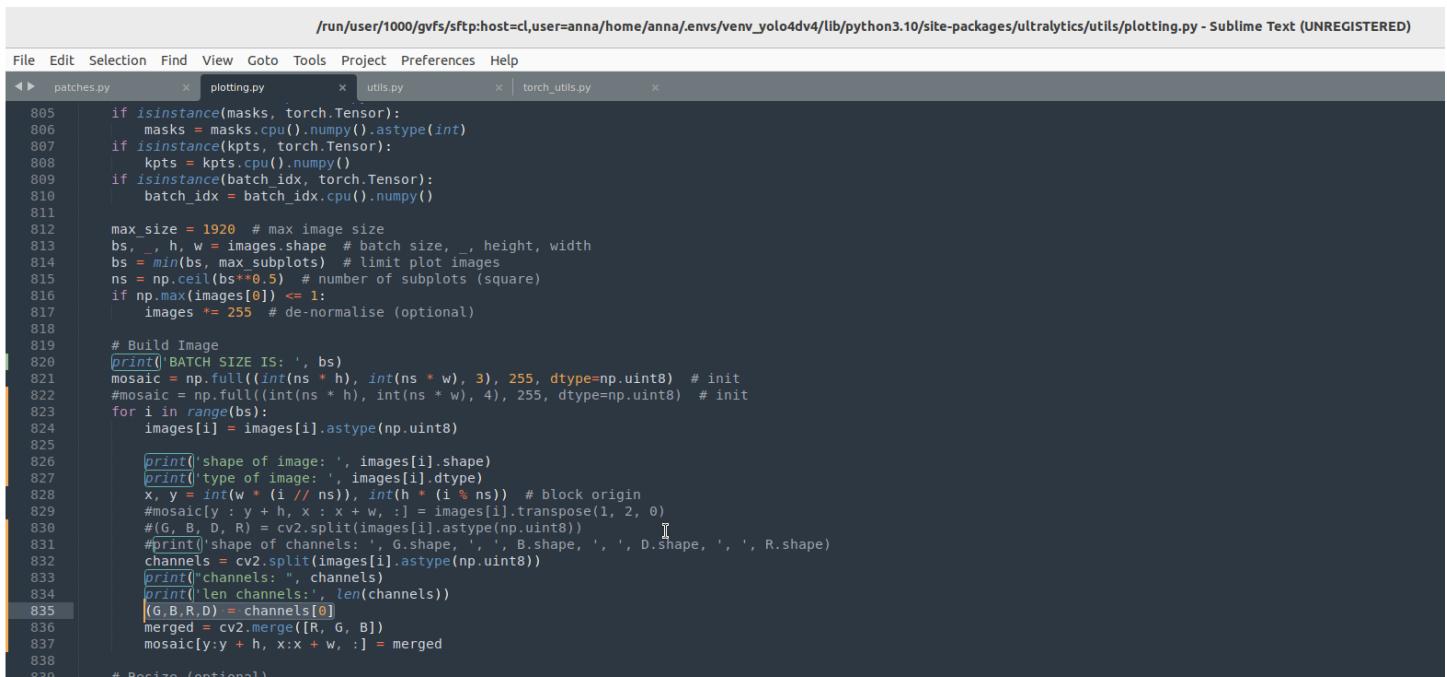
change line:

```
mosaic[y:y + h, x:x + w, :] = images[i].transpose(1, 2, 0)
```

new:

```
#mosaic[y:y + h, x:x + w, :] = images[i].transpose(1, 2, 0)
(G, B, D, R) = cv2.split(images[i])
merged = cv2.merge([R, G, B])
mosaic[y:y + h, x:x + w, :] = merged
```

and:



```
File Edit Selection Find View Goto Tools Project Preferences Help
patches.py x plotting.py x utils.py x torch_utils.py x
/run/user/1000/gvfs/sftp:host=cl,user=anna/home/anna/envs/venv_yolo4dv4/lib/python3.10/site-packages/ultralytics/utils/plotting.py - Sublime Text (UNREGISTERED)

805 if isinstance(masks, torch.Tensor):
806     masks = masks.cpu().numpy().astype(int)
807 if isinstance(kpts, torch.Tensor):
808     kpts = kpts.cpu().numpy()
809 if isinstance(batch_idx, torch.Tensor):
810     batch_idx = batch_idx.cpu().numpy()
811
812 max_size = 1920 # max image size
813 _, h, w = images.shape # batch size, _, height, width
814 bs = min(bs, max_subplots) # limit plot images
815 ns = np.ceil(bs**0.5) # number of subplots (square)
816 if np.max(images[0]) <= 1:
817     images *= 255 # de-normalise (optional)
818
819 # Build Image
820 print('BATCH SIZE IS: ', bs)
821 mosaic = np.full((int(ns * h), int(ns * w), 3), 255, dtype=np.uint8) # init
822 #mosaic = np.full((int(ns * h), int(ns * w), 4), 255, dtype=np.uint8) # init
823 for i in range(bs):
824     images[i] = images[i].astype(np.uint8)
825
826     print('shape of image: ', images[i].shape)
827     print('type of image: ', images[i].dtype)
828     x, y = int(w * (i // ns)), int(h * (i % ns)) # block origin
829     #mosaic[y:y + h, x:x + w, :] = images[i].transpose(1, 2, 0)
830     # (G, B, D, R) = cv2.split(images[i].astype(np.uint8))
831     #print('shape of channels: ', G.shape, ', ', B.shape, ', ', D.shape, ', ', R.shape)
832     channels = cv2.split(images[i].astype(np.uint8))
833     print('channels: ', channels)
834     print('len channels: ', len(channels))
835     (G,B,R,D) = channels[0]
836     merged = cv2.merge([R, G, B])
837     mosaic[y:y + h, x:x + w, :] = merged
838
839 # Resize (optional)
```

---

## IN THE YAML FILE I GIVE TO THE MODEL FOR TRAINING INFO:

---

```
lidar_forest_feb9_rgbd.yaml
path: /home/anna/vis_challenge_2024/data/YOLOtraindir_forest_LIDAR_feb9 # dataset root dir
train: rgbd_images/train/images # train images (relative to 'path') 1742289 images
val: rgbd_images/val/images # val images (relative to 'path') 80000 images
test: rgbd_images/val/images # test images (optional)

# Classes
names:
  0: box
  1: tree
ch: 4
```

## IN CONCLUSION:

check all the *imread*-s, and *ch=3* and in *plotting.py* and *tensorboard.py* adjust the settings.

VSCode can list all imreads if you search in the side panel:

```
42 results - 13 files

data/base.py:
154             Path(fn).unlink(missing_ok=True)
155             im = cv2.imread(f, cv2.IMREAD_UNCHANGED) # BGR
156         else: # read image
157             im = cv2.imread(f, cv2.IMREAD_UNCHANGED) # BGR
158         if im is None:
159
160             if not f.exists():
161                 np.save(f.as_posix(), cv2.imread(self.im_files[i], cv2.IMREAD_UNCHANGED), allow_pickle=False)
162
163             for _ in range(n):
164                 im = cv2.imread(random.choice(self.im_files), cv2.IMREAD_UNCHANGED) # sample image
165                 ratio = self.imgsz / max(im.shape[0], im.shape[1]) # max(h, w) # ratio
166
167
168 data/converter.py:
428     image_name_without_ext = image_path.stem
429     img = cv2.imread(str(image_path), cv2.IMREAD_UNCHANGED)
430     h, w = img.shape[:2]
431
432     boxes[:, [1, 3]] *= h
433     im = cv2.imread(["im_file"], cv2.IMREAD_UNCHANGED)
434     sam_results = sam_model(im, bboxes=xywh2xyxy(boxes), verbose=False, save=False)
435
436
437 data/dataset.py:
452         if im is None: # Warning: two separate if statements required here, do not combine this with previous line
453             im = self.samples[i][3] = cv2.imread(f, cv2.IMREAD_UNCHANGED)
454         elif self.cache_disk:
455             if not fn.exists(): # load npy
456                 np.save(fn.as_posix(), cv2.imread(f, cv2.IMREAD_UNCHANGED), allow_pickle=False)
457             im = np.load(fn)
458         else: # read image
459             im = cv2.imread(f, cv2.IMREAD_UNCHANGED) # BGR
460         # Convert NumPy array to PIL image
461
462
463 data/loaders.py:
362     self.mode = "image"
363     im0 = cv2.imread(path, cv2.IMREAD_UNCHANGED) # BGR
364     if im0 is None:
365
366
367 data/split_data.py:
166     """
167     im = cv2.imread(annotation["filepath"], cv2.IMREAD_UNCHANGED)
168     name = Path(annotation["filepath"]).stem
169
170     windows = get_windows((h, w), crop_sizes=crop_sizes, gaps=gaps)
171     im = cv2.imread(im_file, cv2.IMREAD_UNCHANGED)
172     name = Path(im_file).stem
173
174
175 data/utils.py:
612     LOGGER.info(f"WARNING ⚠️ HUB ops PIL failure {f}: {e}")
613     im = cv2.imread(f, cv2.IMREAD_UNCHANGED)
614     im_height, im_width = im.shape[:2]
615
616
617 data/explorer/explorer.py:
33         else: # read image
34             im = cv2.imread(f, cv2.IMREAD_UNCHANGED) # BGR
35             if im is None:
35
35
36 data/explorer/utils.py:
82     for i, imf in enumerate(images):
83         im = cv2.imread(imf, cv2.IMREAD_UNCHANGED)
84         print('HERE AT READING IN data/explorer/utils.py', im.shape)
85
86
87 utils/_init_.py:
1089 # Apply monkey patches
1090 from .patches import imread, imshow, imwrite, torch_save
1091
1092
1093 # Apply cv2 patches for non-ASCII and non-UTF characters in image paths
1094 cv2.imread, cv2.imwrite, cv2.imshow = imread, imwrite, imshow
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23

utils/plotting.py:
758     xyxy = [50, 50, 150, 150]
759     im = cv2.imread('image.jpg')
760     cropped_im = save_one_box(xyxy, im, file='cropped.jpg', square=True)

utils/callbacks/clearml.py:
47
48:     img = mpimg.imread(plot_path)
49     fig = plt.figure()

utils/callbacks/neptune.py:
43
44:     img = mpimg.imread(plot_path)
45     fig = plt.figure()
```

**In tasks.py-ban there are ch=3 defaults:**

## Change in tensorboard.py:

```
tensorboard.py - ultralytics [SSH: neumann] - Visual Studio Code

File Edit Selection View Go Run Terminal Help

SEARCH ... ○ Search: imread ○ Search: channel ✎ tasks.py 9+ ○ Search:tensorboard ✎ tensorflow.py 3 x ✎ clearml.py 6
utils > callbacks > tensorflow.py 5 _log_tensorboard_graph
21 except (ImportError, AssertionError, TypeError, AttributeError):
22     # TypeError for handling 'Descriptors cannot not be created directly.' protobuf errors in Windows
23     # AttributeError: module 'tensorflow' has no attribute 'io' if 'tensorflow' not installed
24     SummaryWriter = None
25
26
27 def _log_scalars(scalars, step=0):
28     """Logs scalar values to TensorBoard."""
29     WRITER:
30         for k, v in scalars.items():
31             WRITER.add_scalar(k, v, step)
32
33
34 def _log_tensorboard_graph(trainer):
35     """Log model graph to TensorBoard."""
36
37     # Input image
38     imgsz = trainer.args.imgsz
39     imgsz = (imgsz, imgsz) if isinstance(imgsz, int) else imgsz
40     p = next(trainer.model.parameters()) # for device, type
41     #im = torch.zeros((1, 3, *imgsz), device=p.device, dtype=p.dtype) # input image (must be zeros, not empty)
42     im = torch.zeros([1, 4, *imgsz], device=p.device, dtype=p.dtype) # input image (must be zeros, not empty)
43
44     with warnings.catch_warnings():
45         warnings.simplefilter("ignore", category=UserWarning) # suppress jit trace warning
46         warnings.simplefilter("ignore", category=torch.jit.TracerWarning) # suppress jit trace warning
47
48         # Try simple method first (YOLO)
```