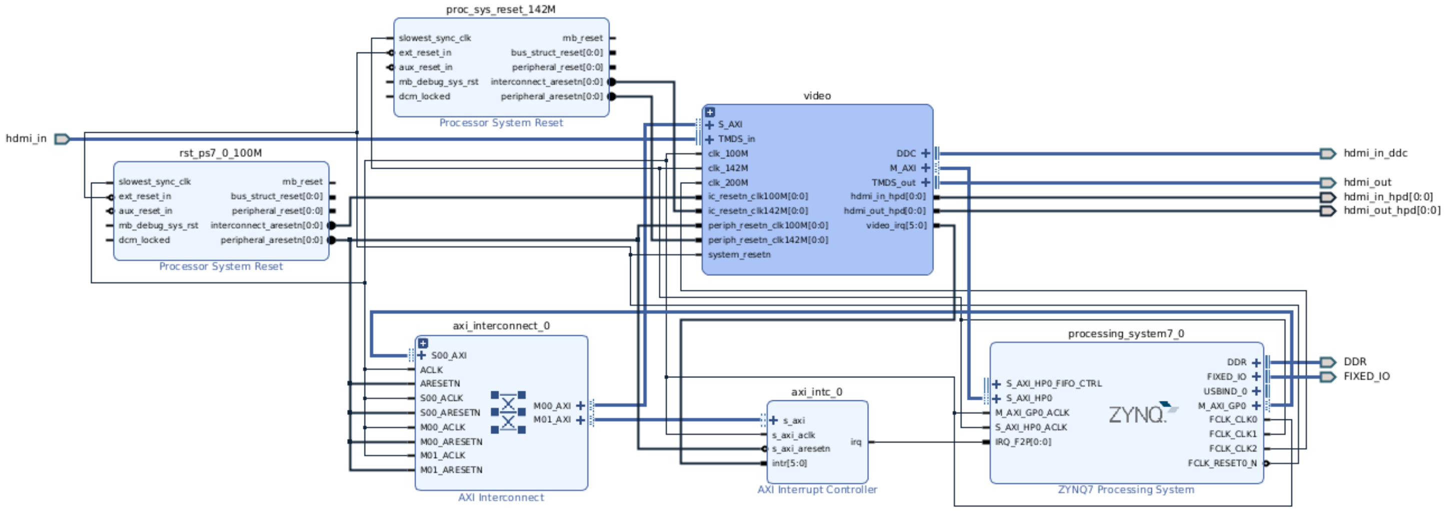
2.python驱动 HDMI out

可以使用pynq 构架来方便产生HDMI out

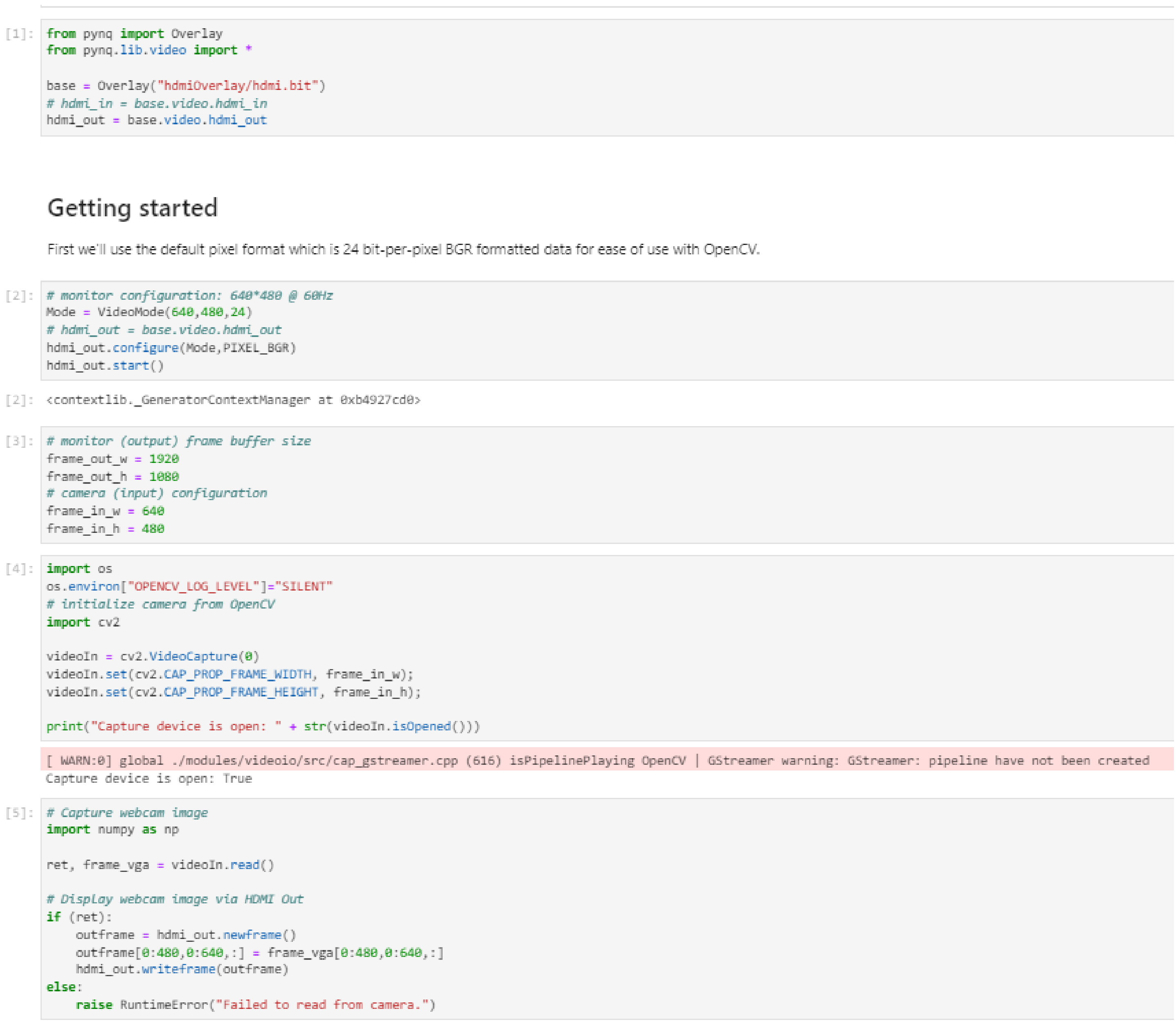
使用如下overlay 设计



注意：这里也实现了一个HDMI in, 需要将hdmi_clk 引脚约束至具有MRCC(多区时钟能力) 或SRCC(单区时钟能力)的引脚上，因此，目前的z7core v2.0版无法实现HDMI in，这一点也同样对HDMI out的时钟引脚相同

生成 xsa后，提取.bit 和hwh, 上传pynq z2板

编写如下简单代码



```
[1]: from pynq import Overlay
     from pynq.lib.video import *

     base = Overlay("hdmiOverlay/hdmi.bit")
     # hdmi_in = base.video.hdmi_in
     hdmi_out = base.video.hdmi_out
```

Getting started

First we'll use the default pixel format which is 24 bit-per-pixel BGR formatted data for ease of use with OpenCV.

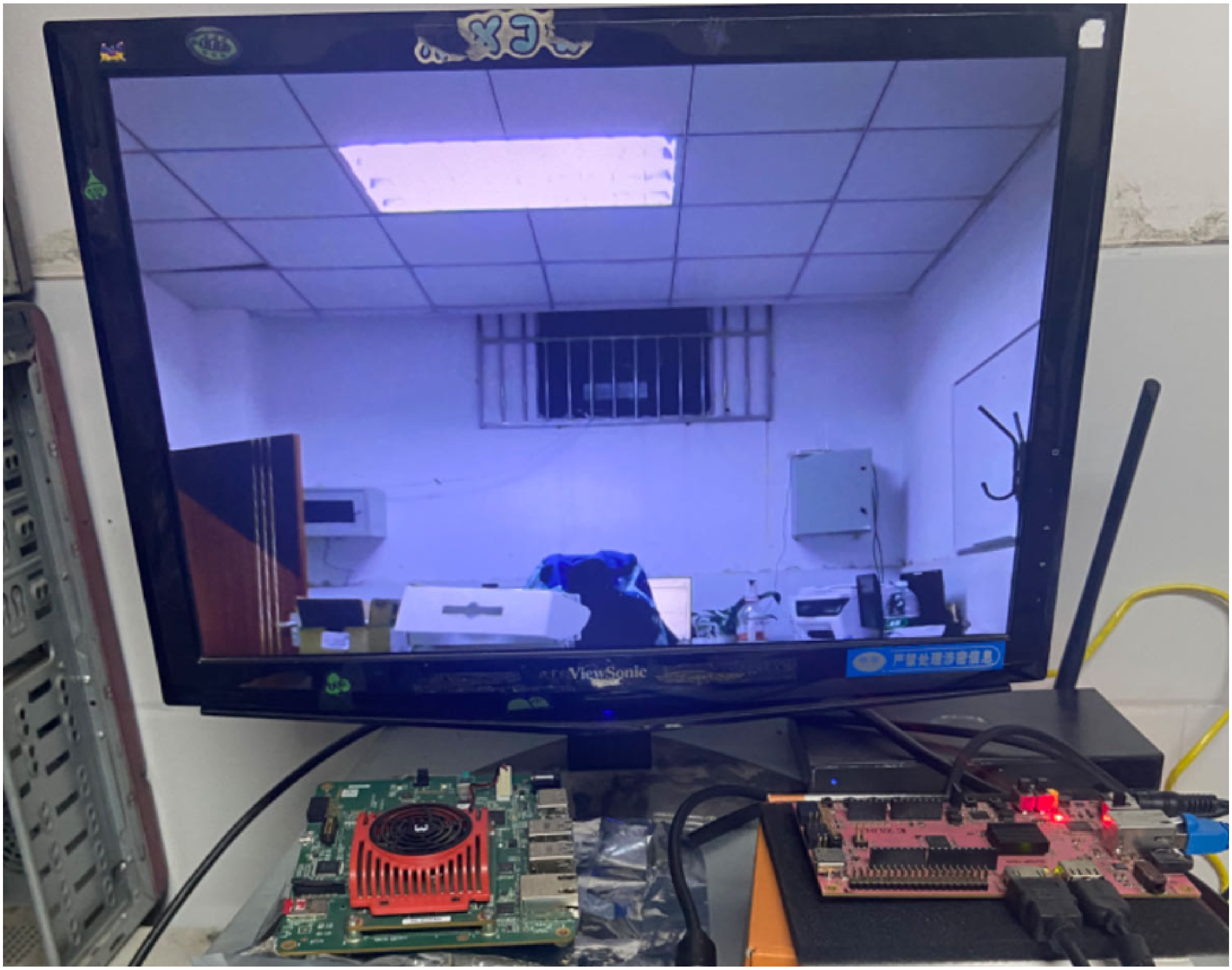
```
[2]: # monitor configuration: 640*480 @ 60Hz
     Mode = VideoMode(640,480,24)
     # hdmi_out = base.video.hdmi_out
     hdmi_out.configure(Mode,PIXEL_BGR)
     hdmi_out.start()

[2]: <contextlib._GeneratorContextManager at 0xb4927cd0>
```

```
[3]: # monitor (output) frame buffer size
     frame_out_w = 1920
     frame_out_h = 1080
     # camera (input) configuration
     frame_in_w = 640
     frame_in_h = 480
```

```
[4]: import os
     os.environ["OPENCV_LOG_LEVEL"]="SILENT"
     # initialize camera from OpenCV
     import cv2

     videoIn = cv2.VideoCapture(0)
     videoIn.set(cv2.CAP_PROP_FRAME_WIDTH, frame_in_w);
     videoIn.set(cv2.CAP_PROP_FRAME_HEIGHT, frame_in_h);

     print("Capture device is open: " + str(videoIn.isOpened()))

     [ WARN:0] global ./modules/videoio/src/cap_gstreamer.cpp (616) isPipelinePlaying OpenCV | GStreamer warning: GStreamer: pipeline have not been created
     Capture device is open: True
```

```
[5]: # Capture webcam image
     import numpy as np

     ret, frame_vga = videoIn.read()

     # Display webcam image via HDMI Out
     if (ret):
         outframe = hdmi_out.newframe()
         outframe[0:480,0:640,:] = frame_vga[0:480,0:640,:]
         hdmi_out.writeframe(outframe)
     else:
         raise RuntimeError("Failed to read from camera.")
```

可以实现web camera 至hdmi out的显示



上述演示，推论numpy 成像结果可以方便显示至HDMI out

可直接下载测试在 https://github.com/chenguoping76/pynq_new_cases

hdmiOverlay.ipynb和hdmiOverlay.rar