```python
from ultralytics import YOLO
from paddleocr import PaddleOCR
import cv2
import pandas as pd
import os
import glob
import numpy as np

def process_images(image_dir, output_csv):
    yolo_model = YOLO('runs/obb/train/weights/best.pt')
    ocr = PaddleOCR(lang='en', use_gpu=False, det_db_thresh=0.3,
rec_thresh=0.65)
    results_list = []

    for img_path in glob.glob(os.path.join(image_dir, '*.jpg')):
        if '_debug' in img_path:
            continue

        image = cv2.imread(img_path)
        predictions = yolo_model.predict(image, conf=0.1)[0]

        image_results = {
            'GTIN': '',
            'SR_NO': '',
            'LOT': '',
            'EXP': '',
            'image_name': os.path.basename(img_path)
        }

        if predictions.obb:
            boxes = predictions.obb.xyxyxyxy.cpu().numpy()
            classes = predictions.obb.cls.cpu().numpy()

            for box, cls_id in zip(boxes, classes):
                try:
                    box_int = box.astype(np.int32)
                    x_min, y_min = np.min(box_int, axis=0)
                    x_max, y_max = np.max(box_int, axis=0)

                    roi = image[y_min:y_max, x_min:x_max]
                    pad = 2
                    roi = cv2.copyMakeBorder(roi, pad, pad, pad, pad,
                                        cv2.BORDER_CONSTANT,
value=[255,255,255])

                    result = ocr.ocr(roi)
                    if result[0]:
                        text = result[0][0][1][0].strip()
                        class_name = yolo_model.names[int(cls_id)]
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```python
                            # Clean and format text based on class
                            if class_name == 'GTIN':
                                text = ''.join(c for c in text if
c.isdigit())

                            elif class_name == 'SR NO':
                                text = ''.join(c for c in text if
c.isdigit())

                            elif class_name == 'EXP':
                                if '/' in text:
                                    text = text.replace('EXP', '').strip()
                            elif class_name == 'LOT':
                                text = text.replace('LOT', '').strip()
                                if text.startswith('T'):
                                    text = 'U' + text[1:]  # Replace T with
U for common OCR error

                            image_results[class_name.replace(' ', '_')] =
text

                except Exception as e:
                    print(f"Error processing box: {e}")
                    continue

        results_list.append(image_results)

    df = pd.DataFrame(results_list)
    df.to_csv(output_csv, index=False)
    return df

# Usage for each dataset split
splits = ['test']
for split in splits:
    input_dir = f'C:/Users/aarya/Videos/New PaddleOCR/{split}/images'
    output_csv = f'{split}_results.csv'
    results = process_images(input_dir, output_csv)
```

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[2024/11/29 11:37:58] ppocr DEBUG: Namespace(help='==SUPPRESS==',
use_gpu=False, use_xpu=False, use_npu=False, use_mlu=False,
ir_optim=True, use_tensorrt=False, min_subgraph_size=15,
precision='fp32', gpu_mem=500, gpu_id=0, image_dir=None, page_num=0,
det_algorithm='DB', det_model_dir='C:\\Users\\aarya/.paddleocr/whl\\
det\\en\\en_PP-OCRv3_det_infer', det_limit_side_len=960,
det_limit_type='max', det_box_type='quad', det_db_thresh=0.3,
det_db_box_thresh=0.6, det_db_unclip_ratio=1.5, max_batch_size=10,
use_dilation=False, det_db_score_mode='fast',
det_east_score_thresh=0.8, det_east_cover_thresh=0.1,
det_east_nms_thresh=0.2, det_sast_score_thresh=0.5,
det_sast_nms_thresh=0.2, det_pse_thresh=0, det_pse_box_thresh=0.85,
det_pse_min_area=16, det_pse_scale=1, scales=[8, 16, 32], alpha=1.0,
beta=1.0, fourier_degree=5, rec_algorithm='SVTR_LCNet',
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rec_model_dir='C:\\Users\\aarya/.paddleocr/whl\\rec\\en\\en_PP-
OCRv4_rec_infer', rec_image_inverse=True, rec_image_shape='3, 48,
320', rec_batch_num=6, max_text_length=25, rec_char_dict_path='C:\\
Users\\aarya\\anaconda3\\envs\\paddleocr\\lib\\site-packages\\
paddleocr\\ppocr\\utils\\en_dict.txt', use_space_char=True,
vis_font_path='./doc/fonts/simfang.ttf', drop_score=0.5,
e2e_algorithm='PGNet', e2e_model_dir=None, e2e_limit_side_len=768,
e2e_limit_type='max', e2e_pgnet_score_thresh=0.5,
e2e_char_dict_path='./ppocr/utils/ic15_dict.txt',
e2e_pgnet_valid_set='totaltext', e2e_pgnet_mode='fast',
use_angle_cls=False, cls_model_dir='C:\\Users\\aarya/.paddleocr/whl\\
cls\\ch_ppocr_mobile_v2.0_cls_infer', cls_image_shape='3, 48, 192',
label_list=['0', '180'], cls_batch_num=6, cls_thresh=0.9,
enable_mkldnn=False, cpu_threads=10, use_pdserving=False,
warmup=False, sr_model_dir=None, sr_image_shape='3, 32, 128',
sr_batch_num=1, draw_img_save_dir='./inference_results',
save_crop_res=False, crop_res_save_dir='./output', use_mp=False,
total_process_num=1, process_id=0, benchmark=False,
save_log_path='./log_output/', show_log=True, use_onnx=False,
return_word_box=False, output='./output', table_max_len=488,
table_algorithm='TableAttn', table_model_dir=None,
merge_no_span_structure=True, table_char_dict_path=None,
formula_algorithm='LaTeXOCR', formula_model_dir=None,
formula_char_dict_path=None, formula_batch_num=1,
layout_model_dir=None, layout_dict_path=None,
layout_score_threshold=0.5, layout_nms_threshold=0.5,
kie_algorithm='LayoutXLM', ser_model_dir=None, re_model_dir=None,
use_visual_backbone=True,
ser_dict_path='../train_data/XFUND/class_list_xfun.txt',
ocr_order_method=None, mode='structure', image_orientation=False,
layout=True, table=True, formula=False, ocr=True, recovery=False,
recovery_to_markdown=False, use_pdf2docx_api=False, invert=False,
binarize=False, alphacolor=(255, 255, 255), lang='en', det=True,
rec=True, type='ocr', savefile=False, ocr_version='PP-OCRv4',
structure_version='PP-StructureV2', rec_thresh=0.65)

0: 640x640 10.7ms
Speed: 3.9ms preprocess, 10.7ms inference, 89.7ms postprocess per
image at shape (1, 3, 640, 640)
[2024/11/29 11:38:01] ppocr WARNING: Since the angle classifier is not
initialized, it will not be used during the forward process
[2024/11/29 11:38:01] ppocr DEBUG: dt_boxes num : 1, elapsed :
0.10295534133911133
[2024/11/29 11:38:01] ppocr DEBUG: rec_res num  : 1, elapsed :
0.16553497314453125
[2024/11/29 11:38:01] ppocr WARNING: Since the angle classifier is not
initialized, it will not be used during the forward process
[2024/11/29 11:38:01] ppocr DEBUG: dt_boxes num : 1, elapsed :
0.07389116287231445
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[2024/11/29 11:38:01] ppocr DEBUG: rec_res num  : 1, elapsed :
0.11197757720947266
[2024/11/29 11:38:01] ppocr WARNING: Since the angle classifier is not
initialized, it will not be used during the forward process
[2024/11/29 11:38:01] ppocr DEBUG: dt_boxes num : 1, elapsed :
0.00600123405456543
[2024/11/29 11:38:02] ppocr DEBUG: rec_res num  : 1, elapsed :
0.07239890098571777
[2024/11/29 11:38:02] ppocr WARNING: Since the angle classifier is not
initialized, it will not be used during the forward process
[2024/11/29 11:38:02] ppocr DEBUG: dt_boxes num : 1, elapsed :
0.00854802131652832
[2024/11/29 11:38:02] ppocr DEBUG: rec_res num  : 1, elapsed :
0.1395280361175537

0: 640x640 11.2ms
Speed: 2.0ms preprocess, 11.2ms inference, 2.0ms postprocess per image
at shape (1, 3, 640, 640)
[2024/11/29 11:38:02] ppocr WARNING: Since the angle classifier is not
initialized, it will not be used during the forward process
[2024/11/29 11:38:02] ppocr DEBUG: dt_boxes num : 1, elapsed :
0.006529331207275391
[2024/11/29 11:38:02] ppocr DEBUG: rec_res num  : 1, elapsed :
0.11293363571166992
[2024/11/29 11:38:02] ppocr WARNING: Since the angle classifier is not
initialized, it will not be used during the forward process
[2024/11/29 11:38:02] ppocr DEBUG: dt_boxes num : 1, elapsed :
0.006890773773193359
[2024/11/29 11:38:02] ppocr DEBUG: rec_res num  : 1, elapsed :
0.06387782096862793
[2024/11/29 11:38:02] ppocr WARNING: Since the angle classifier is not
initialized, it will not be used during the forward process
[2024/11/29 11:38:02] ppocr DEBUG: dt_boxes num : 1, elapsed :
0.008033037185668945
[2024/11/29 11:38:02] ppocr DEBUG: rec_res num  : 1, elapsed :
0.0678870677947998
[2024/11/29 11:38:02] ppocr WARNING: Since the angle classifier is not
initialized, it will not be used during the forward process
[2024/11/29 11:38:02] ppocr DEBUG: dt_boxes num : 1, elapsed :
0.009219169616699219
[2024/11/29 11:38:02] ppocr DEBUG: rec_res num  : 1, elapsed :
0.08842730522155762

0: 640x640 12.6ms
Speed: 2.0ms preprocess, 12.6ms inference, 2.0ms postprocess per image
at shape (1, 3, 640, 640)
[2024/11/29 11:38:02] ppocr WARNING: Since the angle classifier is not
initialized, it will not be used during the forward process
[2024/11/29 11:38:02] ppocr DEBUG: dt_boxes num : 1, elapsed :
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0.0070514678955078125
[2024/11/29 11:38:02] ppocr DEBUG: rec_res num  : 1, elapsed :
0.10683727264404297
[2024/11/29 11:38:02] ppocr WARNING: Since the angle classifier is not
initialized, it will not be used during the forward process
[2024/11/29 11:38:02] ppocr DEBUG: dt_boxes num : 1, elapsed :
0.01169443130493164
[2024/11/29 11:38:02] ppocr DEBUG: rec_res num  : 1, elapsed :
0.06426429748535156
[2024/11/29 11:38:02] ppocr WARNING: Since the angle classifier is not
initialized, it will not be used during the forward process
[2024/11/29 11:38:02] ppocr DEBUG: dt_boxes num : 1, elapsed :
0.010361194610595703
[2024/11/29 11:38:02] ppocr DEBUG: rec_res num  : 1, elapsed :
0.06523323059082031
[2024/11/29 11:38:02] ppocr WARNING: Since the angle classifier is not
initialized, it will not be used during the forward process
[2024/11/29 11:38:02] ppocr DEBUG: dt_boxes num : 1, elapsed :
0.0073511600494384766
[2024/11/29 11:38:02] ppocr DEBUG: rec_res num  : 1, elapsed :
0.1225442886352539

0: 640x640 10.6ms
Speed: 2.0ms preprocess, 10.6ms inference, 3.0ms postprocess per image
at shape (1, 3, 640, 640)
[2024/11/29 11:38:03] ppocr WARNING: Since the angle classifier is not
initialized, it will not be used during the forward process
[2024/11/29 11:38:03] ppocr DEBUG: dt_boxes num : 1, elapsed :
0.00699925422668457
[2024/11/29 11:38:03] ppocr DEBUG: rec_res num  : 1, elapsed :
0.08338022232055664
[2024/11/29 11:38:03] ppocr WARNING: Since the angle classifier is not
initialized, it will not be used during the forward process
[2024/11/29 11:38:03] ppocr DEBUG: dt_boxes num : 1, elapsed :
0.006531953811645508
[2024/11/29 11:38:03] ppocr DEBUG: rec_res num  : 1, elapsed :
0.0695652961730957
[2024/11/29 11:38:03] ppocr WARNING: Since the angle classifier is not
initialized, it will not be used during the forward process
[2024/11/29 11:38:03] ppocr DEBUG: dt_boxes num : 1, elapsed :
0.007717609405517578
[2024/11/29 11:38:03] ppocr DEBUG: rec_res num  : 1, elapsed :
0.06463098526000977
[2024/11/29 11:38:03] ppocr WARNING: Since the angle classifier is not
initialized, it will not be used during the forward process
[2024/11/29 11:38:03] ppocr DEBUG: dt_boxes num : 1, elapsed :
0.008745670318603516
[2024/11/29 11:38:03] ppocr DEBUG: rec_res num  : 1, elapsed :
0.10178184509277344
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0.007082700729370117
[2024/11/29 11:38:18] ppocr DEBUG: rec_res num  : 1, elapsed :
0.06768131256103516
[2024/11/29 11:38:18] ppocr WARNING: Since the angle classifier is not
initialized, it will not be used during the forward process
[2024/11/29 11:38:18] ppocr DEBUG: dt_boxes num : 1, elapsed :
0.0075511932373046875
[2024/11/29 11:38:18] ppocr DEBUG: rec_res num  : 1, elapsed :
0.08728551864624023
[2024/11/29 11:38:18] ppocr WARNING: Since the angle classifier is not
initialized, it will not be used during the forward process
[2024/11/29 11:38:18] ppocr DEBUG: dt_boxes num : 1, elapsed :
0.007516622543334961
[2024/11/29 11:38:18] ppocr DEBUG: rec_res num  : 1, elapsed :
0.06909537315368652
[2024/11/29 11:38:18] ppocr WARNING: Since the angle classifier is not
initialized, it will not be used during the forward process
[2024/11/29 11:38:18] ppocr DEBUG: dt_boxes num : 1, elapsed :
0.005999565124511719
[2024/11/29 11:38:18] ppocr DEBUG: rec_res num  : 1, elapsed :
0.16256976127624512

0: 640x640 82.8ms
Speed: 4.5ms preprocess, 82.8ms inference, 4.0ms postprocess per image
at shape (1, 3, 640, 640)
[2024/11/29 11:38:18] ppocr WARNING: Since the angle classifier is not
initialized, it will not be used during the forward process
[2024/11/29 11:38:18] ppocr DEBUG: dt_boxes num : 1, elapsed :
0.012148857116699219
[2024/11/29 11:38:18] ppocr DEBUG: rec_res num  : 1, elapsed :
0.0723569393157959
[2024/11/29 11:38:18] ppocr WARNING: Since the angle classifier is not
initialized, it will not be used during the forward process
[2024/11/29 11:38:18] ppocr DEBUG: dt_boxes num : 1, elapsed :
0.007009029388427734
[2024/11/29 11:38:19] ppocr DEBUG: rec_res num  : 1, elapsed :
0.10768556594848633
[2024/11/29 11:38:19] ppocr WARNING: Since the angle classifier is not
initialized, it will not be used during the forward process
[2024/11/29 11:38:19] ppocr DEBUG: dt_boxes num : 1, elapsed :
0.007515668869018555
[2024/11/29 11:38:19] ppocr DEBUG: rec_res num  : 1, elapsed :
0.11177206039428711
[2024/11/29 11:38:19] ppocr WARNING: Since the angle classifier is not
initialized, it will not be used during the forward process
[2024/11/29 11:38:19] ppocr DEBUG: dt_boxes num : 1, elapsed :
0.0060579776763916016
[2024/11/29 11:38:19] ppocr DEBUG: rec_res num  : 1, elapsed :
0.06503582000732422
```

```
0: 640x640 15.0ms
Speed: 2.0ms preprocess, 15.0ms inference, 3.0ms postprocess per image
at shape (1, 3, 640, 640)
[2024/11/29 11:38:19] ppocr WARNING: Since the angle classifier is not
initialized, it will not be used during the forward process
[2024/11/29 11:38:19] ppocr DEBUG: dt_boxes num : 1, elapsed :
0.00651860237121582
[2024/11/29 11:38:19] ppocr DEBUG: rec_res num  : 1, elapsed :
0.0699317455291748
[2024/11/29 11:38:19] ppocr WARNING: Since the angle classifier is not
initialized, it will not be used during the forward process
[2024/11/29 11:38:19] ppocr DEBUG: dt_boxes num : 1, elapsed :
0.006520748138427734
[2024/11/29 11:38:19] ppocr DEBUG: rec_res num  : 1, elapsed :
0.0705881118774414
[2024/11/29 11:38:19] ppocr WARNING: Since the angle classifier is not
initialized, it will not be used during the forward process
[2024/11/29 11:38:19] ppocr DEBUG: dt_boxes num : 1, elapsed :
0.008514881134033203
[2024/11/29 11:38:19] ppocr DEBUG: rec_res num  : 1, elapsed :
0.10849666595458984
[2024/11/29 11:38:19] ppocr WARNING: Since the angle classifier is not
initialized, it will not be used during the forward process
[2024/11/29 11:38:19] ppocr DEBUG: dt_boxes num : 1, elapsed :
0.011668920516967773
[2024/11/29 11:38:19] ppocr DEBUG: rec_res num  : 1, elapsed :
0.09421300888061523
```